Supporting Information

Transition metal free decarboxylative fluoroalkylation of *N*-acrylamides with 3,3,3-trifluoro-2,2-dimethylpropanoic Acid (TFDMPA)

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1. General Information.

^{1}H and ^{19}F NMR spectra were recorded on a Bruker AM 400 or 600 spectrometer. ^{13}C NMR spectra were recorded on a Bruker AM 400. Chemical shifts (δ) were reported in ppm, and coupling constants (*J*) were in Hertz (Hz). The following abbreviations were used to explain the multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet.

Materials: Unless otherwise noted, all reagents were obtained commercially and used without further purification. Reactions were performed using glassware that was flame-dried under vacuum.

2. Preparation of Substrates:

General Procedures for the Synthesis of Substrates 1:

All the substrates were synthesized according to the literature[1], and the NMR spectroscopy were consisted with those data reported.

The physical and spectroscopic data of substrate (**1b**, **1c**) were in full accordance with the data reported in literature.[2]

The physical and spectroscopic data of substrate (**1d ,1e, 1f, 1g, 1i, 1k, 1m, 1v, 1w**) were in full accordance with the data reported in literature.[3]

The physical and spectroscopic data of substrate (**1j**) were in full accordance with the data reported in literature.[4]

The physical and spectroscopic data of substrate (**1h**) were in full accordance with the data reported in literature.[5]

The physical and spectroscopic data of substrate (**1l**) were in full accordance with the data reported in literature.[6]

Reference:

[1] X. Mu, T. Wu, H. Y. Wang, Y. L. Guo, G. Liu, *J. Am. Chem. Soc.* 2012, **134**, 878.

[2] W. Wei, J. Wen, M. Guo, H. Wang, *RSC Adv.*, 2014, **4**, 48535.

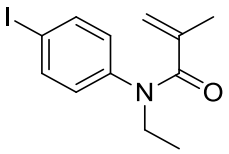
[3] F. Yin, and X.S. Wang, *Org. Lett.*, 2014, **16**,1128.

[4] C. C. Li, and S. D. Yang, *Org. Lett.*, 2015, **17**, 2142.

[5] Q. Dai, J. Yu, Y. Jiang, S. Guo, H. Yang and J. Cheng, *Chem. Commun.*, 2014, **50**, 3865.

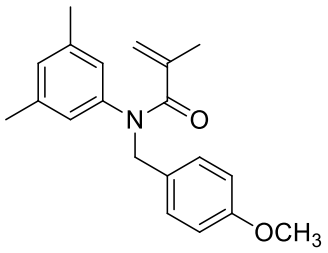
[6]W. Fu, F. Xu, Y. Fu, C. Xu, S. Li, D. Zou, *Eur. J. Org. Chem*. **2014**, 709

3. Physical and Spectroscopic Data of Substrates

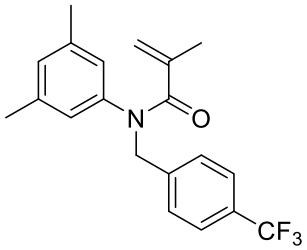


N-ethyl-N-(4-iodophenyl)methacrylamide(1n) (1.06 g, 90%): White solid. m.p. 67-69 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ7.60 (d, *J* = 1.3 Hz, 1H), 7.58 (d, *J* = 1.4 Hz, 1H), 6.80 (d, *J* = 0.7 Hz, 1H), 6.78 (s, 1H), 4.97 (d, *J* = 1.1 Hz, 1H), 4.89 (s, 1H), 3.75-3.69 (m, 2H). 1.69 (s, 3H), 1.05 (td, *J* = 7.1, 1.3 Hz, 3H). ^{13}C NMR

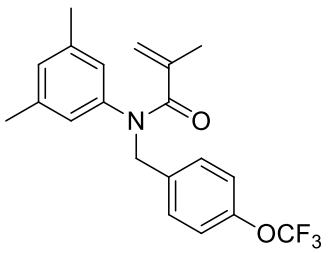
(101 MHz, $CDCl_3$) δ 171.26, 142.72, 140.68, 138.37, 129.42, 119.51, 91.88, 44.54, 20.36, 12.97. ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.26, 142.72, 140.68, 138.37, 129.42, 119.51, 91.88, 44.54, 20.36, 12.97. IR (thin film): v 1621, 1488, 1376, 1231, 1137, 1013, 925cm-1. MS (EI) *m/z*: 316 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{12}H_{15}INO$ $[M+H]^+$: 316.0193; found: 316.0194.



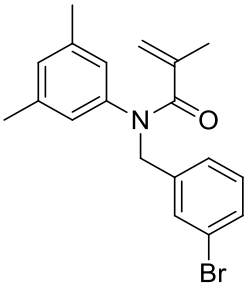
N-(3,5-dimethylphenyl)-N-(4-methoxybenzyl)methacrylamide(1o) (1.31g, 57%): White solid. m.p. 96-98 °C. ^1H NMR (400 MHz, $CDCl_3$) δ 7.14-7.05 (m, 2H), 6.76 (s, 1H), 6.72 (d, *J* = 8.7 Hz, 2H), 6.49 (s, 2H), 4.92 (s, 2H), 4.78 (s, 2H), 3.69 (s, 3H), 2.15 (s, 6H), 1.69 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.74, 157.76, 142.03, 139.92, 137.55, 128.87, 128.80, 127.67, 124.17, 117.88, 112.65, 54.16, 51.63, 20.12, 19.43. IR (thin film): v 2923, 1618, 1600, 1512, 1249, 1182, 925, 859cm-1. MS (EI) *m/z*: 310 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{20}H_{24}NO_2$ $[M+H]^+$: 310.1802; found: 310.1802.



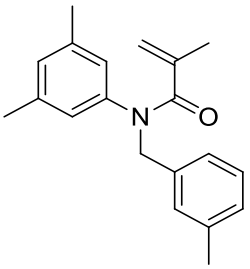
N-(3,5-dimethylphenyl)-N-(4-(trifluoromethyl)benzyl)methacrylamide(1p) (2.05g, 79%): White solid. m.p. 68-70 °C. ^1H NMR (400 MHz, $CDCl_3$) δ 7.45 (d, *J* = 8.1 Hz, 2H), 7.28 (d, *J* = 8.0 Hz, 2H), 6.74 (d, *J* = 25.7 Hz, 1H), 6.52 (s, 2H), 4.97 (d, *J* = 1.3 Hz, 2H), 4.89 (s, 2H), 2.15 (s, 6H), 1.70 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -62.46 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.93, 141.94, 140.75, 140.74, 139.53, 137.92, 128.46 (q, *J* = 32.32 Hz), 127.95, 127.55, 124.37, 124.33, 124.30, 124.26, 123.81, 123.17 (q, *J* = 272.7 Hz), 118.57, 51.98, 20.09, 19.32. IR (thin film): v 2917, 1633, 1367, 1334, 1164, 1107, 916, 853cm-1. MS (EI) *m/z*: 348 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{20}H_{21}F_3NO$ $[M+H]^+$: 348.1570; found: 348.1572.



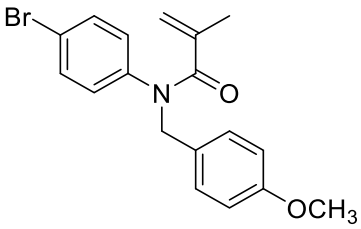
N-(3,5-dimethylphenyl)-N-(4-(trifluoromethoxy)benzyl)methacrylamide(1q) (1.18g,87%):Whit-e solid. m.p. 76-78 °C. ^1H NMR (400 MHz, $CDCl_3$) δ 7.18 (d, *J* = 8.6 Hz, 2H), 7.03 (d, *J* = 8.1 Hz, 2H), 6.77 (s, 1H), 6.49 (s, 2H), 4.95 (d, *J* = 1.2 Hz, 2H), 4.83 (s, 2H), 2.14 (s, 6H), 1.69 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.89, 148.42, 148.40, 142.89, 140.65, 138.86, 136.47, 129.87, 128.93, 125.02, 120.83, 120.48 (q, *J* = 257.55 Hz), 119.41, 52.63, 21.08, 20.36. IR (KBr): v 1657, 1509, 1255, 1161, 938, 705cm-1. MS (EI) *m/z*: 364 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{20}H_{21}F_3NO_2$ $[M+H]^+$: 364.1519; found: 364.1519.



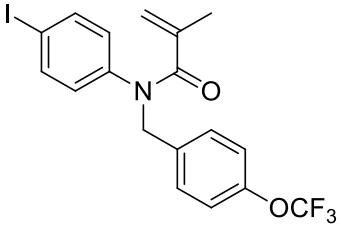
N-(3-bromobenzyl)-N-(3,5-dimethylphenyl)methacrylamide(1r) (2.49g, 93%): White solid. m.p. 67-69 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.09 (d, *J* = 1.9 Hz, 1H), 7.07 (d, *J* = 1.9 Hz, 1H). 6.78 (s, 1H), 6.51 (s, 2H), 4.96 (d, *J* = 1.2 Hz, 2H), 4.80 (s, 2H), 2.16 (s, 6H), 1.70 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.83, 141.87, 139.58, 138.97, 137.81, 130.31, 129.35, 128.92, 127.91, 125.93, 123.92, 121.34, 118.41, 51.72, 20.13, 19.36. IR (thin film): v 2920, 1654, 1590, 1376, 1324, 925, 856cm-1. MS (EI) *m/z*: 358 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{19}H_{21}BrNO$ $[M+H]^+$: 358.0801; found: 358.0802.



N-(3,5-dimethylphenyl)-N-(3-methylbenzyl)methacrylamide(1s) (1.61g, 74%): White solid. m.p. 56-58 °C. 1H NMR (400 MHz, CDCl3) δ 7.16 (t, *J* = 7.5 Hz, 1H), 7.07 (s, 1H), 7.03 (t, *J* = 7.5 Hz, 2H), 6.84 (s, 1H), 6.60 (s, 2H), 5.10-4.98 (m, 2H), 4.89 (s, 2H), 2.30 (s, 3H), 2.22 (s, 6H), 1.79 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.86, 143.28, 140.95, 138.61, 137.94, 137.69, 129.07, 128.71, 128.23, 127.96, 125.33, 125.06, 119.04, 53.27, 21.43, 21.17, 20.47. IR (thin film): v 1624, 1600, 1391, 1321, 1219, , 919, 859, 783cm-1. MS (EI) *m/z*: 294 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{20}H_{24}NO$ $[M+H]^+$: 294.1852; found: 294.1852.



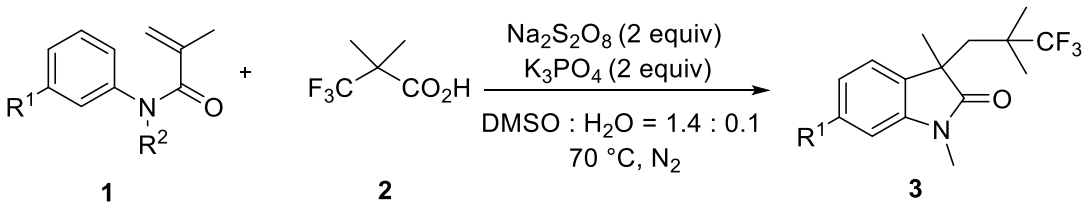
N-(4-bromophenyl)-N-(4-methoxybenzyl)methacrylamide (1t) (1.733g, 80%): White solid. m.p. 86-89 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.30 (dd, *J* = 6.8, 1.9 Hz, 2H), 7.04 (d, *J* = 8.4 Hz, 2H), 6.75 (s, 1H), 6.73 (s, 1H), 6.71 (s, 1H), 4.97 (d, *J* = 0.9 Hz, 1H), 4.90 (s, 1H), 4.79 (s, 1H), 3.70 (s, 3H), 1.70 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.51, 157.95, 141.07, 139.45, 131.20, 128.86, 128.23, 128.19, 119.73, 118.65, 112.84, 54.16, 51.40, 19.39. IR (thin film): v 2926, 1624, 1512, 1246, 1010, 916, 817cm-1. MS (EI) *m/z*: 360 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{18}H_{19}BrNO_2$ $[M+H]^+$: 360.0594; found: 360.0597.



N-(4-iodophenyl)-N-(4-(trifluoromethoxy)benzyl)methacrylamide(1u) (1.63g, 95%): White solid. m.p. 78-80 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.57-7.46 (m, 2H), 7.19 (dd, *J* = 18.8, 14.3 Hz, 2H), 7.05 (d, *J* = 8.5 Hz, 2H), 6.69-6.47 (m, 2H), 5.02 (d, *J* = 0.8 Hz, 1H), 4.94 (s, 1H), 4.85 (s, 2H), 1.71 (s, 3H). ^{19}F NMR (377

MHz, $CDCl_3$) δ -57.83 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 171.63, 148.61, 142.78, 140.17, 138.46, 135.84, 129.88, 129.20, 121.00, 120.43 (q, *J* = 258.56 Hz), 120.30, 92.26, 52.42, 20.34. IR (thin film): v 1621, 1494, 1210, 1149, 1004, 916, 829cm-1. MS (EI) *m/z*: 462 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{18}H_{16}F_3INO_2$ $[M+H]^+$: 462.0172; found: 462.0175.

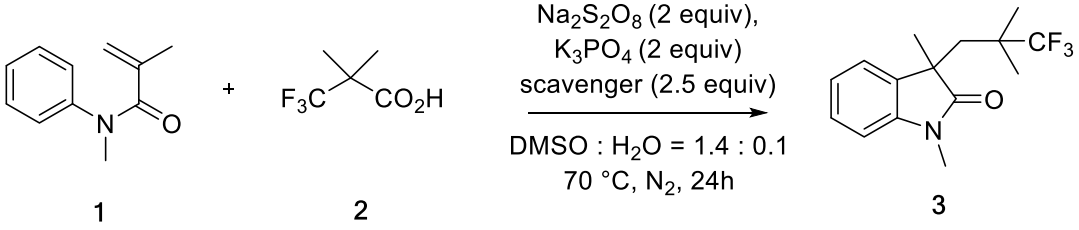
4. General procedures for the synthesis of oxindole derivatives



1 2 3

A mixture of **1** (0.8 mmol, 1.0 equiv.), **2** (2.4 mmol, 3.0 equiv.), K_3PO_4 (1.6 mmol, 2 equiv.) and $Na_2S_2O_8$ (1.6 mmol, 2 equiv.) in DMSO: H_2O =14:1 (5.6 mL : 0.4 mL) was added into a tube that was sealed with a septum, evacuated, and backfilled with nitrogen three times. Then, the tube was stirred at 70 °C for 24 h. After the reaction was completed, saturated sodium bicarbonate solution was added. The resulting mixture was extracted with ethyl acetate for three times. The combined organic layer was dried over anhydrous $MgSO_4$ and concentrated under reduced pressure. The residue was purified by silica gel column chromatography (eluent: petroleum ether / ethyl acetate = 5:1) to give product **3.**

5. Mechanistic Investigation

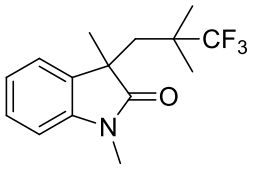


1 2 3

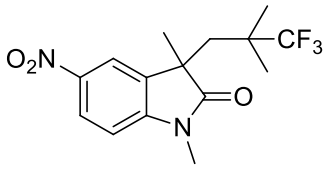
2.5 equiv TEMPO	0 %
2.5 equiv BHT	15 %

A mixture of **1** (35.0 mg, 0.2 mmol, 1.0 equiv), **2** (93.6 mg, 0.60 mmol, 3.0 equiv), TEMPO (78.1 mg, 0.50 mmol, 2.5 equiv) or 2,6-di-tert-butyl-4-methylpenol (BHT) (110.2mg， 0.50 mmol，2.5 equiv) , $Na_2S_2O_8$ (95.2 mg, 0.40 mmol, 2.0 equiv) and K_3PO_4 (84.8mg, 0.4 mmol, 2.0 equiv) were added into a tube that was sealed with a septum, evacuated, and backfilled with nitrogen three times. DMSO : H_2O = 14 : 1 (2.8 mL : 0.2 mL) was then added into the tube. The tube was stirred at 70 °C for 24 h. The reaction was monitored by TLC, ^{19}F NMR spectroscopy. The desired product can be detected by ^{19}F NMR in 15 % yield when 2.5 equiv of BHT was added, and no desired product was detected when 2.5 equiv of TEMPO was added.

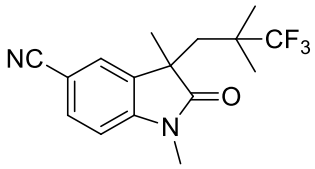
6. Copies of ^{1}H, ^{19}F, and ^{13}C NMR Spectra for the oxindoles



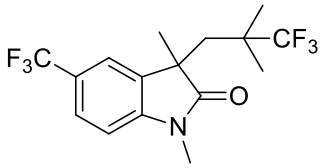
1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one (3a) (159.6 mg, 74 %): White solid. m.p. 69-71 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.23 (m,, 1H), 7.14 (t, *J* = 7.6 Hz, 1H), 7.00 (t, *J* = 7.5 Hz, 1H), 6.81 (d, *J* = 7.8 Hz, 1H), 3.17 (s, 3H), 2.38 (d, *J* = 14.6 Hz, 1H), 2.04 (d, *J* = 14.6 Hz, 1H), 1.27 (s, 3H), 0.77 (s, 3H), 0.53 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.56 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.02, 141.67, 132.20, 127.91 (q, *J* = 284.82 Hz)，127.09, 122.72, 121.37, 107.37, 45.29, 40.16 (q, *J* = 24.24 Hz), 39.74 (q, *J* = 2.02 Hz), 27.71, 25.30, 20.45(q, *J* = 2.02 Hz), 18.77(q, *J* = 2.02 Hz). IR (thin film): *v* 1705, 1615, 1473, 1349, 1110, 1025, 756, 542cm^{-1}. MS (EI) *m/z*: 286 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{15}H_{19}F_3NO$ $[M+H]^+$: 286.1413, found: 286.1414.



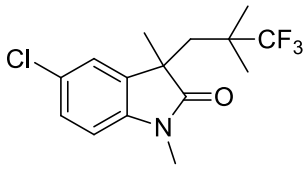
1,3-dimethyl-5-nitro-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3b) (177.4mg, 82 %): Yellow solid. m.p. 138-140 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.23 (dd, *J* = 8.6, 2.2 Hz, 1H), 8.06 (d, *J* = 2.2 Hz, 1H), 6.91 (d, *J* = 8.6 Hz, 1H), 3.25 (s, 3H), 2.43 (d, *J* = 14.9 Hz, 1H), 2.14 (d, *J* = 14.9 Hz, 1H), 1.34 (s, 3H), 0.79 (s, 3H), 0.61 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -79.80 (s, 3F). ^{13}CNMR (101 MHz, $CDCl_3$) δ 178.89, 147.27, 142.35, 133.12, 127.54 (q, *J* = 284.82 Hz), 124.41, 118.43, 106.93, 45.41, 40.31 (q, *J* = 2.02 Hz), 40.08 (q, *J* = 25.25 Hz), 27.68, 25.75, 20.86 (q, *J* = 2.02 Hz), 19.65 (q, *J* = 2.02 Hz). IR (thin film): *v*1708, 1596, 1479, 1346, 1213, 802, 608cm^{-1}. MS (EI) *m/z*: 330 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{15}H_{18}F_3N_2O_3$ $[M+H]^+$: 331.1264; found: 331.1262.



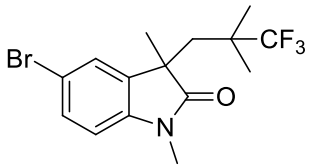
1,3-dimethyl-2-oxo-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indoline-5-carbonitrile**(3c)** (176.1 mg, 71 %): White solid. m.p. 144-146 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 7.66-7.63 (m, 1H), 7.48 (d, *J* = 1.4 Hz, 1H), 6.96 (d, *J* = 8.1 Hz, 1H), 3.28 (s, 3H), 2.47 (d, *J* = 14.9 Hz, 1H), 2.15 (d, *J* = 14.9 Hz, 1H), 1.37 (s, 3H), 0.85 (s, 3H), 0.66 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ ppm -79.96 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ ppm 178.52, 145.53, 133.36, 132.44, 127.57 (q, *J* = 284.82 Hz), 125.92, 118.02, 107.81, 104.64, 45.20, 40.17, 40.06 (q, *J* = 24.24 Hz), 27.68, 25.56, 20.72 (q, *J* = 2.02 Hz), 19.53 (q, *J* = 2.02 Hz). IR (thin film): *v* 2219, 1714, 1615, 1500, 1343, 1052, 823cm^{-1}. MS (EI) *m/z*: 311 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{18}F_3N_2O$ $[M+H]^+$: 311.1366; found: 311.1365



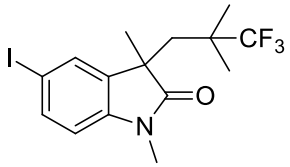
1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)-5-(trifluoromethyl)indolin-2-one(3d) (203.3 mg, 72 %): White solid. m.p. 129-131 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.52 (dd, *J* = 8.2, 0.8 Hz, 1H), 7.36 (d, *J* = 23.7 Hz, 1H), 6.90 (t, *J* = 11.1 Hz, 1H), 3.21 (s, 3H), 2.41 (d, *J* = 14.8 Hz, 1H), 2.09 (d, *J* = 14.8 Hz, 1H), 1.30 (s, 3H), 0.77 (s, 3H), 0.55 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -61.53 (s, 3F), -80.22 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.84, 144.64, 132.82, 127.68 (q, *J* = 283.81 Hz), 124.86 (q, *J* = 4.04 Hz), 123.76 (q, *J* = 33.33 Hz), 123.31 (q, *J* = 272.70 Hz), 119.77 (q, *J* = 4.04 Hz), 107.09, 45.31, 40.10 (q, *J* = 24.24 Hz), 40.04 (q, *J* = 2.02 Hz), 27.64, 25.52, 20.58 (q, *J* = 2.02 Hz), 19.21 (q, *J* = 2.02 Hz). IR (thin film): *v* 1714, 1621, 1337, 1113, 817, 605cm^{-1}. MS (EI) *m/z*: 354 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{18}F_6NO$ $[M+H]^+$: 354.1287, found: 354.1287.



5-chloro-1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3e) (176.0 mg, 69 %): White solid. m.p. 94-96 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24 – 7.18 (m, 1H), 7.13 (d, *J* = 2.1 Hz, 1H), 6.73 (d, *J* = 8.3 Hz, 1H), 3.16 (s, 3H), 2.38 (d, *J* = 14.7 Hz, 1H), 2.02 (d, *J* = 14.7 Hz, 1H), 1.27 (s, 3H), 0.78 (s, 3H), 0.59 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.37 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.43, 140.24, 134.02, 127.76 (q, *J* = 283.81 Hz), 127.05, 126.90, 123.15, 108.29, 45.58, 40.13(q, *J* = 24.24 Hz), 39.88 (q, *J* = 2.02 Hz), 27.68, 25.44, 20.60 (q, *J* = 2.02 Hz), 19.07 (q, *J* = 2.02 Hz). IR (thin film): *v* 1708, 1596, 1479, 1346, 1213, 802, 608cm^{-1}. MS (EI) *m/z*: 320 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{15}H_{18}ClF_3NO$ $[M+H]^+$: 320.1024; found: 320.1023.

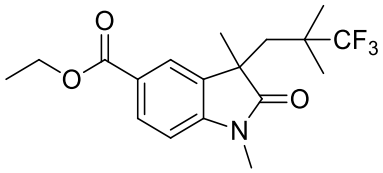


5-bromo-1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3f) (220.7 mg, 76 %): White solid. m.p. 86-88 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36 (dd, *J* = 8.3, 2.0 Hz, 1H), 7.27 (d, *J* = 2.0 Hz, 1H), 6.69 (d, *J* = 8.2 Hz, 1H), 3.16 (s, 3H), 2.37 (d, *J* = 14.7 Hz, 1H), 2.02 (d, *J* = 14.8 Hz, 1H), 1.27 (s, 3H), 0.78 (s, 3H), 0.59 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.37 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.32, 140.68, 134.36, 129.94, 127.73 (q, *J* = 284.82 Hz), 125.89, 114.11, 108.81, 45.53, 40.12 (q, *J* = 24.24 Hz), 39.87 (q, *J* = 2.02 Hz), 27.68, 25.42, 20.64 (q, *J* = 2.02 Hz), 19.04 (q, *J* = 2.02 Hz). IR (thin film): *v* 2984, 1708, 1603, 1349, 1155, 1119, 805, 614cm^{-1}. MS (EI) *m/z*: 363 $[M+H]^+$. HRMS (EI-TOF): *m/z* $[M+H]^+$ Calcd for $C_{15}H_{18}BrF_3NO$ $[M+H]^+$: 364.0518; found: 364.0518.

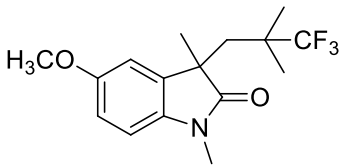


5-iodo-1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3g) (276.2 mg, 84 %): White solid. m.p. 126-128 °C. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.54 (dd, *J* = 8.2, 1.7 Hz, 1H), 7.44 (d, *J* = 1.7

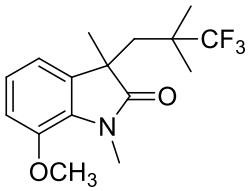
Hz, 1H), 6.60 (d, *J* = 8.2 Hz, 1H), 3.14 (s, 3H), 2.36 (d, *J* = 14.7 Hz, 1H), 2.01 (d, *J* = 14.8 Hz, 1H), 1.26 (s, 3H), 0.77 (s, 3H), 0.58 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.35(s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.12, 141.37, 135.90, 134.69, 131.48, 127.73 (q, *J* = 284.82 Hz), 109.41, 83.81, 45.34, 40.12 (q, *J* = 24.24 Hz), 39.85 (q, *J* = 2.02 Hz), 27.65, 25.35, 20.67 (q, *J* = 2.02 Hz), 19.00 (q, *J* = 2.02 Hz). IR (thin film): *v* 2966, 1705, 1603, 1337, 1119, 795, 605cm^{-1}. MS (EI) *m/z*: 411[M+H]$^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{15}H_{18}F_3INO$ [M+H]$^+$: 412.0380; found: 412.0379.



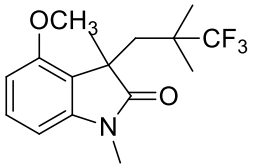
ethyl1,3-dimethyl-2-oxo-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indoline-5-carboxylate(3h) (214.2 mg, 75 %): White solid. m.p. 120-122ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (dd, *J* = 8.2, 1.6 Hz, 1H), 7.83 (d, *J* = 1.4 Hz, 1H), 6.85 (d, *J* = 8.2 Hz, 1H), 4.31 (q, *J* = 7.1 Hz, 2H), 3.21 (s, 3H), 2.40 (d, *J* = 14.7 Hz, 1H), 2.11 (d, *J* = 14.7 Hz, 1H), 1.34 (t, *J* = 7.1 Hz, 3H), 1.30 (s, 3H), 0.76 (s, 3H), 0.56 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.31 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.26, 165.30, 145.68, 132.18, 129.73, 127.77 (q, *J* = 283.82 Hz), 123.90, 123.79, 106.86, 59.98, 45.19, 40.14 (q, *J* = 24.24 Hz), 39.93 (q, *J* = 2.02 Hz), 27.64, 25.52, 20.75 (q, *J* = 2.02 Hz), 19.02 (q, *J* = 2.02 Hz), 13.37. IR (thin film): *v* 2219, 1714, 1615, 1500, 1343, 1052, 823cm-1. MS (EI) *m/z*: 358 [M+H]$^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{18}H_{23}F_3NO_3$ [M+H]$^+$: 358.1625; found: 358.1623.



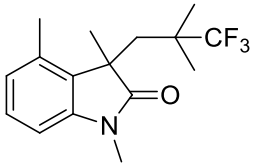
5-methoxy-1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3i) (143.6 mg, 57 %):Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.76 (d, *J* = 0.8 Hz, 1H), 6.74 (d, *J* = 2.4 Hz, 1H), 6.71 (dd, *J* = 8.1, 1.0 Hz, 1H), 3.73 (s, 3H), 3.14 (s, 3H), 2.36 (d, *J* = 14.6 Hz, 1H), 2.01 (d, *J* = 14.6 Hz, 1H), 1.25 (s, 3H), 0.78 (s, 3H), 0.57 (s, 3H); ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.57 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.56, 155.28, 142.70, 128.37, 128.06 (q, *J* = 285.82 Hz), 117.82, 104.61, 100.72, 54.04, 45.35, 40.08 (q, *J* = 24.24 Hz), 37.91 (q, *J* = 2.02 Hz), 25.50, 24.46, 18.92 (q, *J* = 2.02 Hz), 18.04 (q, *J* = 2.02 Hz). IR (thin film): *v* 2933, 1708, 1497, 1288, 1113, 1034, 805, 696cm^{-1}. MS (EI) *m/z*: 315 [M+H]$^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{21}F_3NO_2$ [M+H]$^+$: 316.1519; found: 316.1519.



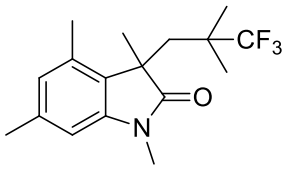
7-methoxy-1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3j) (85.2 mg, 38 %): White solid. m.p. 120-122ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.93 (dd, *J* = 8.4, 7.4 Hz, 1H), 6.78 (d, *J* = 3.0 Hz, 1H), 6.77 – 6.74 (m, 1H), 3.80 (s, 3H), 3.44 (s, 3H), 2.35 (d, *J* = 14.6 Hz, 1H), 1.98 (dd, *J* = 13.3, 10.5 Hz, 1H), 1.24 (s, 3H), 0.80 (s, 3H), 0.54 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.65 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.26, 144.58, 133.94, 129.49, 127.96 (q, *J* = 283.81 Hz), 121.85, 115.44, 110.59, 54.83, 45.33, 40.19 (q, *J* = 24.24 Hz), 39.79 (q, *J* = 2.02 Hz), 28.64, 27.94, 20.34 (q, *J* = 2.02 Hz), 18.77 (q, *J* = 2.02 Hz). IR (thin film): *v* 2219, 1714, 1615, 1500, 1343, 1052, 823cm^{-1}. MS (EI) *m/z*: 316 [M+H]$^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{21}F_3NO_2$ [M+H]$^+$: 316.1519; found: 316.1518.



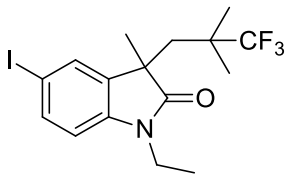
4-methoxy-1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3k) (148.6 mg, 59 %): Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.20 (t, *J* = 8.1 Hz, 1H), 6.53 (d, *J* = 8.5 Hz, 1H), 6.47 (d, *J* = 7.8 Hz, 1H), 3.79 (s, 3H), 3.13 (s, 3H), 2.35 (d, *J* = 14.3 Hz, 1H), 2.24 (d, *J* = 14.2 Hz, 1H), 1.30 (s, 3H), 0.71 (s, 3H), 0.60 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.49 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.66, 154.90, 135.19, 133.62, 128.05 (q, *J* = 284.82 Hz), 111.19, 110.29, 107.67, 54.80, 45.71, 40.15 (q, *J* = 24.24 Hz), 39.67 (q, *J* = 2.02 Hz), 27.76, 25.38, 20.45 (q, *J* = 2.02 Hz), 18.80 (q, *J* = 2.02 Hz). IR (thin film): *v* 2936, 1714, 1612, 1476, 1152, 1071, 780cm^{-1}. MS (EI) *m/z*: 315 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{21}F_3NO_2$ $[M+H]^+$ 316.1519; found: 316.1519.



1,3,6-trimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3l)(162.6 mg, 68 %): Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.97 (d, *J* = 7.3 Hz, 1H), 6.94 (d, *J* = 7.1 Hz, 1H), 6.87 (t, *J* = 7.5 Hz, 1H), 3.44 (s, 3H), 2.52 (s, 3H), 2.35 (d, *J* = 14.5 Hz, 1H), 2.00 (d, *J* = 14.6 Hz, 1H), 1.23 (s, 3H), 0.78 (s, 3H), 0.52 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.63 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.78, 139.42, 132.77, 130.73, 127.93 (q, *J* = 283.81 Hz), 121.25, 120.66, 119.02, 44.61, 40.16 (q, *J* = 23.23 Hz), 39.83 (q, *J* = 2.02 Hz), 28.64, 28.08, 20.45 (q, *J* = 2.02 Hz), 18.72 (q, *J* = 2.02 Hz), 18.06. IR (thin film): *v* 2981, 1711, 1463, 1143, 1116, 750, 596cm^{-1}. MS (EI) *m/z*: 299 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{21}F_3NO$ $[M+H]^+$: 300.1570; found: 300.1569.

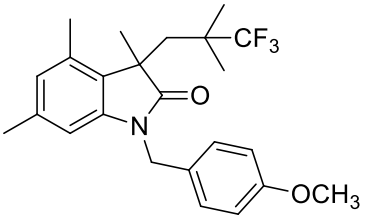


1,3,4,6-tetramethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3m) (160.3 mg, 64 %): White solid. m.p. 80-82 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 6.58 (s, 1H), 6.48 (s, 1H), 3.13 (s, 3H), 2.31(d, *J* = 14.7 Hz, 1H), 2.29 (s, 6H), 2.22 (d, *J* = 14.7 Hz, 1H), 1.31 (s, 3H), 0.75 (s, 3H), 0.59 (s, 3H).^{19}F NMR (377 MHz, $CDCl_3$) δ ppm -80.68 (s, 3F).^{13}C NMR (101 MHz, $CDCl_3$) δ ppm 179.38, 142.04, 137.04, 133.47, 128.01 (q, *J* = 283.81 Hz), 126.28, 124.85, 106.08, 45.70, 40.23 (q, *J* = 23.23 Hz), 38.16 (q, *J* = 2.02 Hz), 25.34, 24.72 (q, *J* = 2.02 Hz), 20.53, 18.72, 18.22 (q, *J* = 2.02 Hz), 17.51. IR (thin film): *v* 1702, 1621, 1457, 1334, 1149, 1052, 835cm^{-1}. MS (EI) *m/z*: 314 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{17}H_{23}F_3NO$ $[M+H]^+$: 314.1726; found: 314.1726.

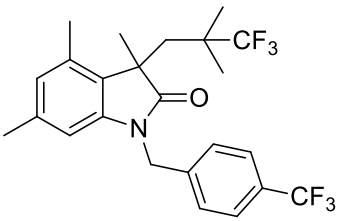


1-ethyl-5-iodo-3-methyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one (3n) (227.6 mg, 67 %): White solid. m.p. 138-140 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.53 (dd, *J* = 8.2, 1.7 Hz, 1H), 7.44 (d, *J* = 1.6 Hz, 1H), 6.61 (d, *J* = 8.2 Hz, 1H), 3.79 (dq, *J* = 14.4, 7.2 Hz, 1H), 3.60 (dq, *J* = 14.3, 7.2 Hz, 1H), 2.36 (d, *J*

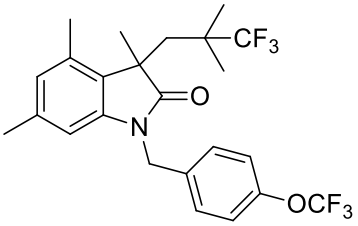
= 14.7 Hz, 1H), 2.00 (d, *J* = 14.7 Hz, 1H), 1.25 (s, 3H), 1.17 (t, *J* = 7.2 Hz, 3H), 0.80 (s, 3H), 0.60 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.36 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 177.71, 140.49, 135.83, 135.02, 131.72, 127.77 (q, *J* = 284.82 Hz), 109.51, 83.50, 45.35, 40.19 (q, *J* = 24.24 Hz), 39.66 (q, *J* = 2.02 Hz), 33.69, 27.95, 20.63 (q, *J* = 2.02 Hz), 19.19 (q, *J* = 2.02 Hz), 11.11. IR (thin film): *v* 1708, 1596, 1479, 1346, 1213, 802, 608cm^{-1}. MS (EI) *m/z*: 426 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{20}F_3INO$ $[M+H]^+$: 426.0536; found: 426.0534.



1-(4-methoxybenzyl)-3,4,6-trimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indol in-2-one(3o) (201.1 mg, 60 %): White solid. m.p. 73-75 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28 (s, 1H), 7.26 (d, *J* = 1.2 Hz, 1H), 6.85 (s, 1H), 6.83 (s, 1H), 6.61 (s, 1H), 6.54 (s, 1H), 4.92 (d, *J* = 15.2 Hz, 1H), 4.72 (d, *J* = 15.2 Hz, 1H), 3.77 (s, 3H), 2.41 (d, *J* = 14.7 Hz, 1H), 2.35 (s, 3H), 2.32 (d, *J* = 14.8 Hz, 1H), 2.28 (s, 3H), 1.41 (s, 3H), 0.79 (s, 3H), 0.65 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.69 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 180.39, 159.06, 142.32, 137.88, 134.56, 129.12, 129.08 (q, *J* = 284.82 Hz), 128.07, 127.38, 125.88, 114.07, 107.98, 55.25, 46.75, 43.44, 41.30 (q, *J* = 24.24 Hz), 39.01 (q, *J* = 2.02 Hz), 31.60, 26.22, 21.61, 19.64 (q, *J* = 2.02 Hz), 18.63. IR (thin film): *v* 1717, 1615, 1518, 1442, 1346, 1246, 1034, 823cm^{-1}. MS (EI) *m/z*: 420 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{24}H_{29}F_3NO_2$ $[M+H]^+$: 420.2145; found: 420.2144.

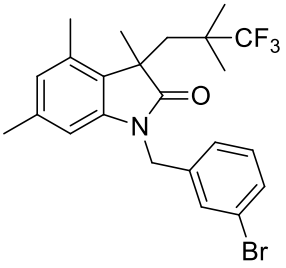


3,4,6-trimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)-1-(4-(trifluoromethyl)ben zyl)indolin-2-one(3p) (201.1 mg, 55 %): White solid. m.p. 120-122ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.51 (d, *J* = 8.1 Hz, 2H), 7.35 (d, *J* = 8.1 Hz, 2H), 6.58 (s, 1H), 6.38 (s, 1H), 5.03 (d, *J* = 15.8 Hz, 1H), 4.70 (d, *J* = 15.8 Hz, 1H), 2.36 (d, *J* = 14.7 Hz, 1H), 2.29 (s, 3H), 2.25 (s, *J* = 14.8 Hz, 1H), 2.21 (s, 3H), 1.37 (s, 3H), 0.73 (s, 3H), 0.61 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -62.60 (s, 3F), -80.61 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.54, 140.85, 139.03, 137.08, 133.83, 129.00 (q, *J* = 32.32 Hz), 127.97 (q, *J* = 283.81 Hz), 126.82, 126.26, 125.26, 124.74 (q, *J* = 4.04 Hz), 122.97 (q, *J* = 27.27 Hz), 106.67, 45.79, 42.51, 40.29 (q, *J* = 24.24 Hz), 38.08 (q, *J* = 2.02 Hz), 25.28, 20.53, 18.75 (q, *J* = 2.02 Hz), 18.64 (q, *J* = 2.02 Hz), 17.60. IR (thin film): *v* 1699, 1618, 1454, 1327, 1152, 1107, 1022, 835, 669cm^{-1}. MS (EI) *m/z*: 458 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{24}H_{26}F_6NO$ $[M+H]^+$: 458.1913; found:458.1911.

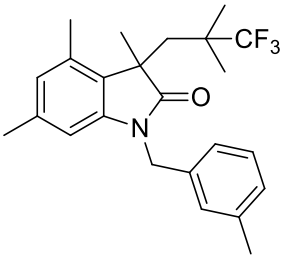


3,4,6-trimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)-1-(4-(trifluoromethoxy)benzyl)indolin-2-one (3q) (314.1 mg, 83 %): White solid. m.p. 88-90 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 7.28 (d, *J* = 8.5 Hz, 2H), 7.09 (d, *J* = 8.1 Hz, 2H), 6.57 (s, 1H), 6.42 (s, 1H), 4.95 (d, *J* = 15.5 Hz, 1H), 4.66 (d, *J* = 15.5 Hz, 1H), 2.34 (d, *J* = 14.7 Hz, 1H), 2.29 (s, 3H), 2.26 (d, *J* = 14.8 Hz, 1H), 2.22 (s, 3H), 1.36 (s, 3H), 0.70 (s, 3H), 0.59 (s,

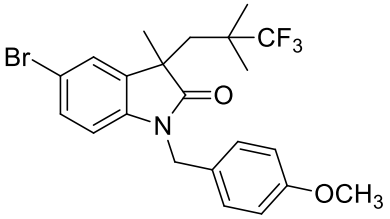
3H); ^{19}F NMR (377 MHz, $CDCl_3$) δ ppm -57.90 (s, 3F), -80.65 (s, 3F); ^{13}C NMR (101 MHz, $CDCl_3$) δ ppm 179.5,147.64, 140.9, 137.0, 133.8, 133.7, 128.1, 127.97 (q, *J* = 284.82 Hz), 126.3, 125.2, 120.22, 119.39 (q, *J* = 258.56 Hz), 106.68, 45.74, 42.21, 40.25 (q, *J* = 24.24 Hz), 38.06 (q, *J* = 2.02 Hz), 25.22, 20.55, 18.70 (q, *J* = 2.02 Hz), 18.57 (q, *J* = 2.02 Hz), 17.60. IR (thin film): *v* 2987, 1923, 1624, 1512, 1343, 1255, 1149, 838cm^{-1}. MS (EI) *m/z*: 474 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{24}H_{26}F_6NO_2$ $[M+H]^+$: 474.1862; found: 474.1861.



1-(3-bromobenzyl)-3,4,6-trimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3r) (254.0 mg, 68 %): White solid. m.p. 138-140 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.39 (s, 1H), 7.33 (d, *J* = 7.8 Hz, 1H), 7.17 (d, *J* = 7.8 Hz, 1H), 7.11 (t, *J* = 7.7 Hz, 1H), 6.57 (s, 1H), 6.39 (s, 1H), 4.89 (d, *J* = 15.6 Hz, 1H), 4.66 (d, *J* = 15.6 Hz, 1H), 2.35 (d, *J* = 14.7 Hz, 1H), 2.29 (s, 3H), 2.25 (d, *J* = 14.8 Hz, 1H), 2.21 (s, 3H), 1.37 (s, 3H), 0.75 (s, 3H), 0.60 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.64 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.47, 140.90, 137.24, 137.04, 133.72, 129.83, 129.60, 129.29, 127.99 (q, *J* = 284.82 Hz), 126.26, 125.16, 121.78, 106.73, 45.76, 42.36, 40.27 (q, *J* = 24.24 Hz), 38.02 (q, *J* = 2.02 Hz), 30.56, 25.29, 20.56, 18.67 (q, *J* = 2.02 Hz), 17.61. IR (thin film): *v* 1708, 1624, 1442, 1352, 1237, 1119, 841, 684cm^{-1}. MS (EI) *m/z*: 468 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{23}H_{26}BrF_3NO$ $[M+H]^+$: 468.1144; found: 468.1145.

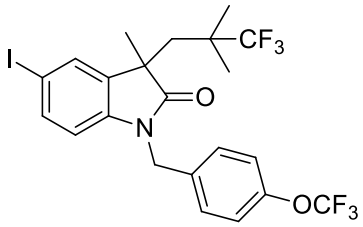


3,4,6-trimethyl-1-(3-methylbenzyl)-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one(3s) (187.0 mg, 58 %): White solid. m.p. 98-100 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.12 (t, *J* = 7.5 Hz, 1H), 7.06 (s, 1H), 7.03 (d, *J* = 7.8 Hz, 1H), 6.99 (d, *J* = 7.4 Hz, 1H), 6.55 (s, 1H), 6.45 (s, 1H), 4.87 (d, *J* = 15.4 Hz, 1H), 4.68 (d, *J* = 15.4 Hz, 1H), 2.38-2.33 (m, 1H), 2.29 (s, 3H), 2.25 (d, 1H), 2.24 (s, 3H), 2.20 (s, 3H), 1.36 (s, 3H), 0.75 (s, 3H), 0.59 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.69 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 179.42, 141.36, 137.38, 136.87, 134.89, 133.49, 128.05 (q, *J* = 284.42Hz), 127.54, 127.35, 127.34, 126.34, 124.89, 123.64, 107.00, 45.75, 42.96, 40.29 (q, *J* = 24.24 Hz), 37.98 (q, *J* = 2.02 Hz), 25.27, 20.56, 20.37, 18.67 (q, *J* = 2.02 Hz), 18.61 (q, *J* = 2.02 Hz), 17.60. IR (thin film): *v* 1699, 1621, 1451, 1352, 1237, 1143, 1113, 841, 783cm^{-1}. MS (EI) *m/z*: 404 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{24}H_{30}F_3NO$ $[M+H]^+$: 404.2196; found: 404.2196.

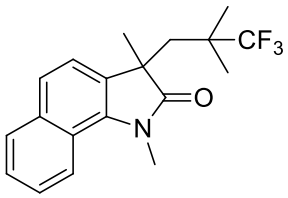


5-bromo-1-(4-methoxybenzyl)-3-methyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)indolin-2-one (3t) (251.3 mg, 67 %): White solid. m.p. 66-68 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 7.29-7.22 (m, 2H), 7.21-7.14 (m, 2H), 6.82-6.74 (m, 2H), 6.70-6.58 (m, 1H), 4.85 (d, *J* = 15.2 Hz, 1H), 4.68 (d, *J* = 15.2 Hz, 1H), 3.70 (s, 3H),

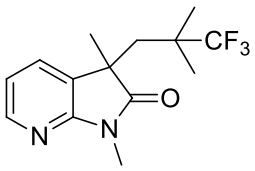
2.40 (d, *J* = 14.7 Hz, 1H), 2.04 (d, *J* = 14.7 Hz, 1H), 1.30 (s, 3H), 0.76 (s, 3H), 0.57 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ ppm -80.40 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ ppm 178.26, 158.23, 139.87, 134.51, 129.79, 128.05, 127.78 (q, *J* = 284.82 Hz), 126.33, 125.94, 114.08, 113.18, 109.85, 54.23, 45.58, 42.52, 40.16 (q， *J* = 24.24 Hz), 39.60 (q, *J* = 2.02 Hz), 28.28, 20.55 (q, *J* = 2.02 Hz), 19.29 (q, *J* = 2.02 Hz). IR (thin film): *v* 1702, 1612, 1512, 1249, 1034, 802cm^{-1}. MS (EI) *m/z*: 470 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{22}H_{24}BrF_3NO_2$ $[M+H]^+$: 470.0937; found: 470.0938.



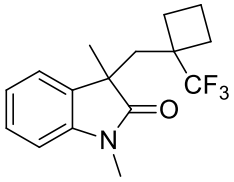
5-iodo-3-methyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)-1-(4-(trifluoromethoxy)benzyl)indolin-2-one (3u) (333.5 mg, 73 %): White solid. m.p. 121-123 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 7.49 – 7.44 (m, 2H), 7.25 (d, *J* = 8.6 Hz, 2H), 7.10 (d, *J* = 8.1 Hz, 2H), 6.52 (d, *J* = 8.6 Hz, 1H), 4.94 (d, *J* = 15.5 Hz, 1H), 4.70 (d, *J* = 15.5 Hz, 1H), 2.40 (d, *J* = 14.8 Hz, 1H), 2.05 (d, *J* = 14.8 Hz, 1H), 1.31 (s, 3H), 0.74 (s, 3H), 0.59 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ ppm -57.91 (s, 3F), -80.29 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ ppm 178.17, 147.81, 140.21, 135.89, 134.75, 133.03, 131.79, 128.06, 127.71 (q, *J* = 283.81 Hz), 120.36,119.36 (q, *J* = 258.56 Hz), 110.13, 84.13,45.44, 42.25, 40.15 (q, *J* = 40.15 Hz), 39.70 (q, *J* = 2.02 Hz), 28.32, 20.68 (q, *J* = 2.02 Hz), 19.30 (q, *J* = 2.02 Hz). IR (thin film): *v* 1711, 1612, 1509, 1476, 1252, 998, 798cm-1. MS (EI) *m/z*: 572 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{22}H_{21}F_6INO_2$ $[M+H]^+$: 572.0516; found: 572.0512.



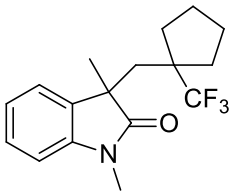
1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)-1,3-dihydro-2H-benzo[g]indol-2-one (3v) (195.6 mg, 73%): White solid. m.p. 98-100 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 7.65 (dd, *J* = 8.0, 0.9 Hz, 1H), 7.49 – 7.41 (m, 2H), 7.41 – 7.32 (m, 2H), 6.88 (dd, *J* = 7.5, 0.6 Hz, 1H), 3.45 (s, 3H), 2.87 (d, *J* = 14.4 Hz, 1H), 2.17 (d, *J* = 14.4 Hz, 1H), 1.65 (s, 3H), 0.80 (s,3H), 0.29 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ ppm -80.40 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ ppm 171.95, 136.23, 135.39, 132.43, 128.08 (q, *J* = 284.82 Hz), 125.61, 125.46, 125.28, 123.11, 121.70, 118.21, 107.48, 45.72, 43.96, 40.34 (q, *J* = 24.24 Hz), 35.08, 28.60, 20.53, 19.07. IR (thin film): *v* 1660, 1584, 1473, 1385, 1315, 1068, 826, 750cm^{-1}. MS (EI) *m/z*: 336 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{19}H_{21}F_3NO$ $[M+H]^+$: 336.1570; found: 336.1570.



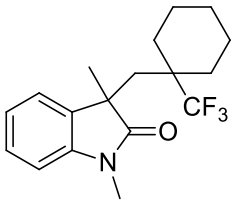
1,3-dimethyl-3-(3,3,3-trifluoro-2,2-dimethylpropyl)-1,3-dihydro-2H-pyrrolo[2,3-b]pyridin-2-one(3w) (117.1 mg, 51 %): White solid. m.p. 120-122ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.15 (dd, *J* = 5.2, 1.2 Hz, 1H), 7.38 (dd, *J* = 7.3, 1.4 Hz, 1H), 6.91 (dd, *J* = 7.2, 5.3 Hz, 1H), 3.26 (s, 3H), 2.41 (d, *J* = 14.8 Hz, 1H), 2.06 (d, *J* = 14.8 Hz, 1H), 1.30 (s, 3H), 0.82 (s, 3H), 0.59 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -80.16 (s, 3F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.52, 155.16, 146.09, 129.93, 127.54 (q, *J* = 284.82 Hz), 126.62, 116.96, 45.05, 40.48 (q, *J* = 25.25 Hz), 39.76 (q, *J* = 2.02 Hz), 27.33, 24.46, 20.59 (q, *J* = 2.02 Hz), 19.45 (q, *J* = 2.02 Hz). IR (thin film): *v* 2219, 1714, 1615, 1500, 1343, 1052, 823cm^{-1}. MS (EI) *m/z*: 287 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{14}H_{18}F_3N_2O$ $[M+H]^+$: 287.1366; found: 287.1365.



1,3-dimethyl-3-((1-(trifluoromethyl)cyclobutyl)methyl)indolin-2-one(4a) (125.9 mg, 53 %):Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.22 (dd, *J* = 9.9, 5.4 Hz, 1H), 7.14 (dd, *J* = 12.5, 4.6 Hz, 1H), 6.99 (t, *J* = 7.5 Hz, 1H), 6.83-6.76 (m, 1H), 3.17 (s, 3H), 2.40 (dd, *J* = 15.2, 8.0 Hz, 1H), 2.14 (dd, *J* = 15.2, 4.1 Hz, 1H), 2.00-1.91 (m, 1H), 1.89-1.82 (m, 2H), 1.74-1.60 (m, 2H), 1.45-1.32 (m, 1H), 1.30 (s, 3H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -78.26 (s, 0.61F), δ -78.83 (s, 3F),. ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.76(178.14), 142.08(140.69), 131.90(133.63), 127.88 (q, *J* = 280.78 Hz)[128.09 (q, *J* = 202.00 Hz)], 126.98(126.89), 122.22(122.73), 121.31(121.38), 107.20(108.07), 45.81(46.07), 43.68 (q, *J* = 26.26 Hz)[43.58 (q, *J* = 26.26 Hz)], 39.00(q, *J* = 2.02 Hz) [39.46 (q, *J* = 2.02 Hz)], 27.84(28.68), 25.26 (q, *J* = 3.03 Hz)[25.85 (q, *J* = 3.03 Hz)], 25.20, 24.70(q, *J* = 3.03 Hz)[25.03(q, *J* = 3.03 Hz)], 14.04(14.14). IR (thin film): *v* 2966, 1711, 1612, 1492, 1374, 1121, 753cm^{-1}. MS (EI) *m/z*: 297 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{16}H_{19}F_3NO$ $[M+H]^+$: 298.1413; found: 298.1411.

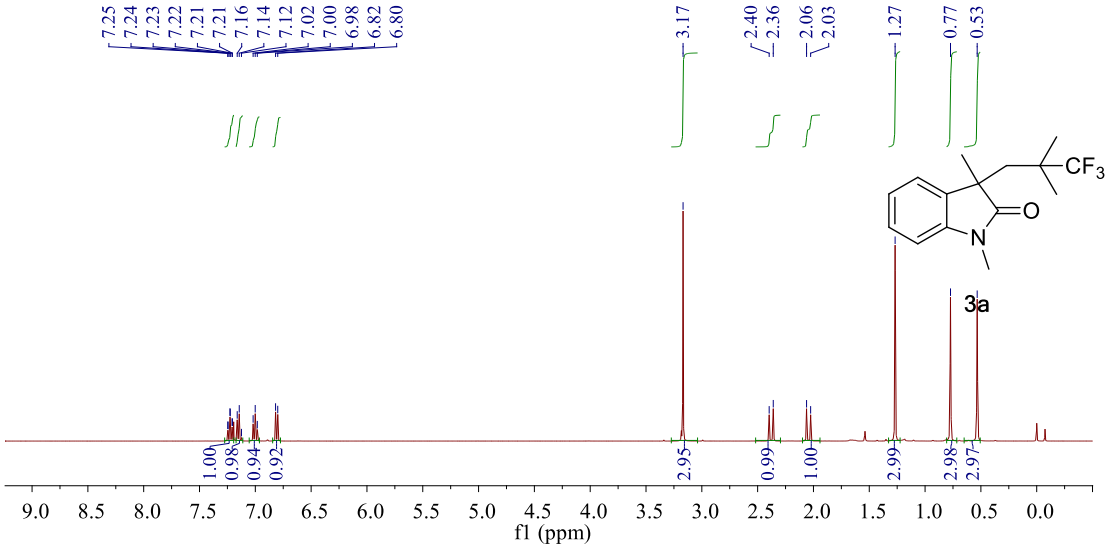


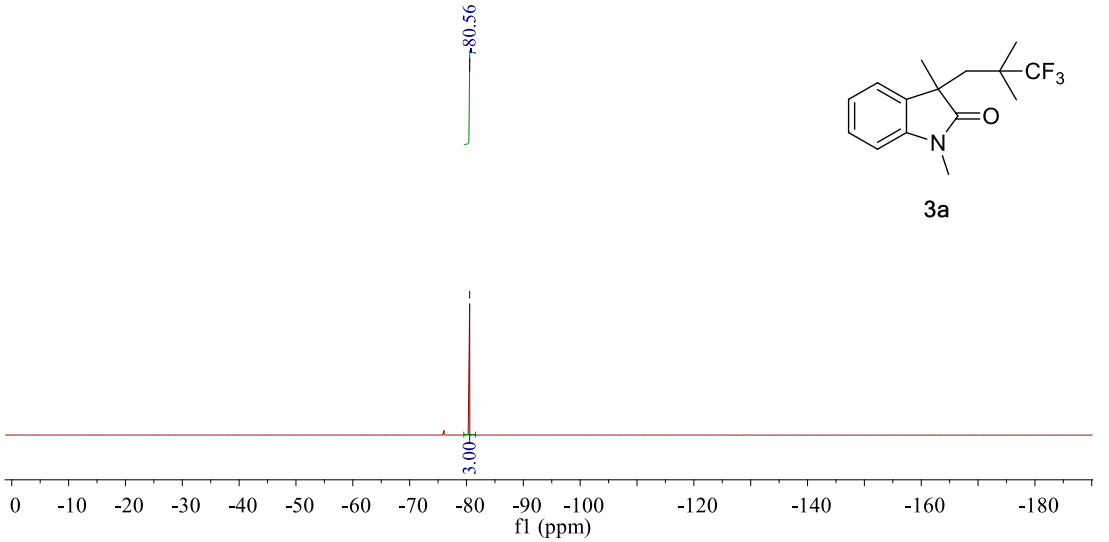
1,3-dimethyl-3-((1-(trifluoromethyl)cyclopentyl)methyl)indolin-2-one(4b) (136.8 mg, 55 %):Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.20 (dd, *J* = 9.3, 6.1 Hz, 1H), 7.13 (dd, *J* = 15.6, 7.6 Hz, 1H), 6.99 (t, *J* = 7.5 Hz, 1H), 6.78 (t, *J* = 8.8 Hz, 1H), 3.15 (s, 3H), 2.41 (d, *J* = 15.1 Hz, 1H), 2.16 (d, *J* = 15.1 Hz, 1H), 1.61-1.50 (m, 2H), 1.40 (d, *J* = 15.4, 6.0 Hz, 2H), 1.32 (dd, *J* = 14.2, 8.4 Hz, 2H), 1.26 (s, 3H), 1.22-1.04 (m, 2H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -74.85(s, 3F), δ -74.90(s, 0.55F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.76(178.95), 141.92(139.18), 131.98, 128.61 (q, *J* = 283.81 Hz)[127.43 (q, *J* = 282.80 Hz)], 126.92, 122.43(122.02), 121.24(121.50), 107.17(107.44), 50.16 (q, *J* = 23.23 Hz)[55.15 (q, *J* = 24.24 Hz)], 45.86(45.65), 40.01 (q, *J* = 2.02 Hz), 31.74(q, *J* = 2.02 Hz) [32.93 (q, *J* = 2.02 Hz)], 31.45(q, *J* = 2.02 Hz) [31.57 (q, *J* = 2.02 Hz)], 28.32(28.01), 25.18(25.22), 24.76(24.80), 24.50(24.42). IR (thin film): *v* 2966, 1709, 1613, 1493, 1375, 1345, 1140, 754cm^{-1}. MS (EI) *m/z*: 311 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{17}H_{21}F_3NO$ $[M+H]^+$: 312.1570; found: 312.1568.

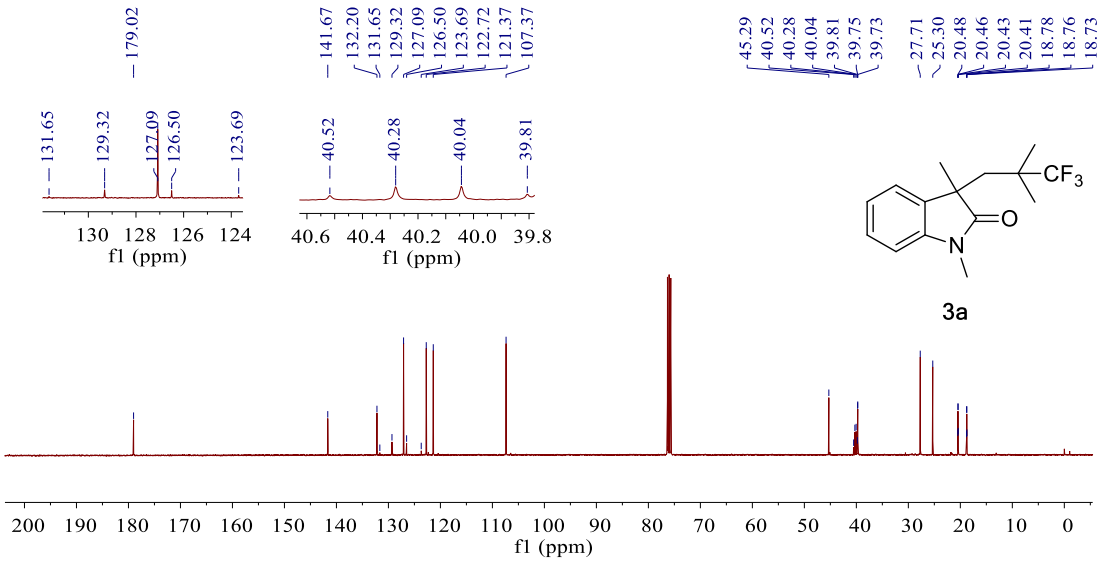


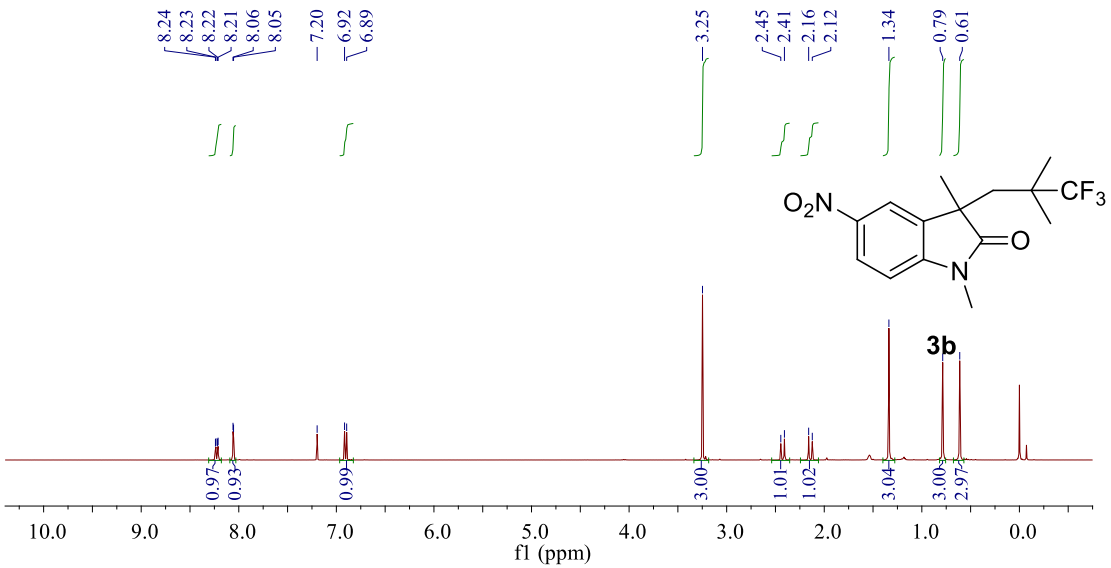
1,3-dimethyl-3-((1-(trifluoromethyl)cyclohexyl)methyl)indolin-2-one(4a)(156.0 mg, 60 %):Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.19 (t, *J* = 7.7 Hz, 1H), 7.13 (t, *J* = 6.8 Hz, 1H), 6.95 (t, *J* = 7.5 Hz, 1H), 6.78 (t, *J* = 11.9 Hz, 1H), 3.14 (s, 3H), 2.34 (d, *J* = 15.5 Hz, 1H), 2.14 (d, *J* = 15.4 Hz, 1H), 1.49-1.40 (m, 2H), 1.39-1.33 (m, 4H), 1.30 (dd, *J* = 12.2, 5.9 Hz, 2H), 1.27 (s, 3H), 1.23-1.13 (m, 2H). ^{19}F NMR (377 MHz, $CDCl_3$) δ -73.69 (s, 3F), δ -73.93 (s, 0.25F). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.62(178.75), 141.93 (142.31), 131.99, 127.79 (q, *J* = 284.82 Hz)[129.97(q, *J* = 254.52 Hz)], 126.75(126.65), 122.17(122.65), 120.85(121.83), 106.99 (107.84), 45.56, 42.10 (q, *J* = 23.23 Hz), 37.88, 28.86(28.68), 28.80 (q, *J* = 2.02 Hz), 28.00(q, *J* = 2.02 Hz) [28.33 (q, *J* = 2.02 Hz)], 25.16(25.27), 24.09(24.74), 20.07, 19.96. IR (thin film): *v* 2929, 1715, 1613,

1493, 1161, 1122, 754cm^{-1}. MS (EI) *m/z*: 325 $[M+H]^+$. HRMS (EI-TOF): *m/z* Calcd for $C_{18}H_{23}F_3NO$ $[M+H]^+$: 326.1726; found: 326.1724.





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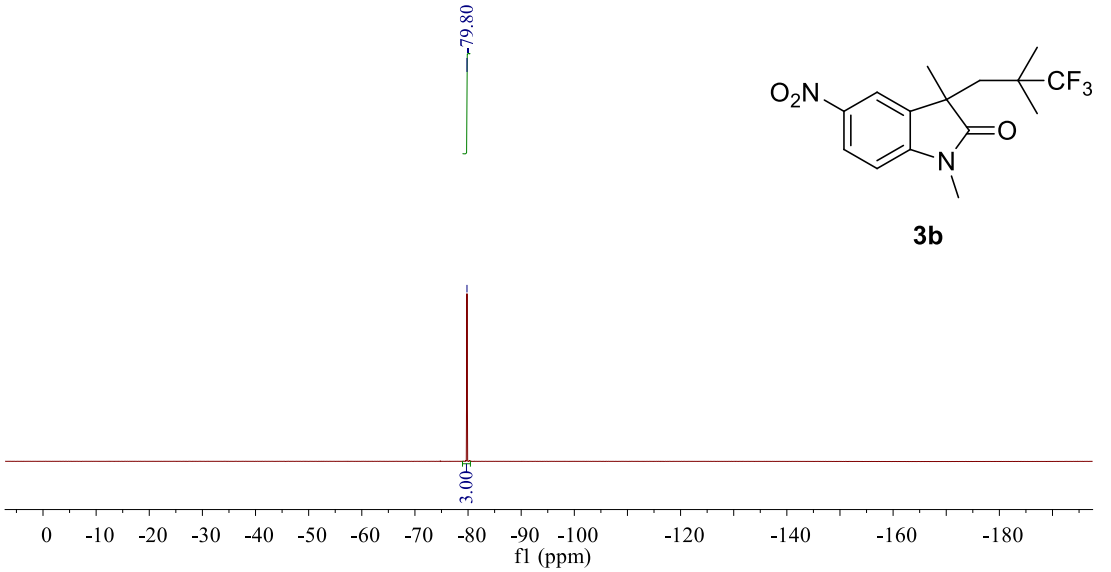
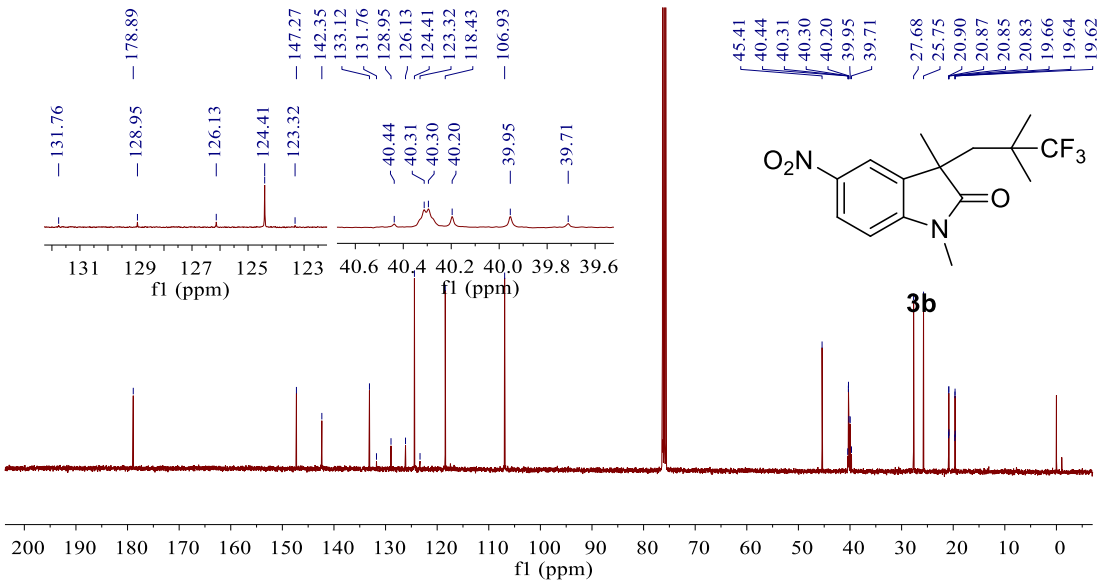
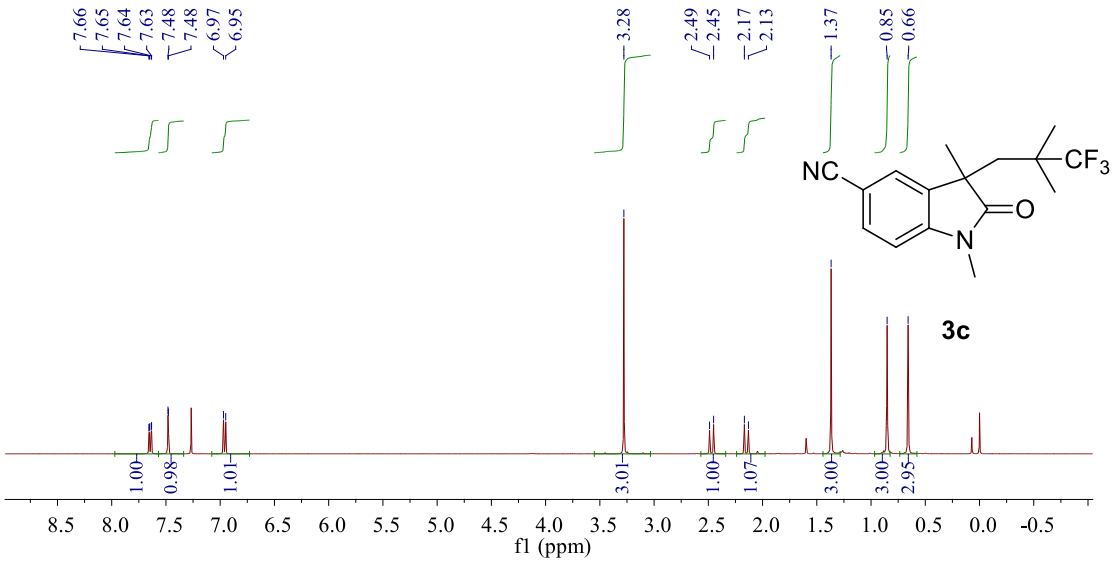
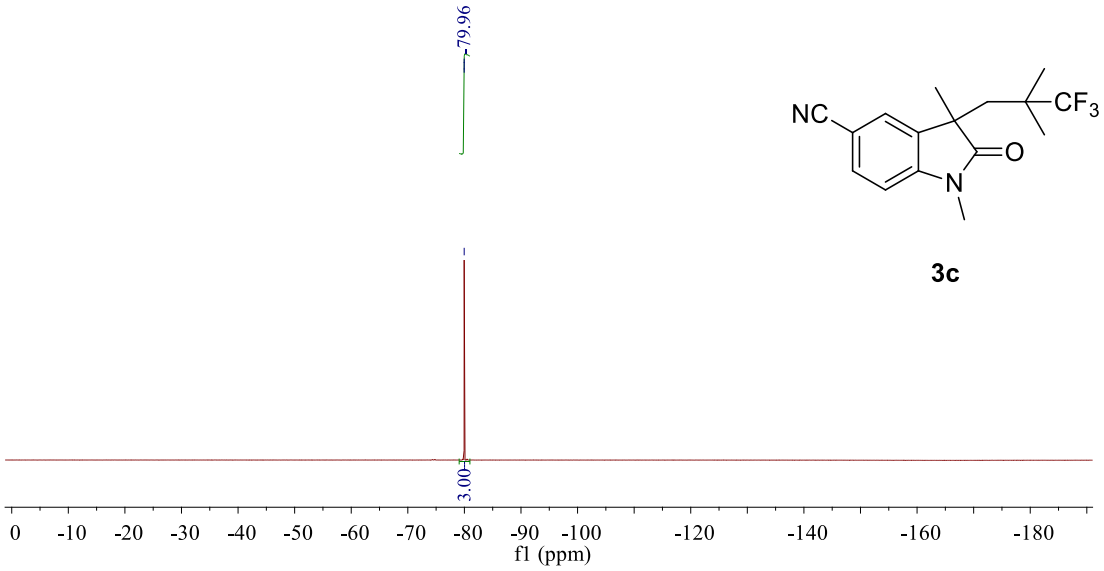
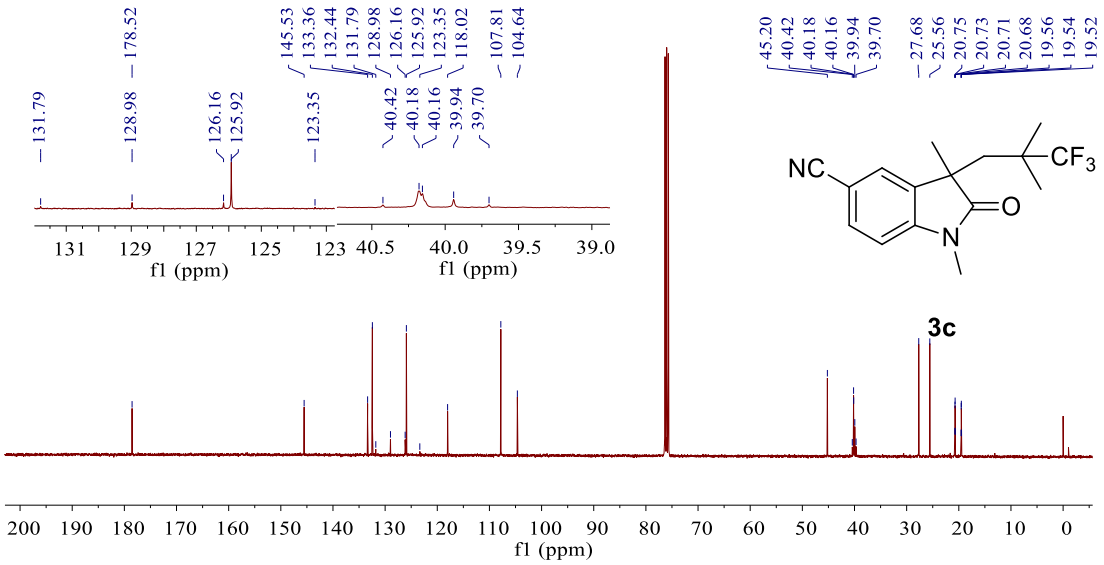
0.0
f1 (ppm)

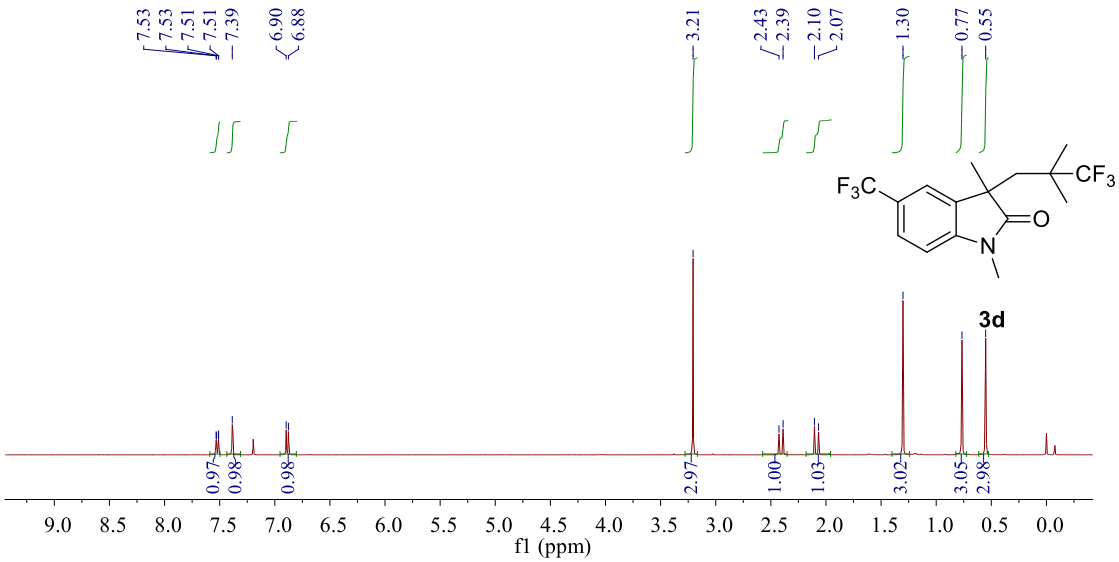

79.80
O2N
CF3
O
N
3b
3.00
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-120
-140
-160
-180
f1 (ppm)

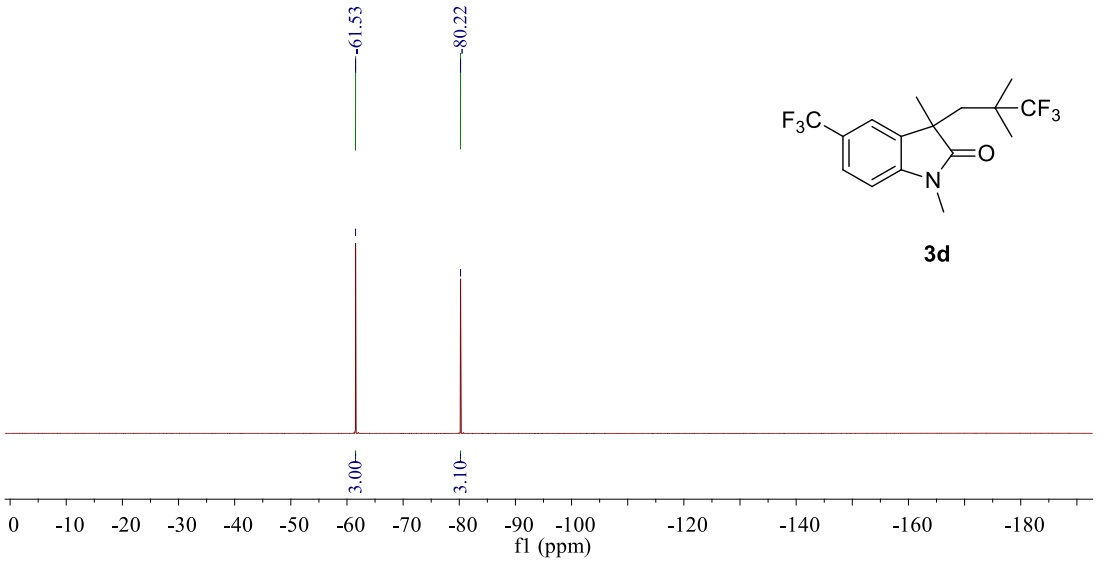

178.89
147.27
142.35
133.12
131.76
128.95
126.13
124.41
123.32
118.43
106.93
45.41
40.44
40.31
40.30
40.20
39.95
39.71
27.68
25.75
20.90
20.87
20.85
20.83
19.66
19.64
19.62
O2N
CF3
O
N
3b
131
129
127
125
123
40.6
40.4
40.2
40.0
39.8
39.6
f1 (ppm)
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

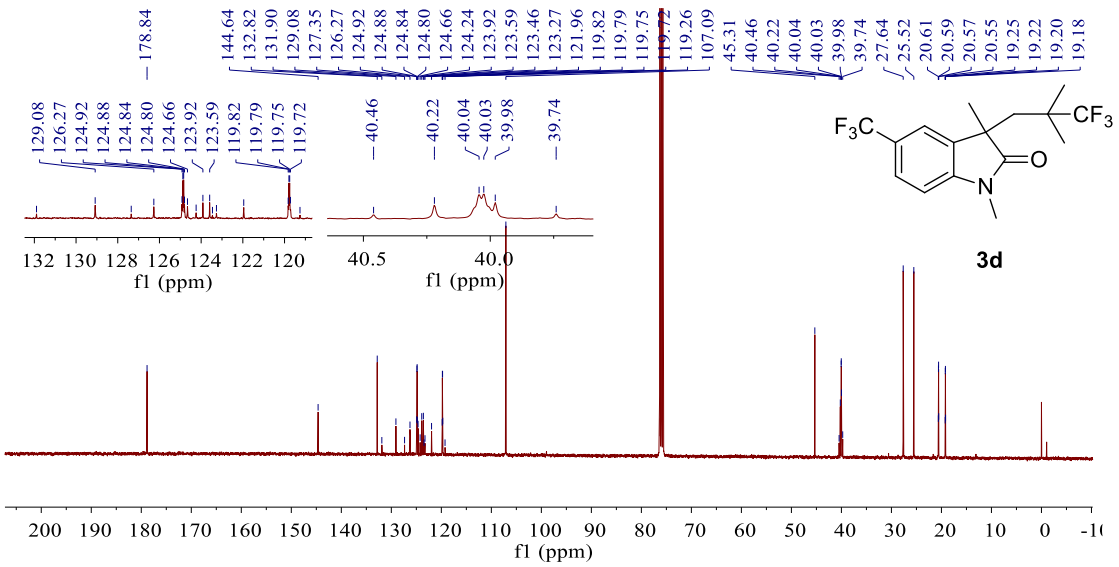

7.66
7.65
7.64
7.63
7.48
7.48
6.97
6.95
3.28
2.49
2.45
2.17
2.13
1.37
0.85
0.66
NC
CF3
O
N
3c
1.00
0.98
1.01
3.01
1.00
1.07
3.00
3.00
2.95
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

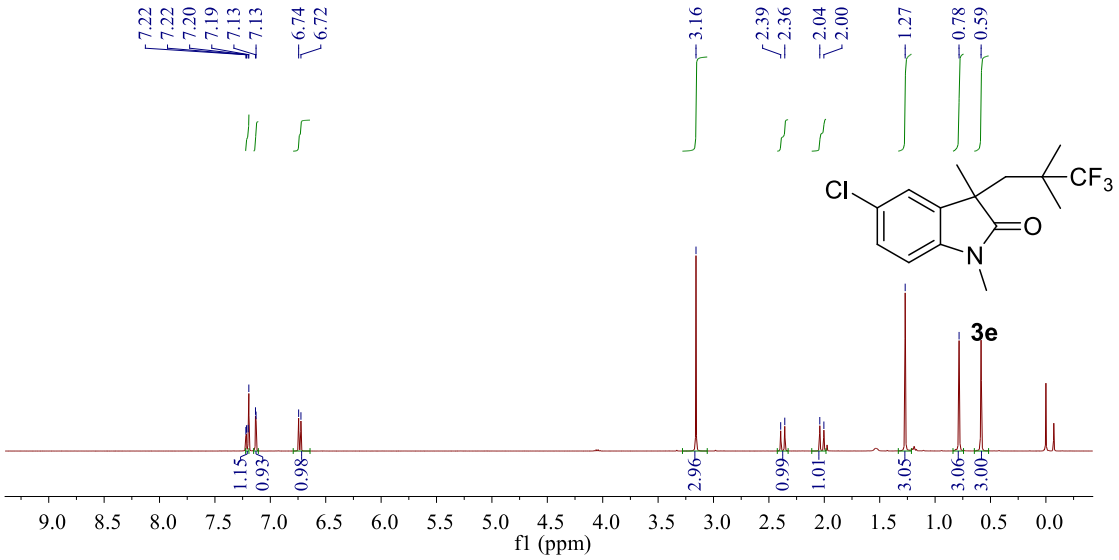

-79.96
NC
CF3
O
N
3c
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -120 -140 -160 -180
f1 (ppm)

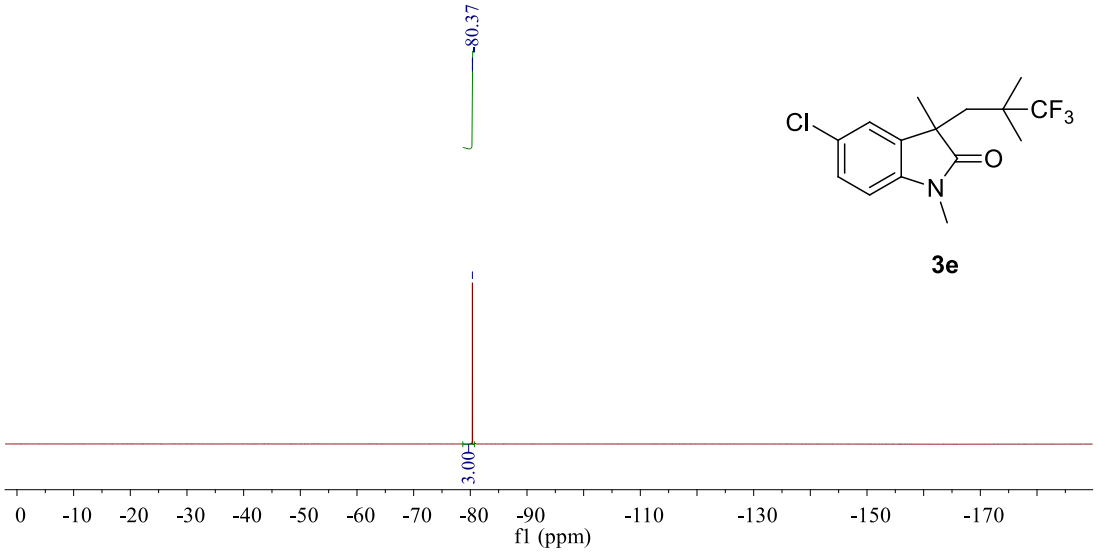

145.53
133.36
132.44
131.79
128.98
126.16
125.92
123.35
118.02
107.81
104.64
178.52
131.79
128.98
126.16
125.92
123.35
40.42
40.18
40.16
39.94
39.70
45.20
40.42
40.18
40.16
39.94
39.70
27.68
25.56
20.75
20.73
20.71
20.68
19.56
19.54
19.52
NC
CF3
O
N
3c
131 129 127 125 123
f1 (ppm)
40.5 40.0 39.5 39.0
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

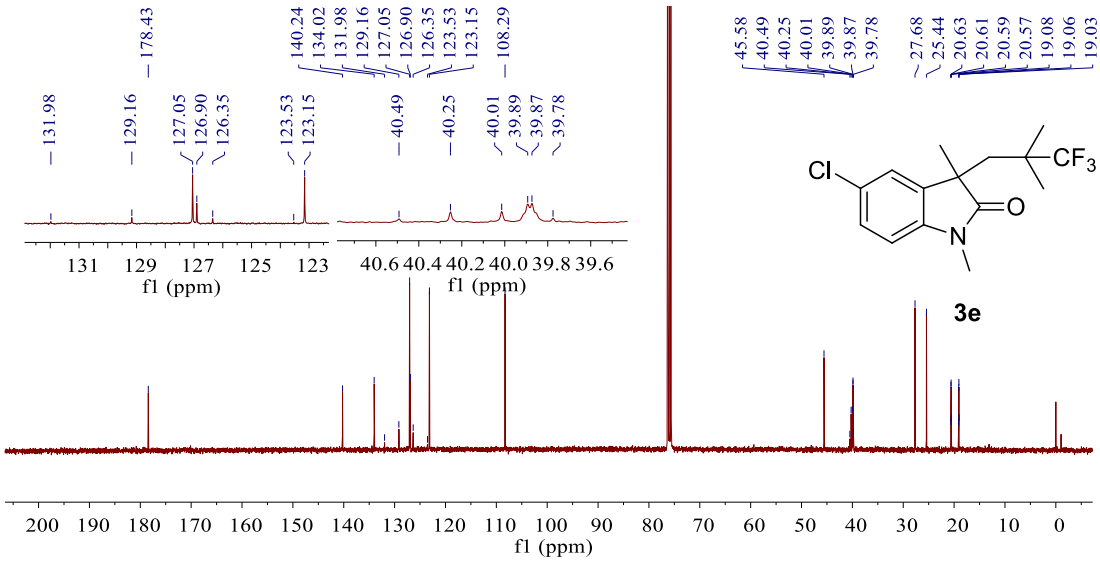

7.53
7.53
7.51
7.51
7.39
6.90
6.88
3.21
2.43
2.39
2.10
2.07
1.30
0.77
0.55
F3C
CF3
O
N
3d
0.97
0.98
0.98
2.97
1.00
1.03
3.02
3.05
2.98
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

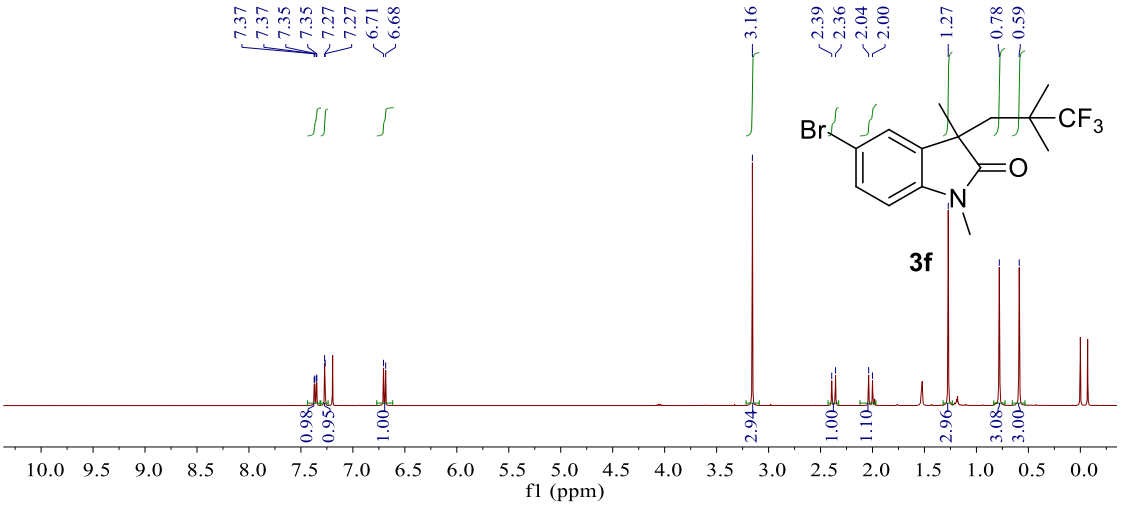

-61.53
-80.22
F3C
CF3
O
N
3d
3.00
3.10
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -120 -140 -160 -180
f1 (ppm)

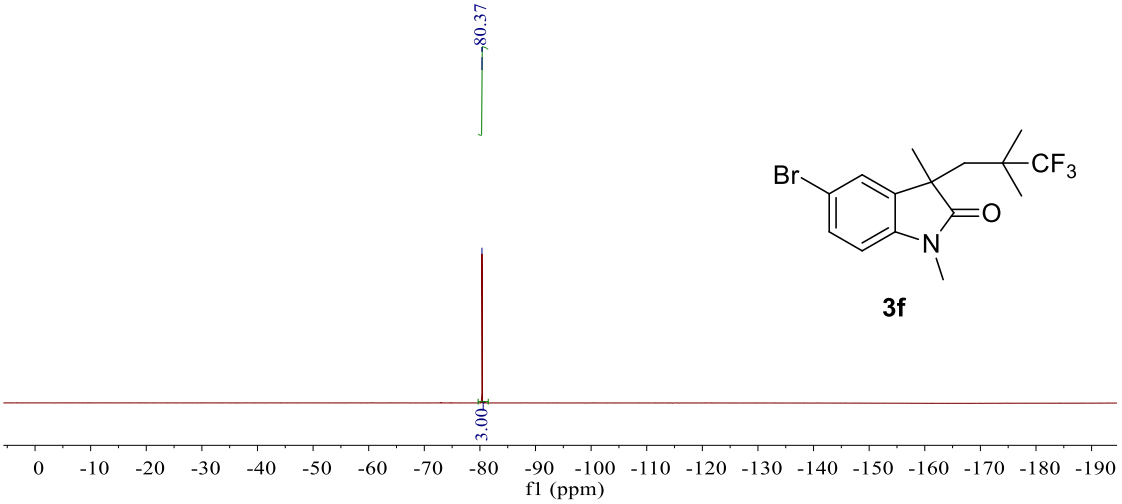

178.84
144.64
132.82
131.90
129.08
127.35
126.27
124.92
124.88
124.84
124.80
124.66
124.24
123.92
123.59
123.46
123.27
121.96
119.82
119.79
119.75
119.72
119.26
107.09
45.31
40.46
40.22
40.04
40.03
39.98
39.74
27.64
25.52
20.61
20.59
20.57
20.55
19.25
19.22
19.20
19.18
F3C
CF3
O
N
3d
132 130 128 126 124 122 120
f1 (ppm)
40.5
40.0
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

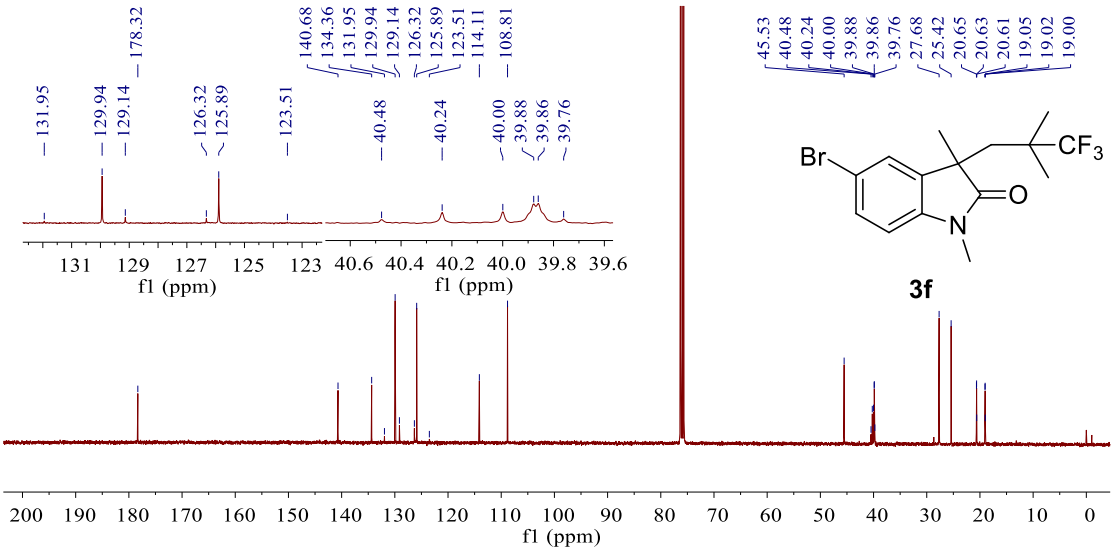

7.22
7.22
7.20
7.19
7.13
7.13
6.74
6.72
3.16
2.39
2.36
2.04
2.00
1.27
0.78
0.59
Cl
CF3
O
N
3e
1.15
0.93
0.98
2.96
0.99
1.01
3.05
3.06
3.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

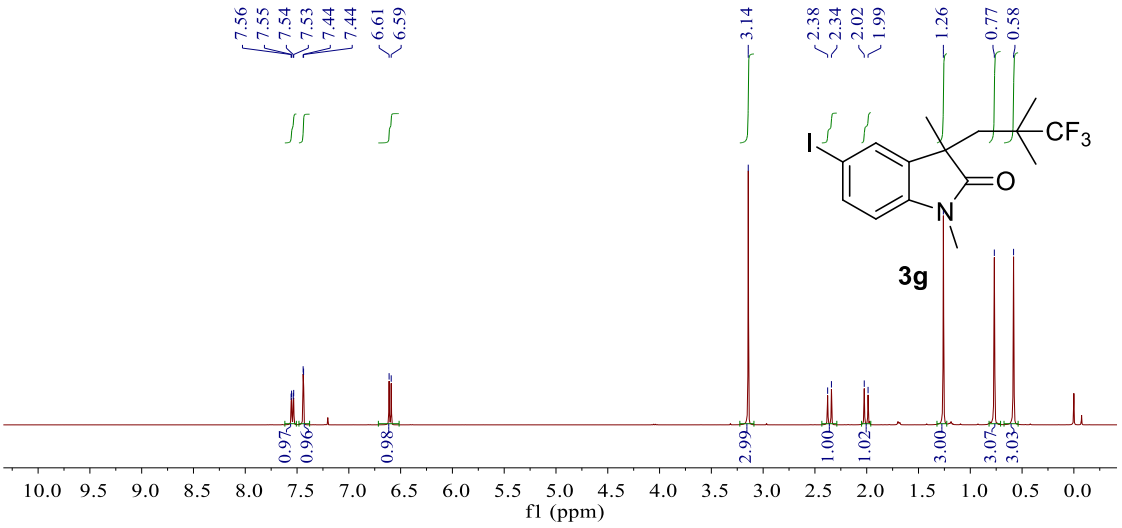

80.37
Cl
CF3
O
N
3e
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -110 -130 -150 -170
f1 (ppm)

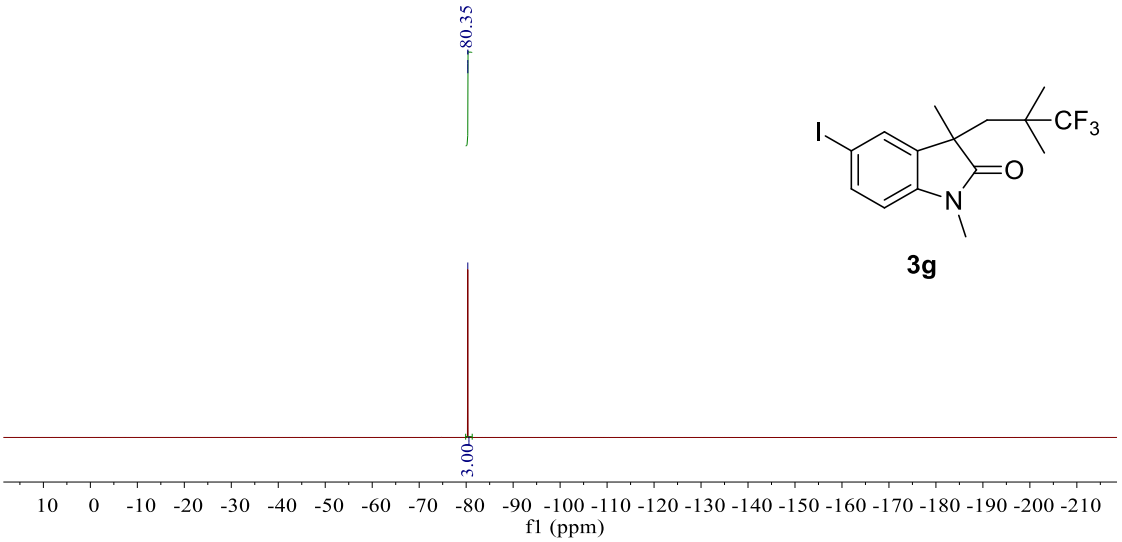

178.43
140.24
134.02
131.98
129.16
127.05
126.90
126.35
123.53
123.15
108.29
45.58
40.49
40.25
40.01
39.89
39.87
39.78
27.68
25.44
20.63
20.61
20.59
20.57
19.08
19.06
19.03
131.98
129.16
127.05
126.90
126.35
123.53
123.15
40.49
40.25
40.01
39.89
39.87
39.78
131 129 127 125 123
f1 (ppm)
40.6 40.4 40.2 40.0 39.8 39.6
f1 (ppm)
Cl
CF3
O
N
3e
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

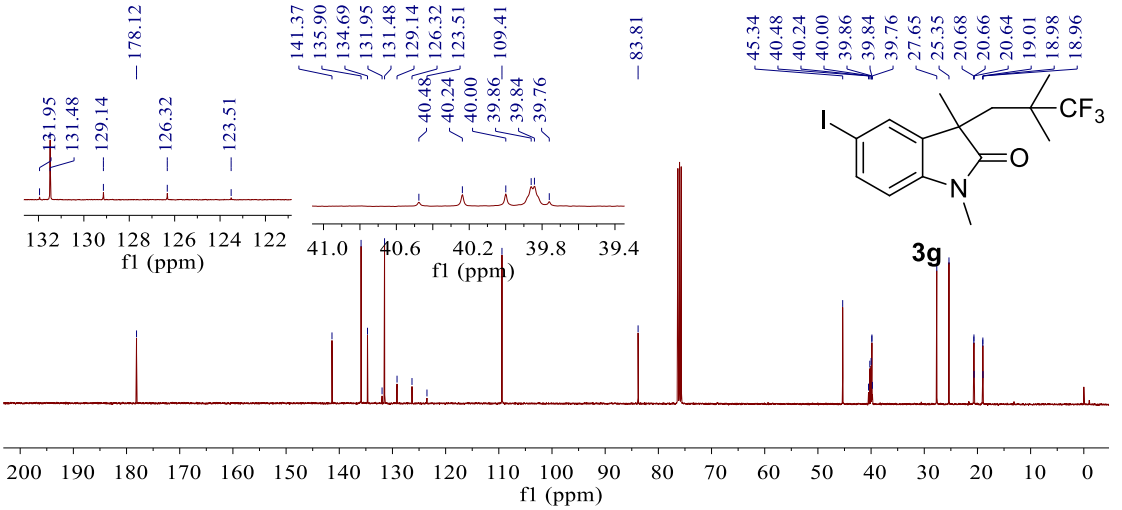

7.37
7.37
7.35
7.35
7.27
7.27
6.71
6.68
3.16
2.39
2.36
2.04
2.00
1.27
0.78
0.59
Br
CF3
O
N
3f
0.98
0.95
1.00
2.94
1.00
1.10
2.96
3.08
3.00
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

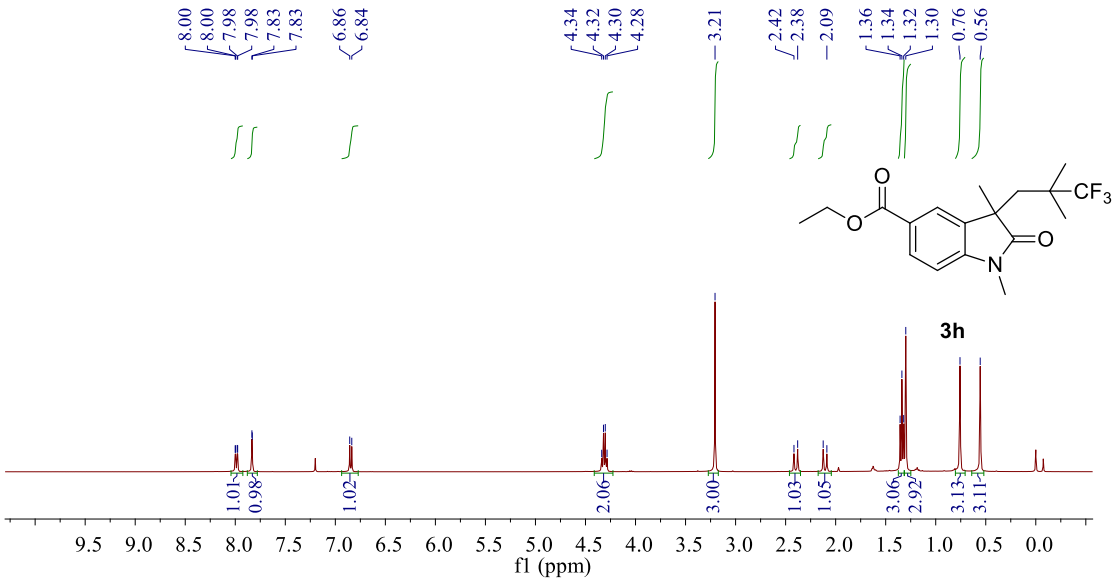

80.37
Br
CF3
O
N
3f
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)

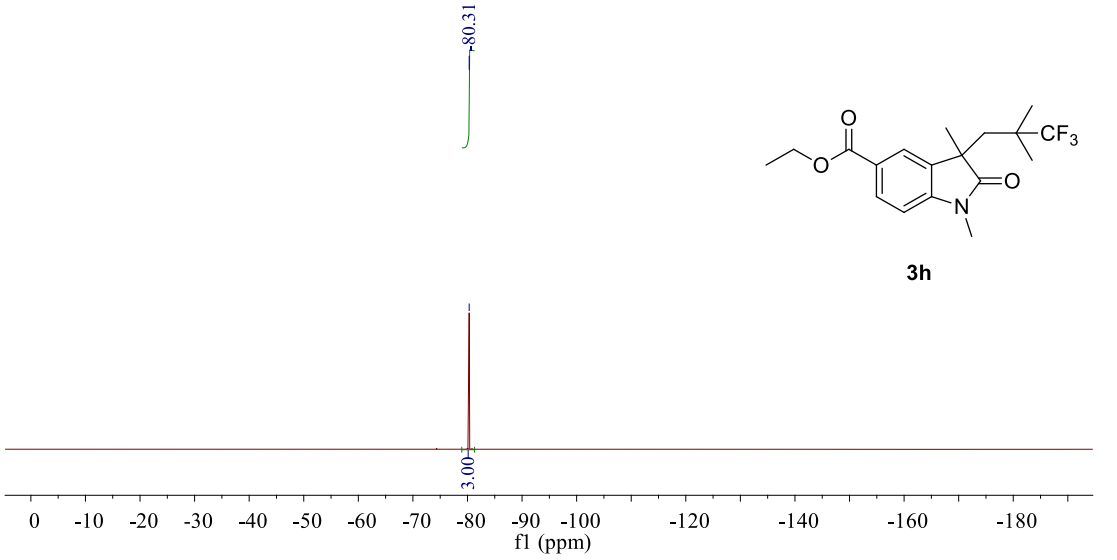

178.32
140.68
134.36
131.95
129.94
129.14
126.32
125.89
123.51
114.11
108.81
131.95
129.94
129.14
126.32
125.89
123.51
40.48
40.24
40.00
39.88
39.86
39.76
45.53
40.48
40.24
40.00
39.88
39.86
39.76
27.68
25.42
20.65
20.63
20.61
19.05
19.02
19.00
Br
CF3
O
N
3f
131 129 127 125 123
f1 (ppm)
40.6 40.4 40.2 40.0 39.8 39.6
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

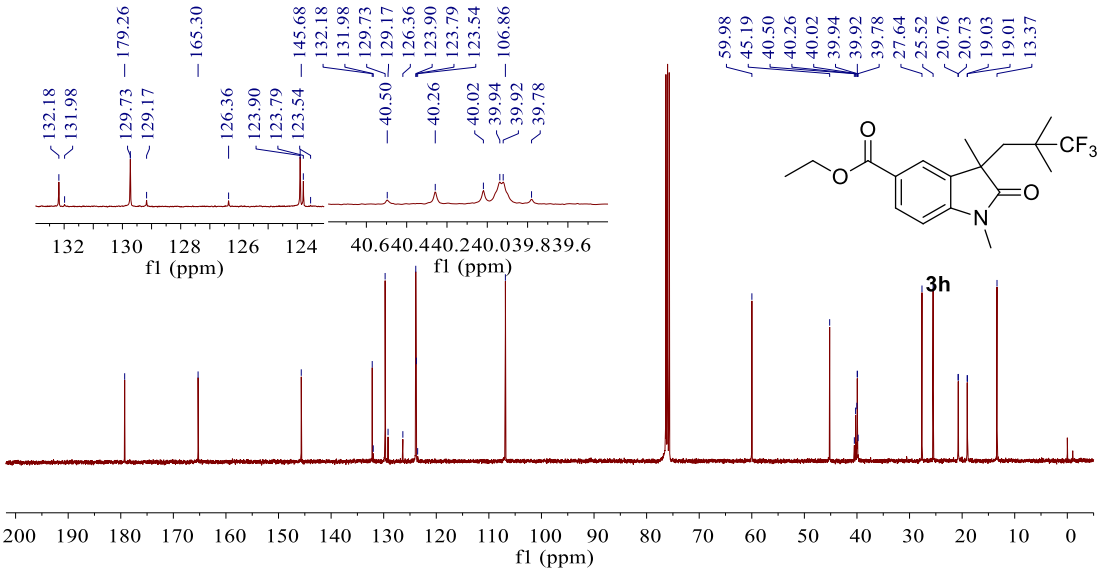

7.56
7.55
7.54
7.53
7.44
7.44
6.61
6.59
3.14
2.38
2.34
2.02
1.99
1.26
0.77
0.58
I
CF3
O
N
3g
0.97
0.96
0.98
2.99
1.00
1.02
3.00
3.07
3.03
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

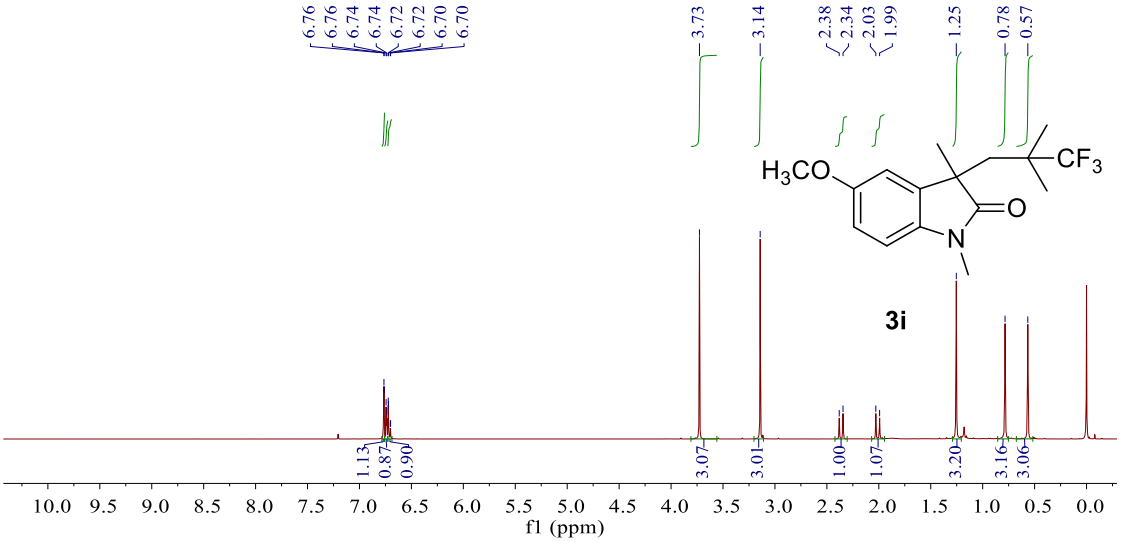

80.35
I
CF3
O
N
3g
3.00
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

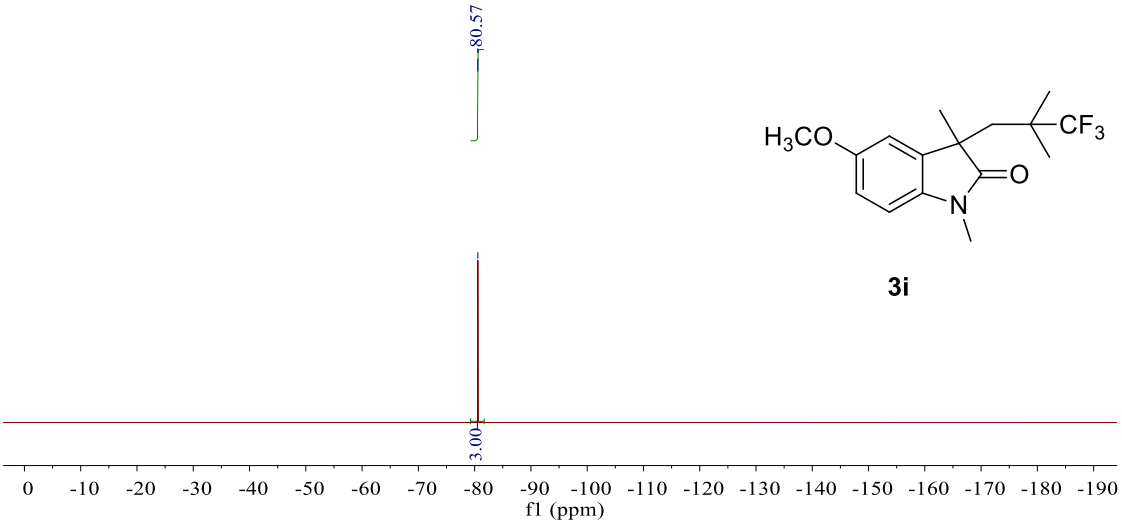

178.12
141.37
135.90
134.69
131.95
131.48
129.14
126.32
123.51
109.41
83.81
45.34
40.48
40.24
40.00
39.86
39.84
39.76
27.65
25.35
20.68
20.66
20.64
19.01
18.98
18.96
I
CF3
O
N
3g
132 130 128 126 124 122
f1 (ppm)
41.0 40.6 40.2 39.8 39.4
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

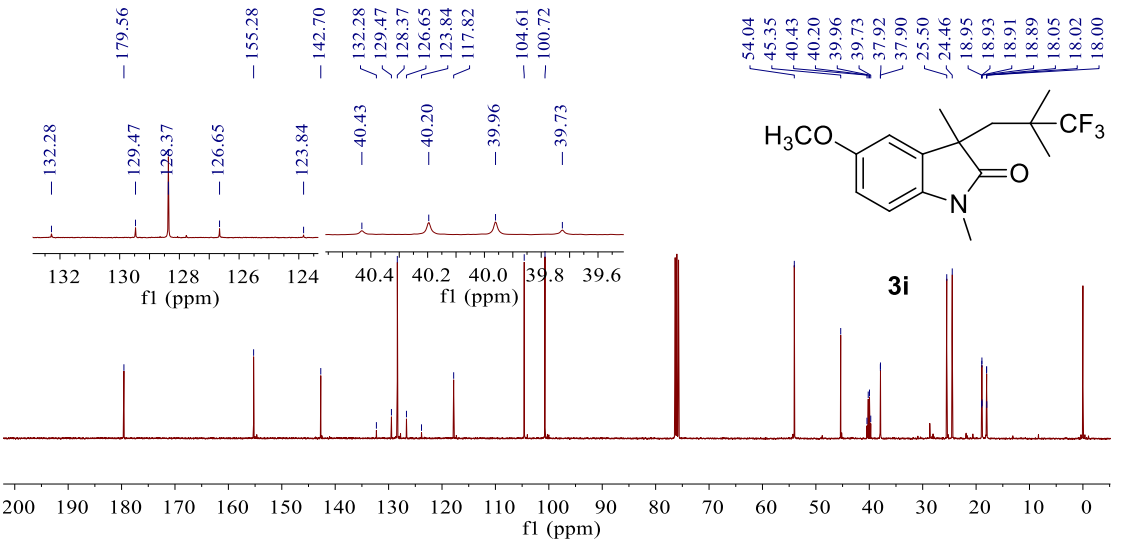

8.00
8.00
7.98
7.98
7.83
7.83
6.86
6.84
4.34
4.32
4.30
4.28
3.21
2.42
2.38
2.09
1.36
1.34
1.32
1.30
0.76
0.56
O
O
CF3
O
N
3h
1.01
0.98
1.02
2.06
3.00
1.03
1.05
3.06
2.92
3.13
3.11
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

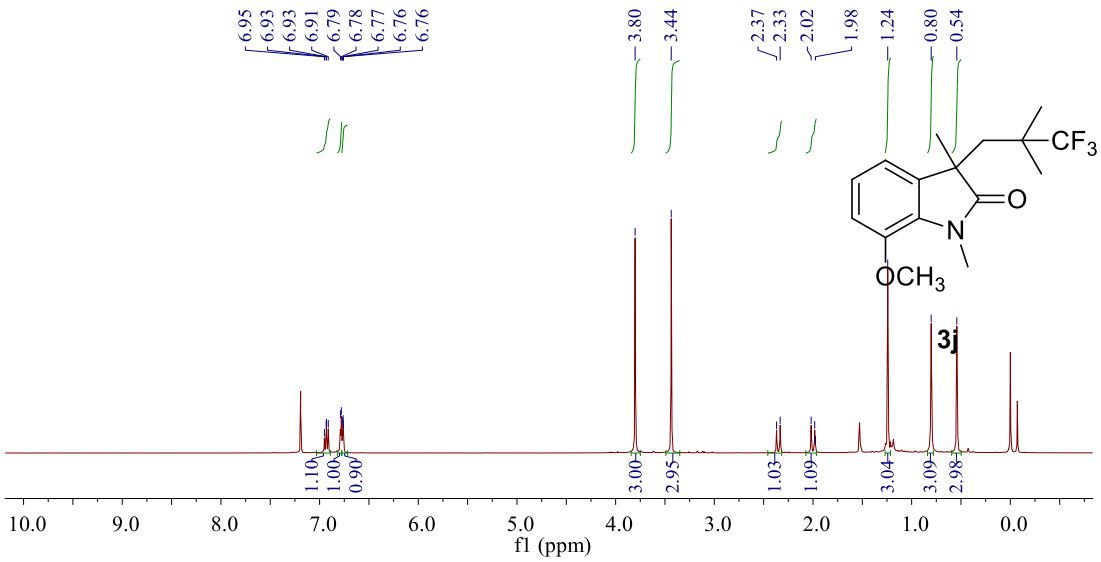

-80.31
O
O
CF3
O
N
3h
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -120 -140 -160 -180
f1 (ppm)

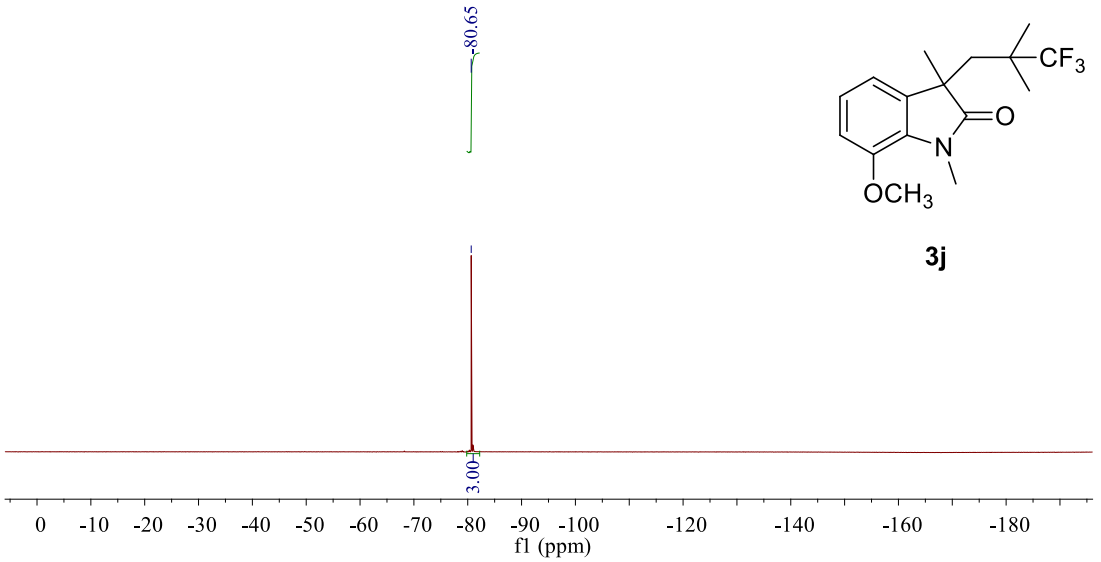

132.18
131.98
129.73
179.26
129.17
165.30
126.36
123.90
123.79
123.54
145.68
132.18
131.98
129.73
129.17
126.36
123.90
123.79
123.54
106.86
40.50
40.26
40.02
39.94
39.92
39.78
59.98
45.19
40.50
40.26
40.02
39.94
39.92
39.78
27.64
25.52
20.76
20.73
19.03
19.01
13.37
O
O
CF3
O
N
3h
132 130 128 126 124
f1 (ppm)
40.640.440.240.039.839.6
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

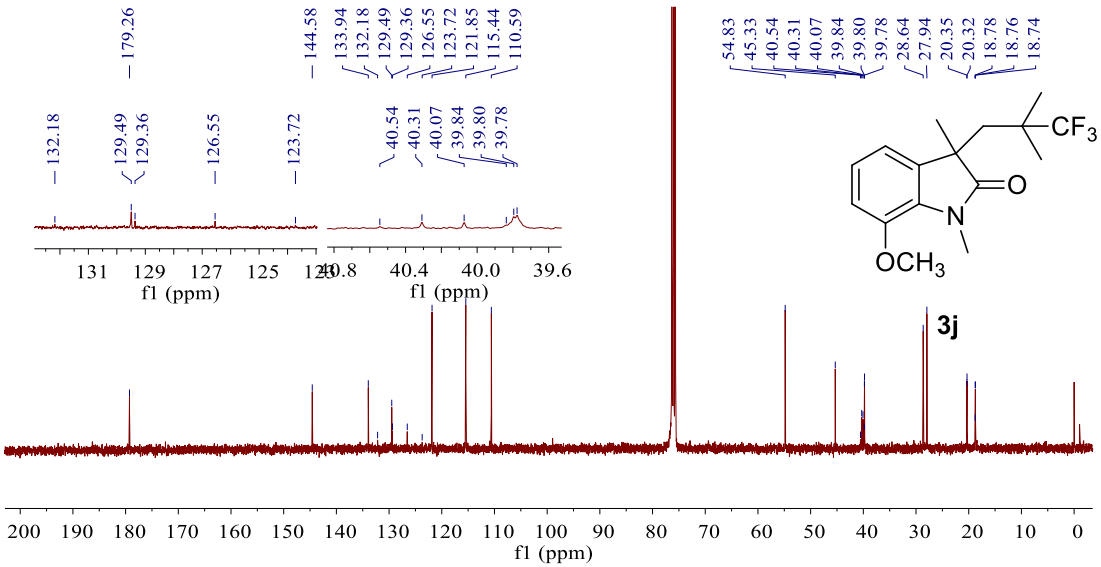

6.76
6.76
6.74
6.74
6.72
6.72
6.70
6.70
3.73
3.14
2.38
2.34
2.03
1.99
1.25
0.78
0.57
H3CO
CF3
O
N
3i
1.13
0.87
0.90
3.07
3.01
1.00
1.07
3.20
3.16
3.06
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

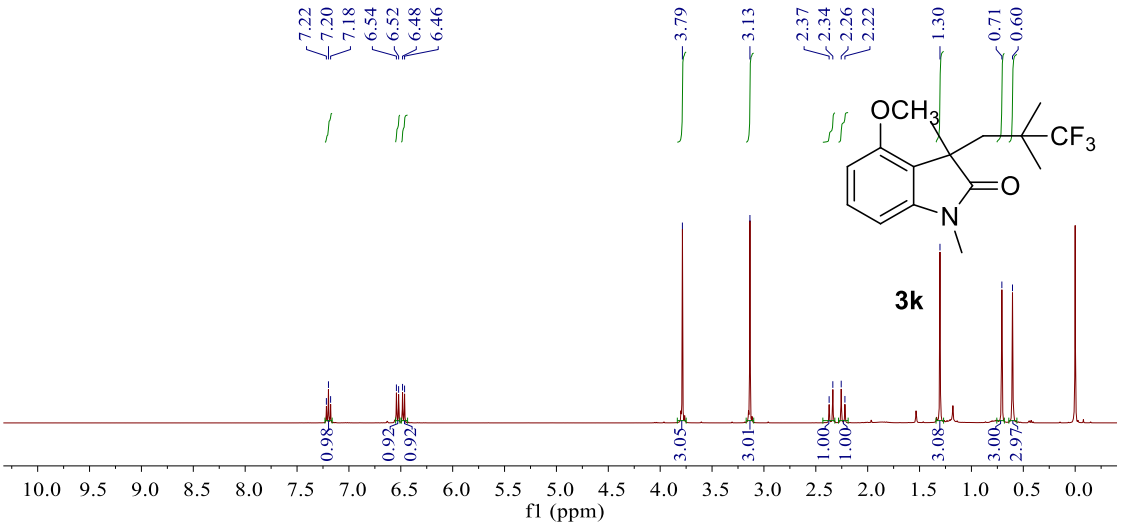

-80.57
H3CO
CF3
O
N
3i
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)

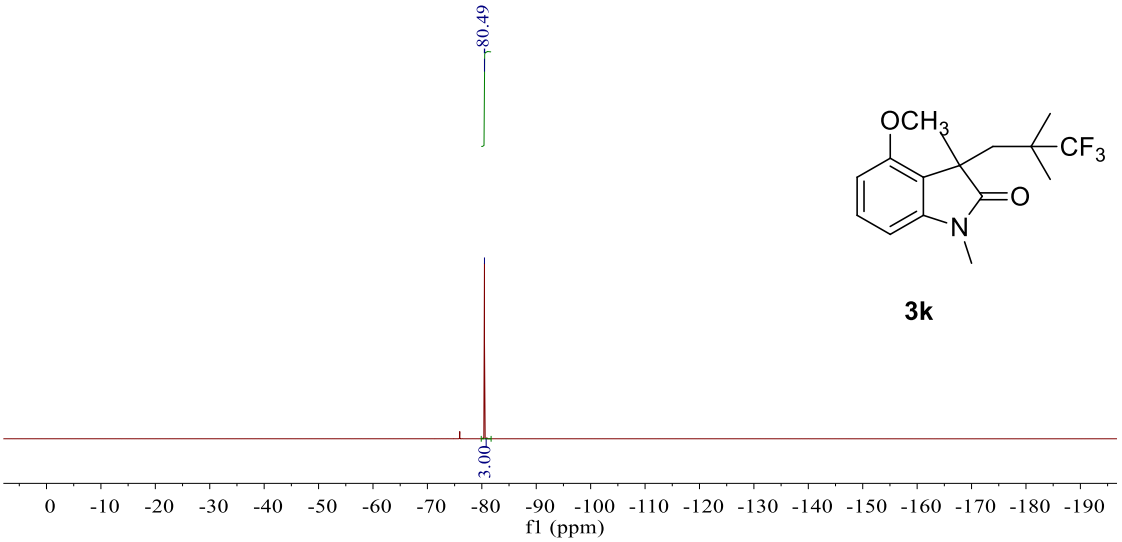

179.56
155.28
142.70
132.28
129.47
128.37
126.65
123.84
117.82
104.61
100.72
54.04
45.35
40.43
40.20
39.96
39.73
37.92
37.90
25.50
24.46
18.95
18.93
18.91
18.89
18.05
18.02
18.00
H3CO
CF3
O
N
3i
132 130 128 126 124
f1 (ppm)
40.4 40.2 40.0 39.8 39.6
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

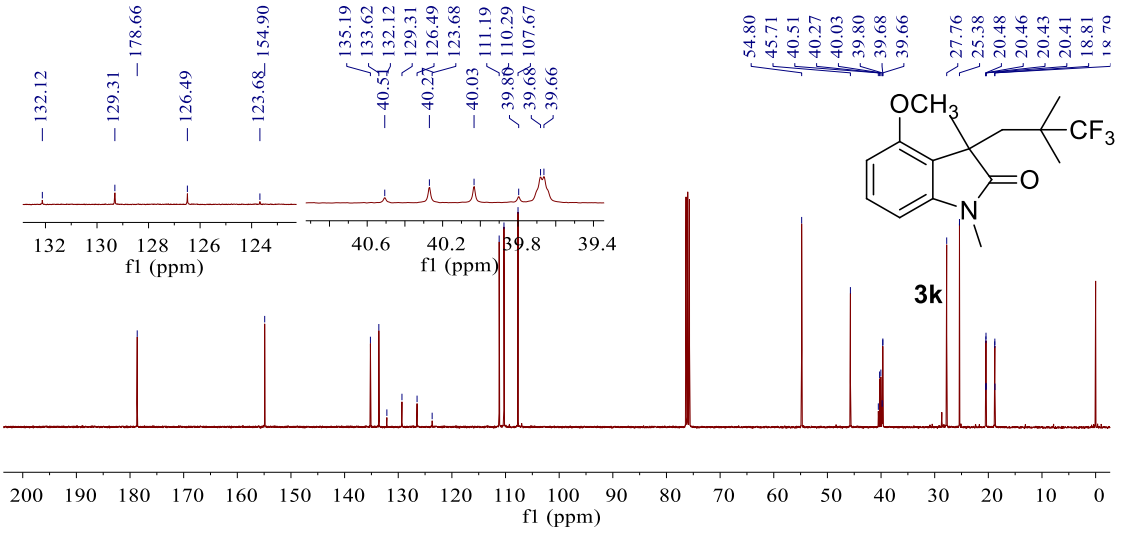

6.95
6.93
6.93
6.91
6.79
6.78
6.77
6.76
6.76
3.80
3.44
2.37
2.33
2.02
1.98
1.24
0.80
0.54
CF3
O
N
OCH3
3j
1.10
1.00
0.90
3.00
2.95
1.03
1.09
3.04
3.09
2.98
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
f1 (ppm)

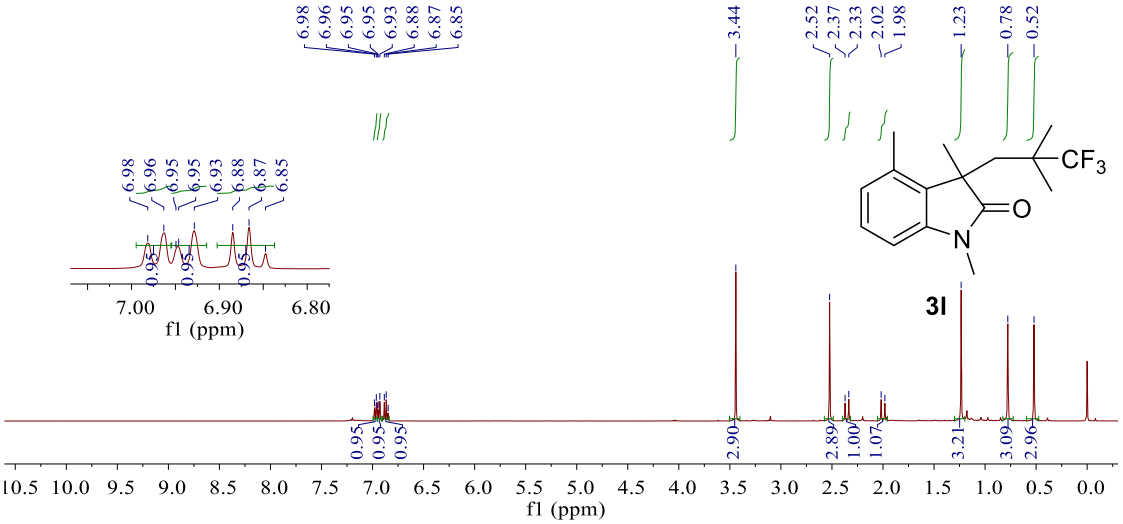

-80.65
CF3
O
N
OCH3
3j
3.00
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-120
-140
-160
-180
f1 (ppm)

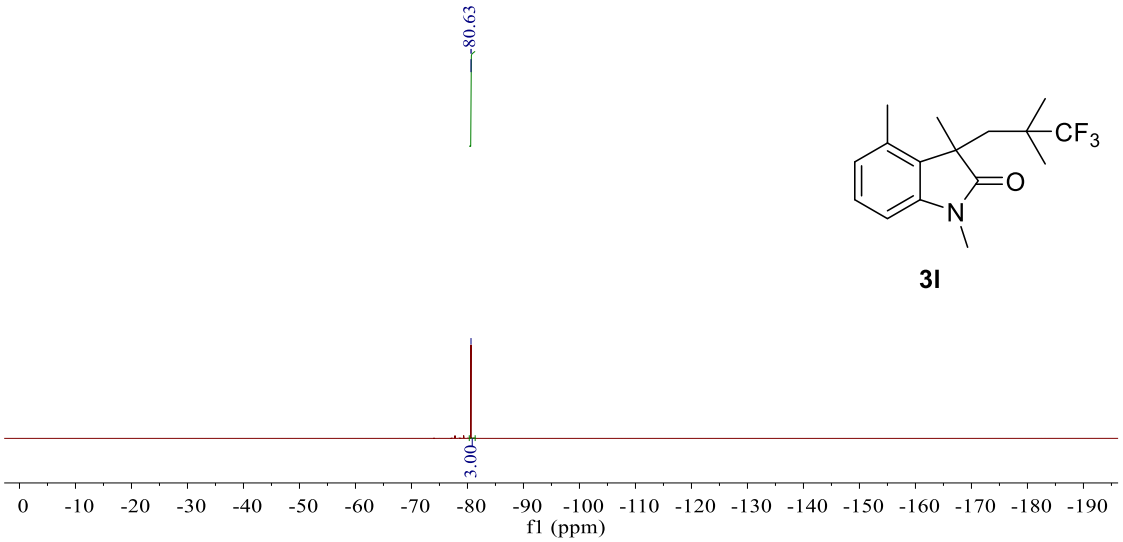

179.26
144.58
133.94
132.18
129.49
129.36
126.55
123.72
121.85
115.44
110.59
54.83
45.33
40.54
40.31
40.07
39.84
39.80
39.78
28.64
27.94
20.35
20.32
18.78
18.76
18.74
132.18
129.49
129.36
126.55
123.72
40.54
40.31
40.07
39.84
39.80
39.78
131
129
127
125
40.8
40.4
40.0
39.6
f1 (ppm)
CF3
O
N
OCH3
3j
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

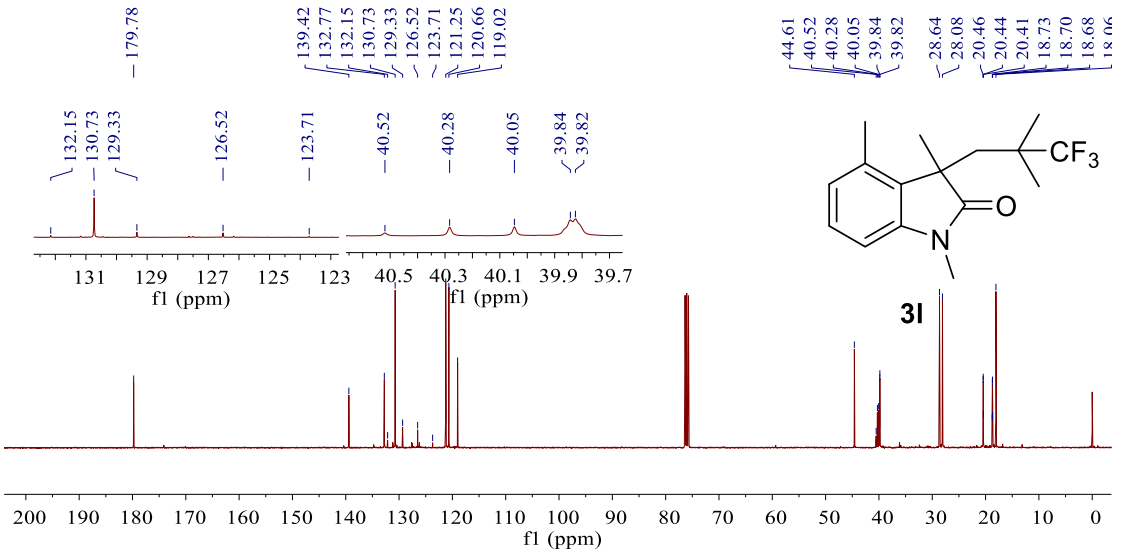

7.22
7.20
7.18
6.54
6.52
6.48
6.46
3.79
3.13
2.37
2.34
2.26
2.22
1.30
0.71
0.60
OCH3
CF3
O
N
3k
0.98
0.92
0.92
3.05
3.01
1.00
1.00
3.08
3.00
2.97
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

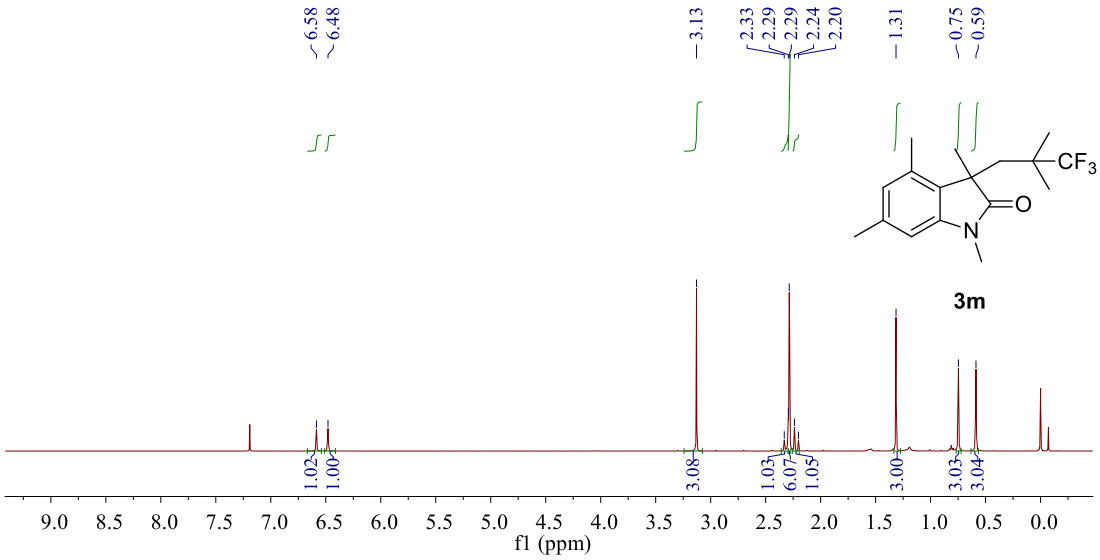

80.49
OCH3
CF3
O
N
3k
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)

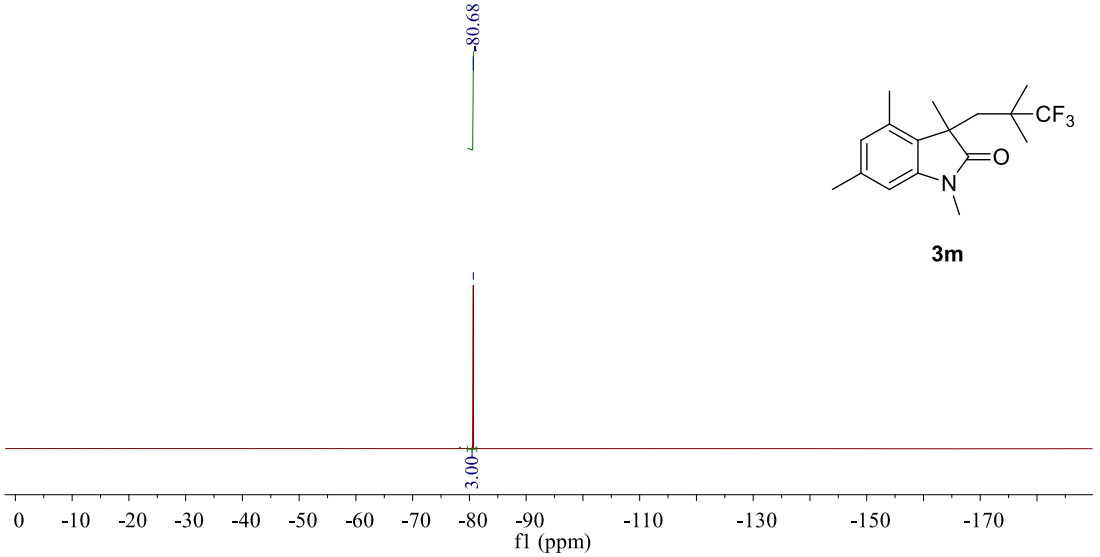

178.66
154.90
135.19
133.62
132.12
129.31
126.49
123.68
111.19
110.29
107.67
54.80
45.71
40.51
40.27
40.03
39.80
39.68
39.66
27.76
25.38
20.48
20.46
20.43
20.41
18.81
132.12
129.31
126.49
123.68
40.51
40.27
40.03
39.86
39.68
39.66
OCH3
CF3
O
N
3k
132 130 128 126 124
f1 (ppm)
40.6 40.2 39.8 39.4
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

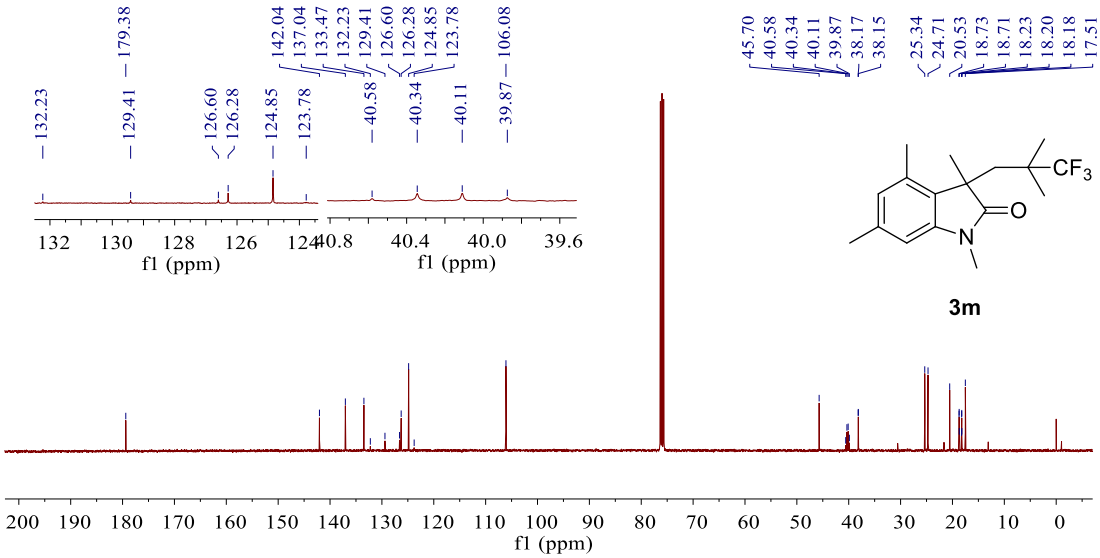

6.98
6.96
6.95
6.95
6.93
6.88
6.87
6.85
3.44
2.52
2.37
2.33
2.02
1.98
1.23
0.78
0.52
CF3
O
N
3l
7.00
6.90
6.80
f1 (ppm)
0.95
0.95
0.95
2.90
2.89
1.00
1.07
3.21
3.09
2.96
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

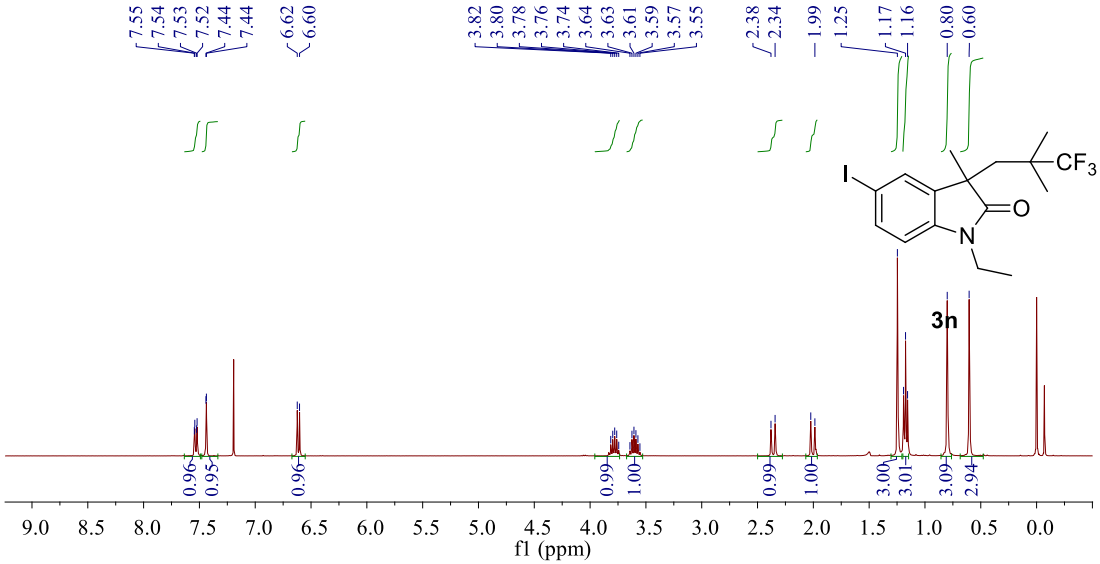

80.63
CF3
O
N
3l
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)

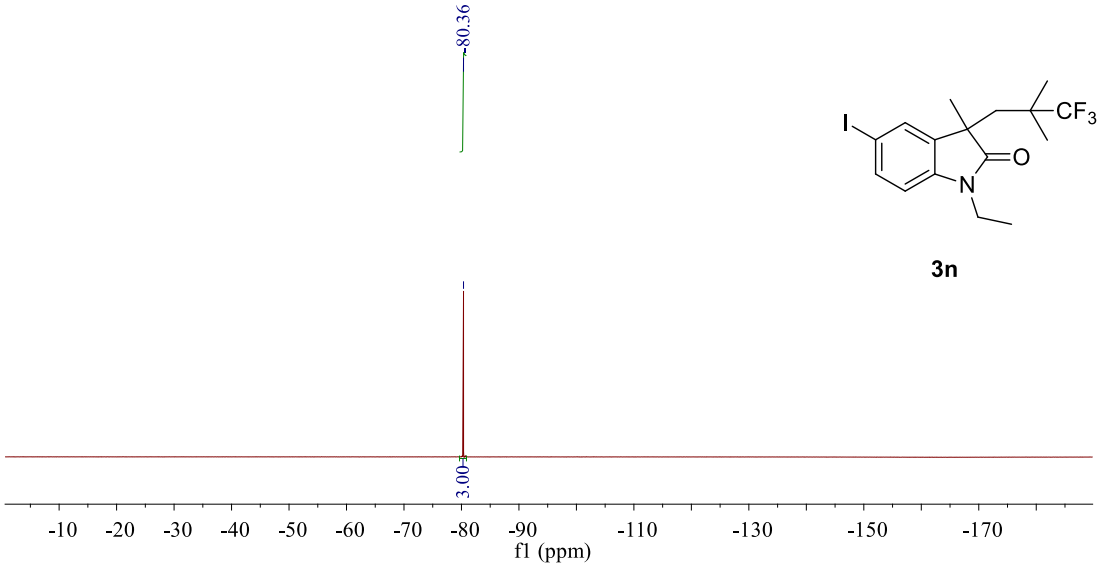

179.78
139.42
132.77
132.15
130.73
129.33
126.52
123.71
121.25
120.66
119.02
44.61
40.52
40.28
40.05
39.84
39.82
28.64
28.08
20.46
20.44
20.41
18.73
18.70
18.68
132.15
130.73
129.33
126.52
123.71
40.52
40.28
40.05
39.84
39.82
131 129 127 125 123
f1 (ppm)
40.5 40.3 40.1 39.9 39.7
f1 (ppm)
CF3
O
N
3l
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

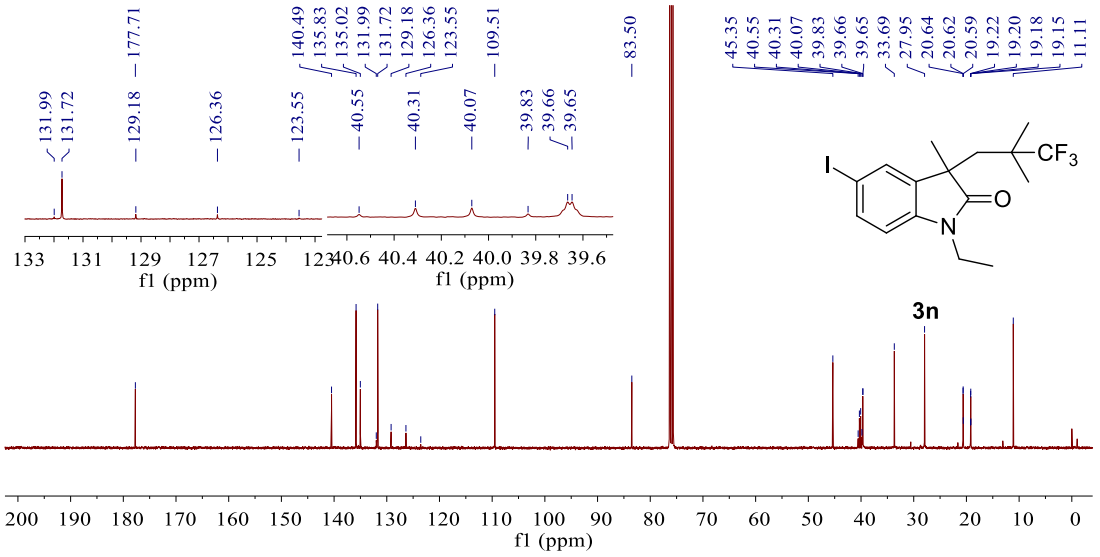

6.58
6.48
3.13
2.33
2.29
2.29
2.24
2.20
1.31
0.75
0.59
CF3
O
N
3m
1.02
1.00
3.08
1.03
6.07
1.05
3.00
3.03
3.04
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

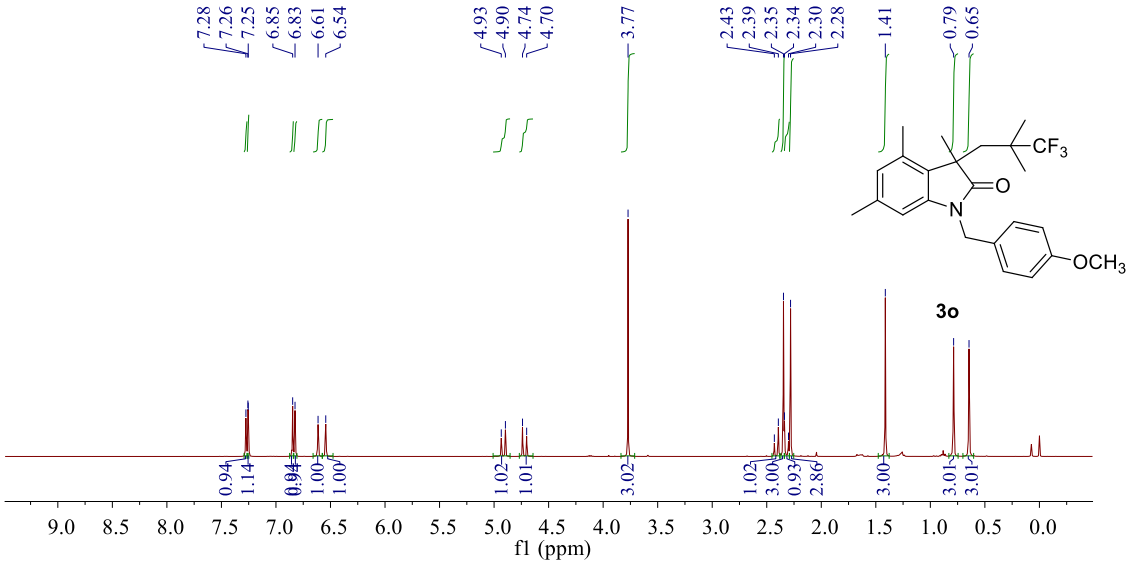

80.68
CF3
O
N
3m
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -110 -130 -150 -170
f1 (ppm)

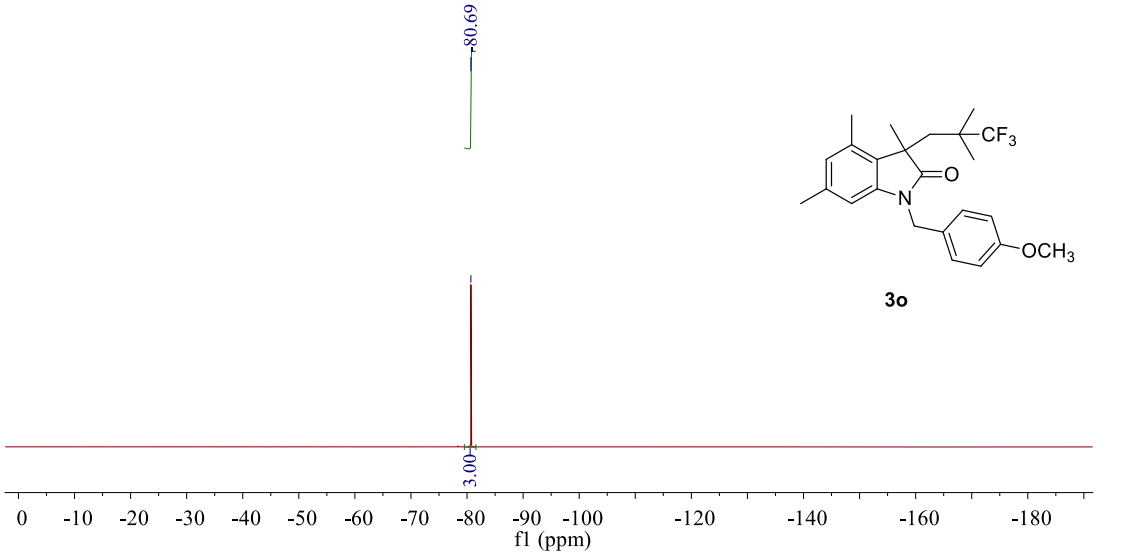

132.23
179.38
129.41
126.60
126.28
124.85
123.78
142.04
137.04
133.47
132.23
129.41
126.60
126.28
124.85
123.78
40.58
40.34
40.11
39.87
106.08
45.70
40.58
40.34
40.11
39.87
38.17
38.15
25.34
24.71
20.53
18.73
18.71
18.23
18.20
18.18
17.51
CF3
O
N
3m
132 130 128 126 124
f1 (ppm)
40.8 40.4 40.0 39.6
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

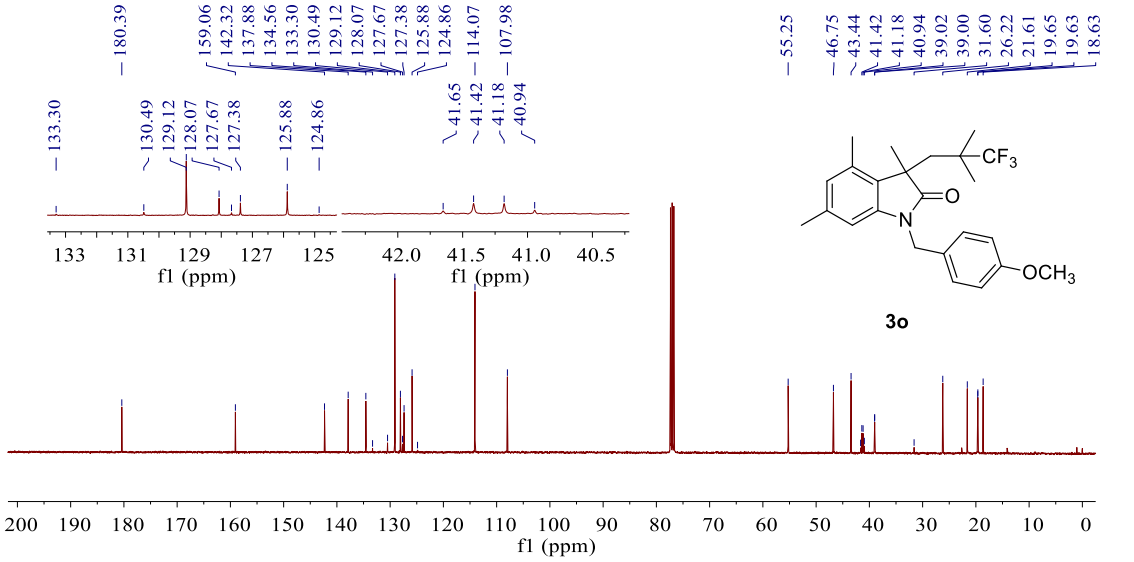

7.55
7.54
7.53
7.52
7.44
7.44
6.62
6.60
3.82
3.80
3.78
3.76
3.74
3.64
3.63
3.61
3.59
3.57
3.55
2.38
2.34
1.99
1.25
1.17
1.16
0.80
0.60
I
CF3
O
N
3n
0.96
0.95
0.96
0.99
1.00
0.99
1.00
3.00
3.01
3.09
2.94
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

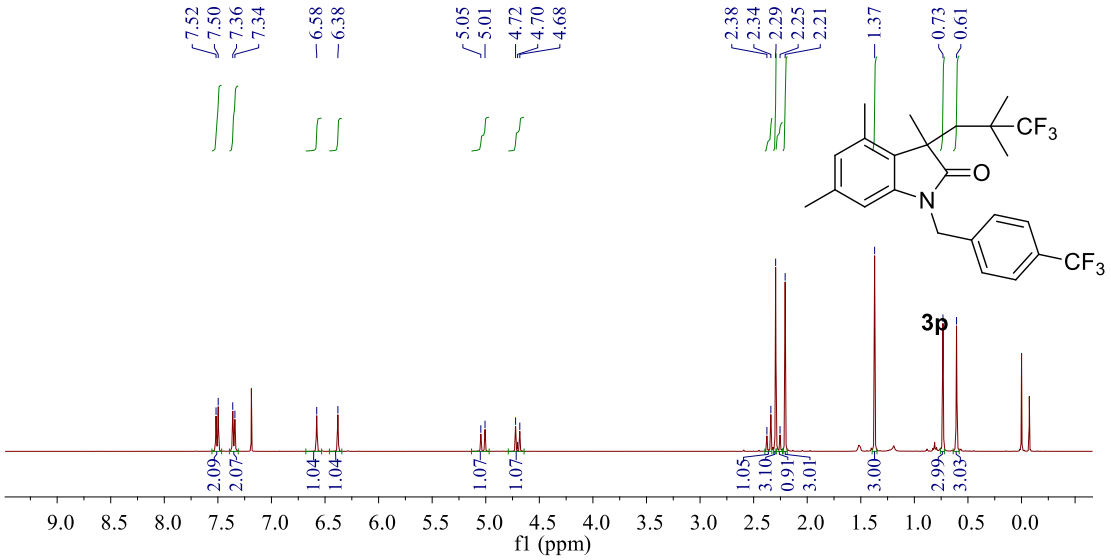

-80.36
I
CF3
O
N
3n
3.00
-10 -20 -30 -40 -50 -60 -70 -80 -90 -110 -130 -150 -170
f1 (ppm)


131.99
131.72
129.18
177.71
126.36
123.55
140.49
135.83
135.02
131.99
131.72
129.18
126.36
123.55
109.51
83.50
40.55
40.31
40.07
39.83
39.66
39.65
45.35
40.55
40.31
40.07
39.83
39.66
39.65
33.69
27.95
20.64
20.62
20.59
19.22
19.20
19.18
19.15
11.11
I
CF3
O
N
3n
133 131 129 127 125 123
f1 (ppm)
40.6 40.4 40.2 40.0 39.8 39.6
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.28
7.26
7.25
6.85
6.83
6.61
6.54
4.93
4.90
4.74
4.70
3.77
2.43
2.39
2.35
2.34
2.30
2.28
1.41
0.79
0.65
CF3
O
N
OCH3
3o
0.94
1.14
1.00
1.00
1.02
1.01
3.02
1.02
3.00
0.93
2.86
3.00
3.01
3.01
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


-80.69
CF3
O
N
OCH3
3o
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -120 -140 -160 -180
f1 (ppm)


180.39
159.06
142.32
137.88
134.56
133.30
130.49
129.12
128.07
127.67
127.38
125.88
124.86
114.07
107.98
55.25
46.75
43.44
41.42
41.18
40.94
39.02
39.00
31.60
26.22
21.61
19.65
19.63
18.63
41.65
41.42
41.18
40.94
CF3
O
N
OCH3
3o
133 131 129 127 125
f1 (ppm)
42.0 41.5 41.0 40.5
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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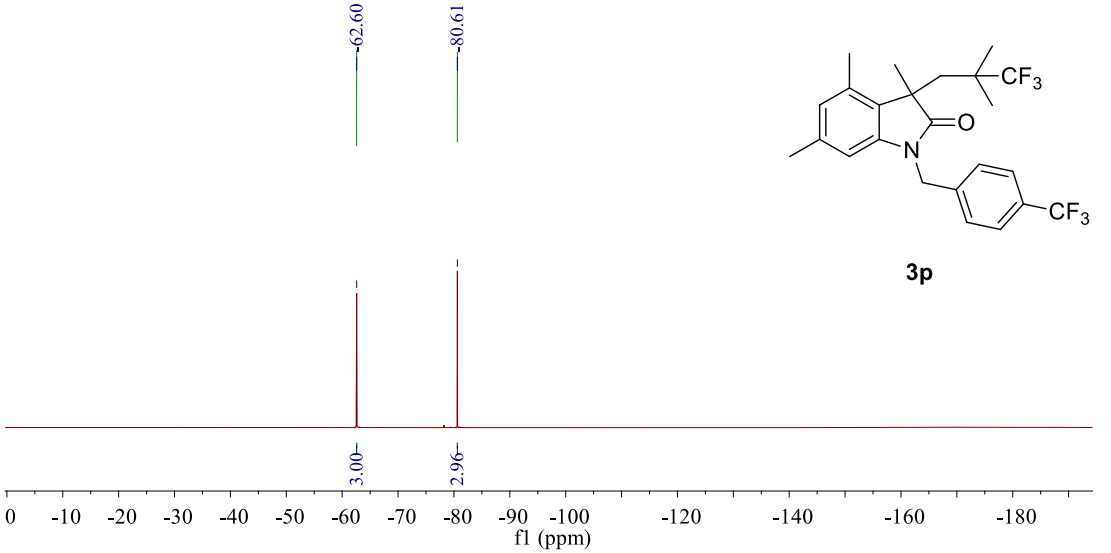
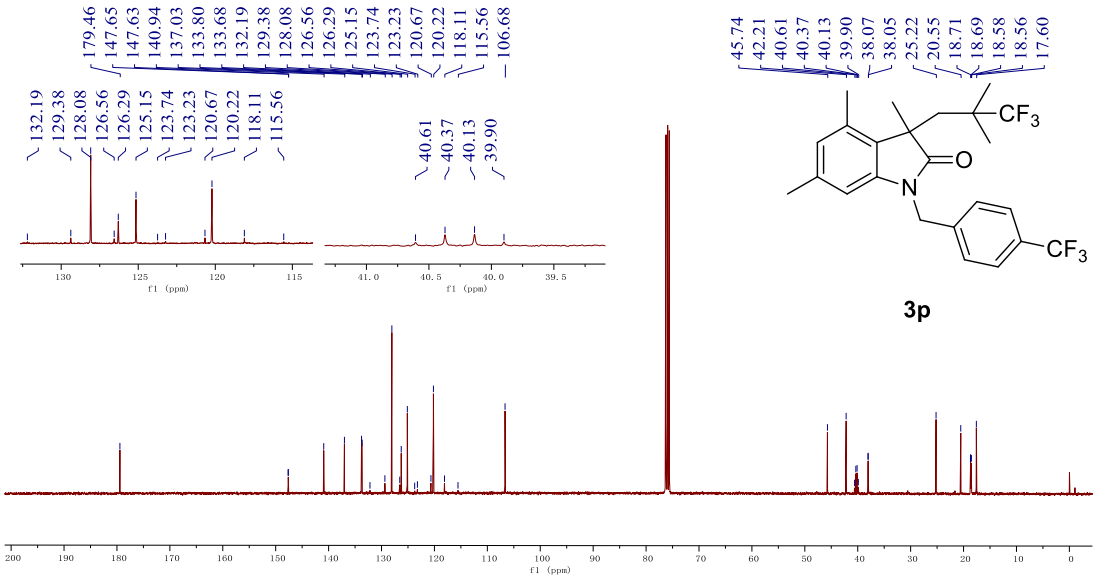
7.50
7.36
7.34
6.58
6.38
5.05
5.01
4.72
4.70
4.68
2.38
2.34
2.29
2.25
2.21
1.37
0.73
0.61
CF3
O
N
CF3
3p
2.09
2.07
1.04
1.04
1.07
1.07
1.05
3.10
0.91
3.01
3.00
2.99
3.03
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


-62.60
-80.61
CF3
O
N
CF3
3p
3.00
2.96
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -120 -140 -160 -180
f1 (ppm)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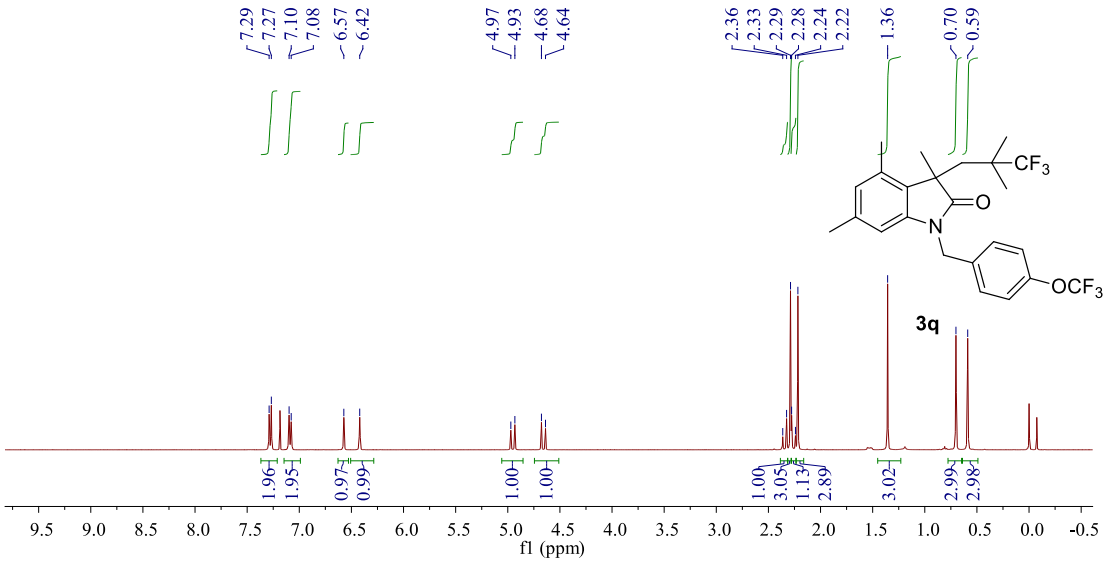
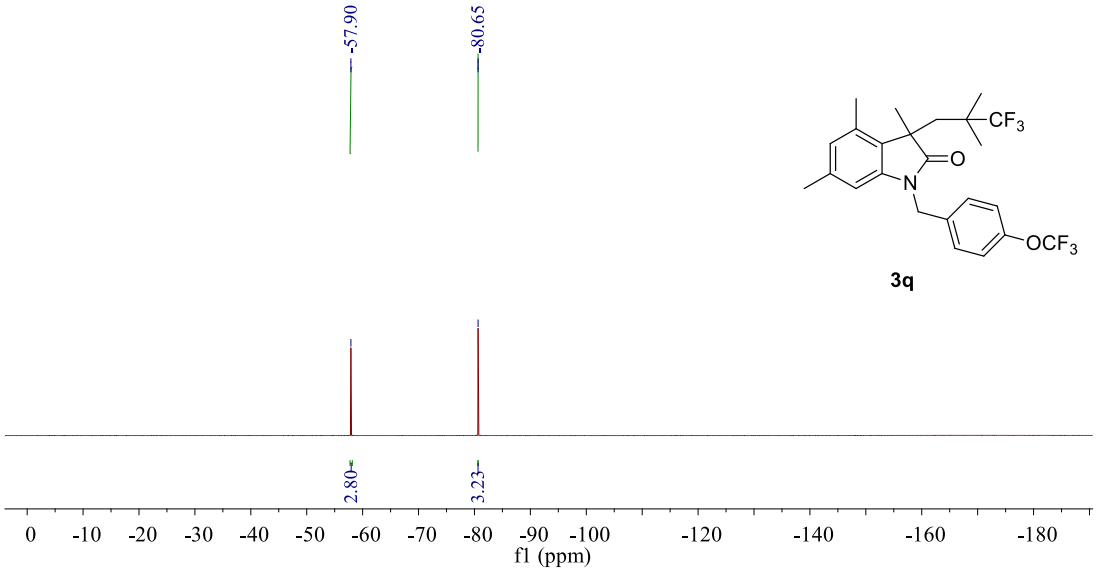
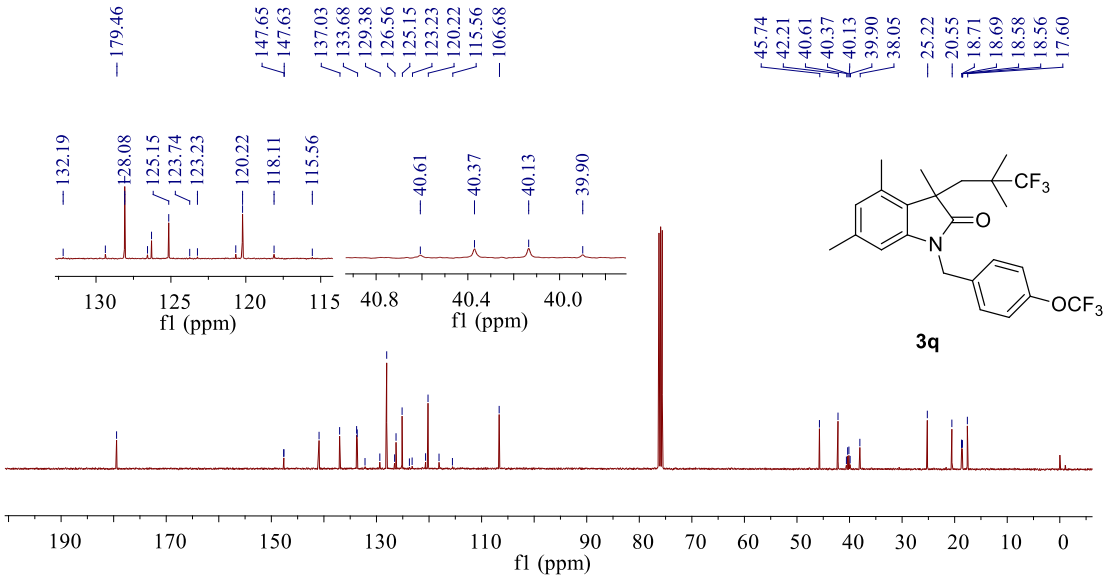
147.63
140.94
137.03
133.80
133.68
132.19
129.38
128.08
126.56
126.29
125.15
123.74
123.23
120.67
120.22
118.11
115.56
106.68
45.74
42.21
40.61
40.37
40.13
39.90
38.07
38.05
25.22
20.55
18.71
18.69
18.58
18.56
17.60
CF3
O
N
CF3
3p
f1 (ppm)


7.29
7.27
7.10
7.08
6.57
6.42
4.97
4.93
4.68
4.64
2.36
2.33
2.29
2.28
2.24
2.22
1.36
0.70
0.59
CF3
O
N
OCF3
3q
1.96
1.95
0.97
0.99
1.00
1.00
1.00
3.05
1.13
2.89
3.02
2.99
2.98
fl (ppm)


-57.90
-80.65
CF3
O
N
OCF3
3q
2.80
3.23
fl (ppm)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147.65
147.63
137.03
133.68
129.38
126.56
125.15
123.23
120.22
115.56
106.68
45.74
42.21
40.61
40.37
40.13
39.90
38.05
25.22
20.55
18.71
18.69
18.58
18.56
17.60
132.19
128.08
125.15
123.74
123.23
120.22
118.11
115.56
40.61
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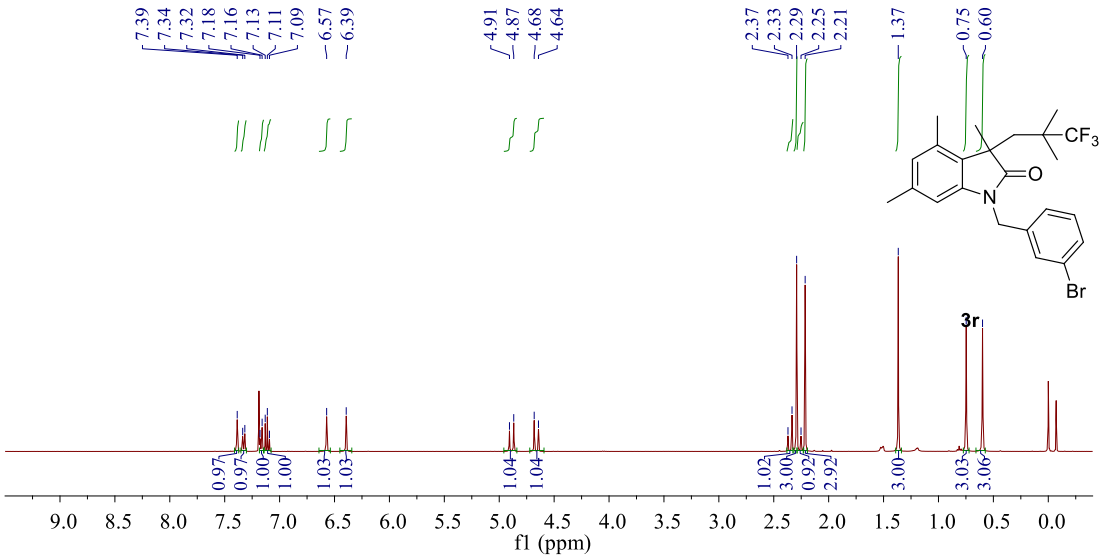
40.13
39.90
fl (ppm)
fl (ppm)
CF3
O
N
OCF3
3q
fl (ppm)


7.39
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7.32
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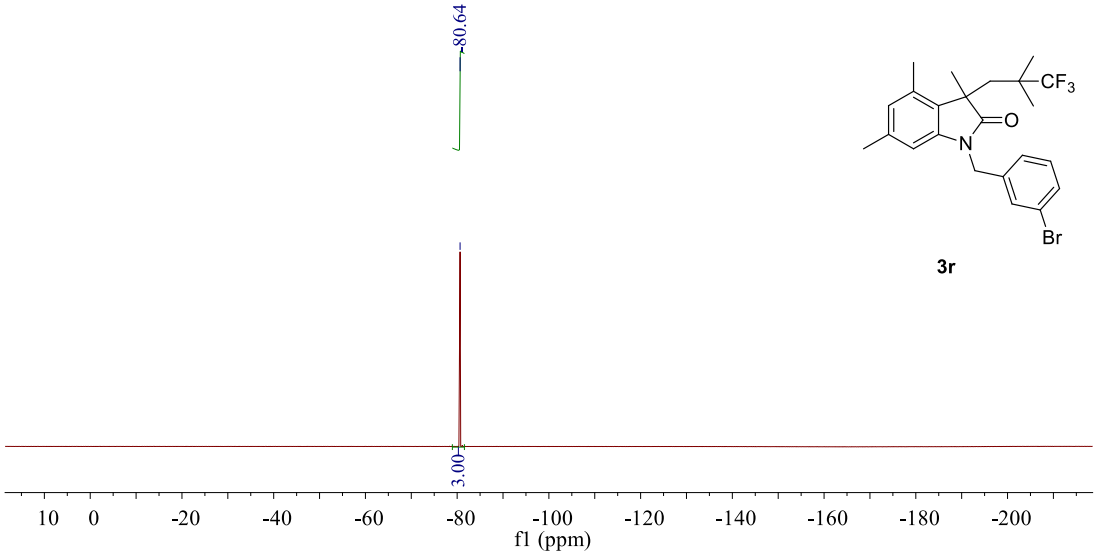
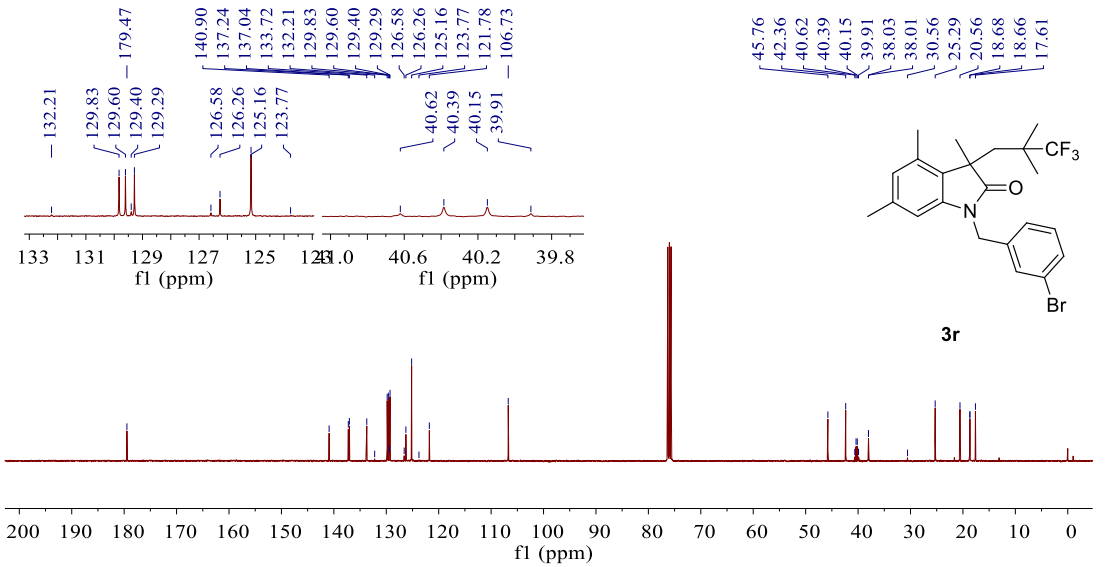
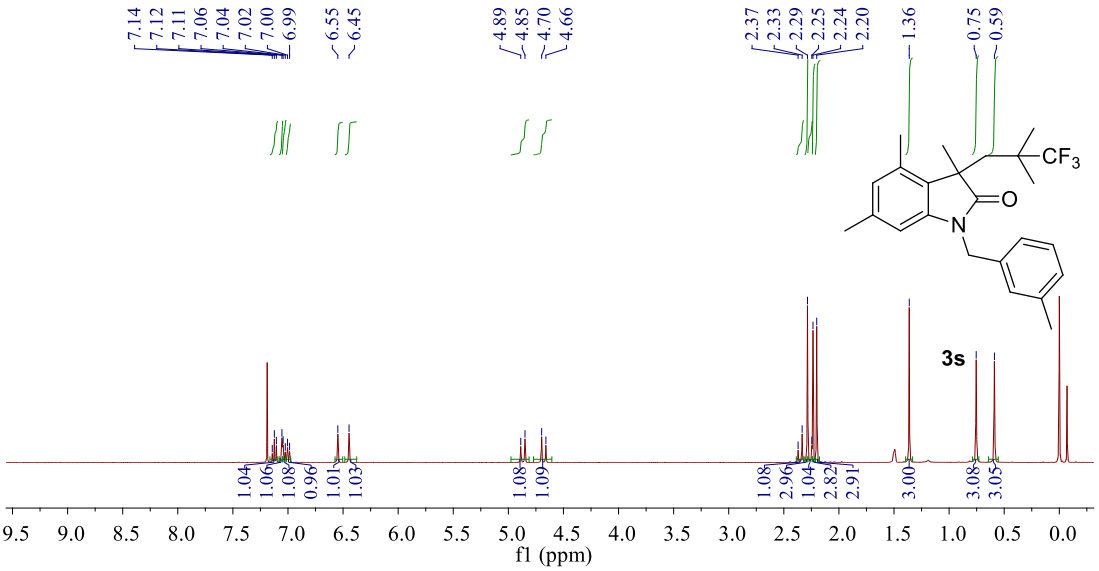
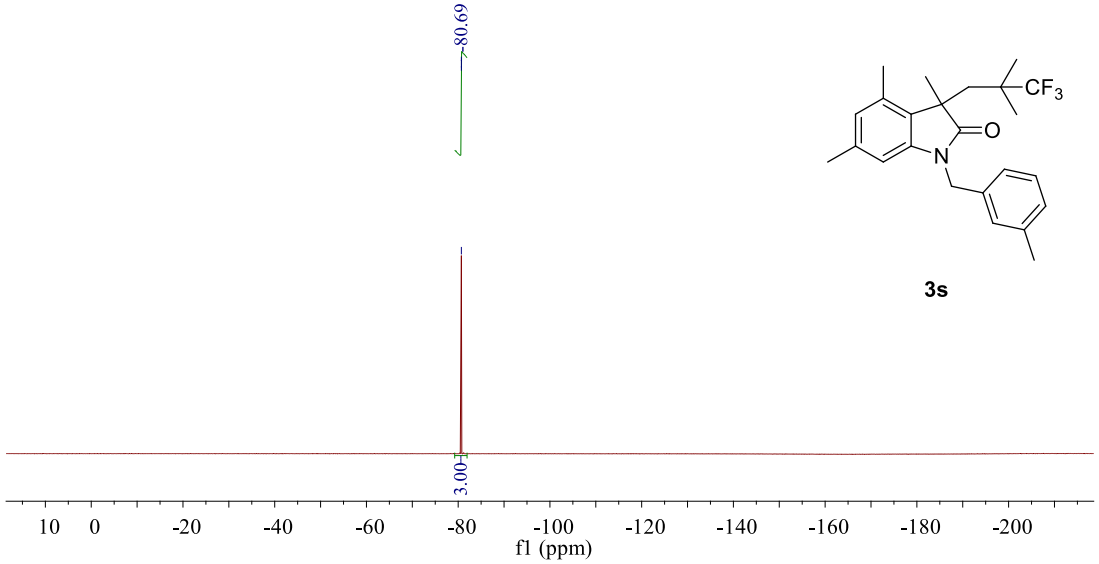
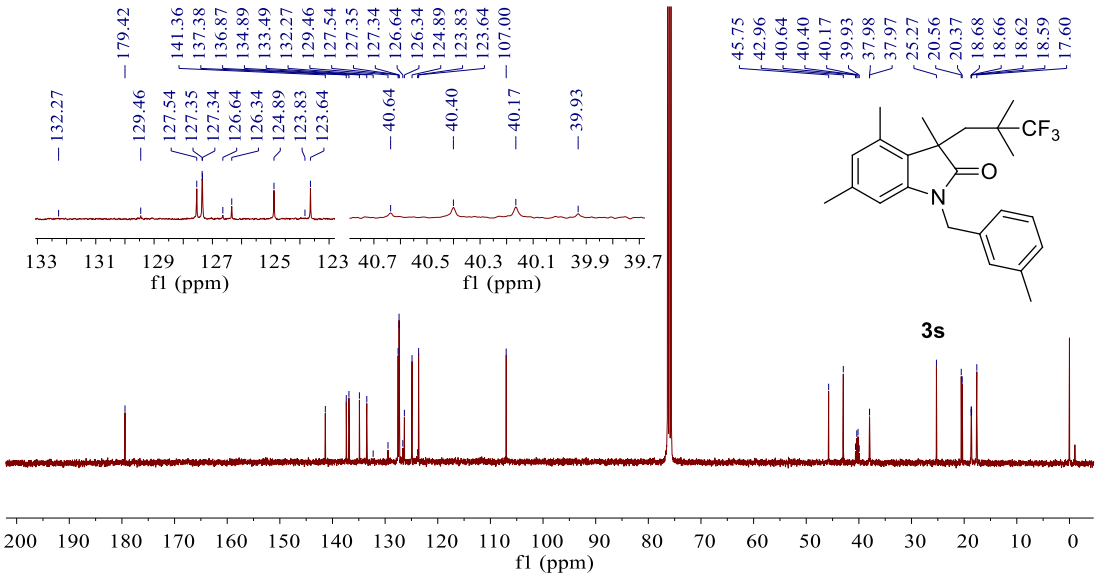
7.13
7.11
7.09
6.57
6.39
4.91
4.87
4.68
4.64
2.37
2.33
2.29
2.25
2.21
1.37
0.75
0.60
CF3
O
N
Br
3r
0.97
0.97
1.00
1.00
1.03
1.03
1.04
1.04
1.02
3.00
0.92
2.92
3.00
3.03
3.06
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

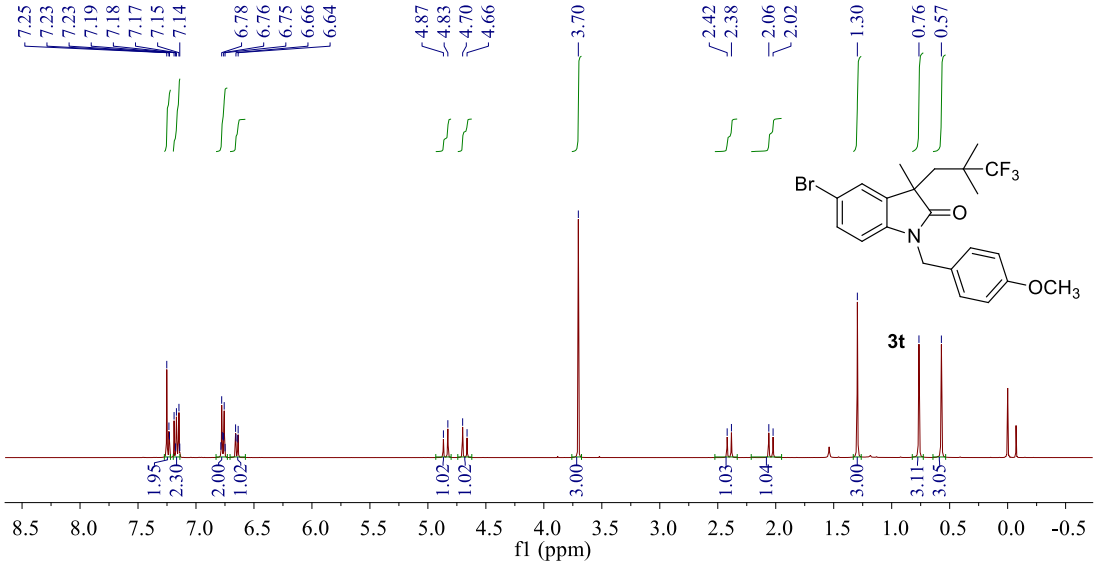

80.64
CF3
O
N
Br
3r
3.00
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)


140.90
137.24
137.04
133.72
132.21
129.83
129.60
129.40
129.29
126.58
126.26
125.16
123.77
121.78
106.73
179.47
132.21
129.83
129.60
129.40
129.29
126.58
126.26
125.16
123.77
40.62
40.39
40.15
39.91
45.76
42.36
40.62
40.39
40.15
39.91
38.03
38.01
30.56
25.29
20.56
18.68
18.66
17.61
CF3
O
N
Br
3r
133 131 129 127 125
41.0 40.6 40.2 39.8
f1 (ppm)
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.14
7.12
7.11
7.06
7.04
7.02
7.00
6.99
6.55
6.45
4.89
4.85
4.70
4.66
2.37
2.33
2.29
2.25
2.24
2.20
1.36
0.75
0.59
CF3
O
N
3s
1.04
1.06
1.08
0.96
1.01
1.03
1.08
1.09
1.08
2.96
1.04
2.82
2.91
3.00
3.08
3.05
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


80.69
CF3
O
N
3s
3.00
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)


179.42
141.36
137.38
136.87
134.89
133.49
132.27
129.46
127.54
127.35
127.34
126.64
126.34
124.89
123.83
123.64
107.00
132.27
129.46
127.54
127.35
127.34
126.64
126.34
124.89
123.83
123.64
40.64
40.40
40.17
39.93
45.75
42.96
40.64
40.40
40.17
39.93
37.98
37.97
25.27
20.56
20.37
18.68
18.66
18.62
18.59
17.60
CF3
O
N
3s
133 131 129 127 125 123
f1 (ppm)
40.7 40.5 40.3 40.1 39.9 39.7
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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7.23
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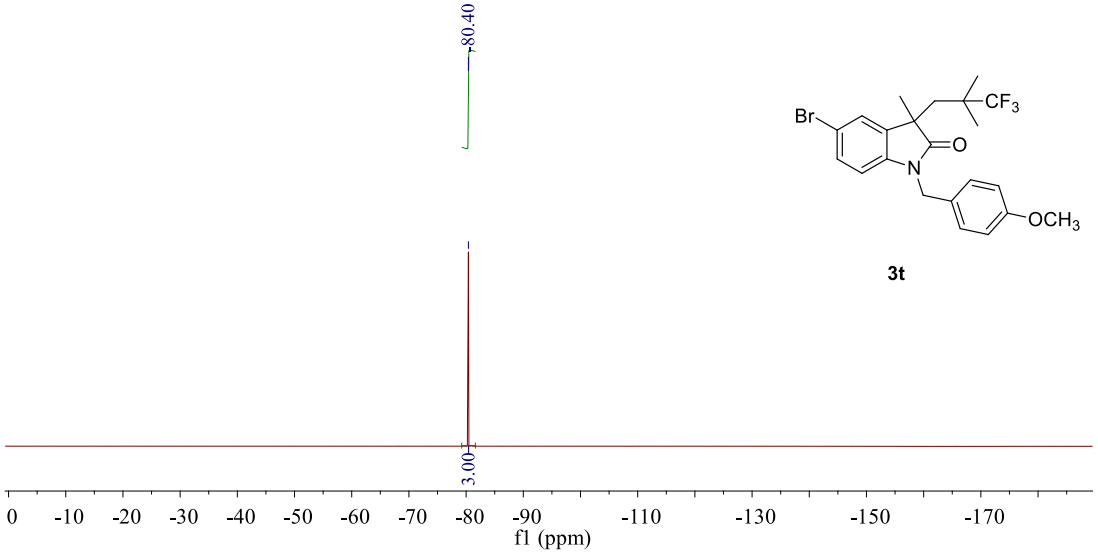
7.14
6.78
6.76
6.75
6.66
6.64
4.87
4.83
4.70
4.66
3.70
2.42
2.38
2.06
2.02
1.30
0.76
0.57
Br
CF3
O
N
OCH3
3t
1.95
2.30
2.00
1.02
1.02
1.02
3.00
1.03
1.04
3.00
3.11
3.05
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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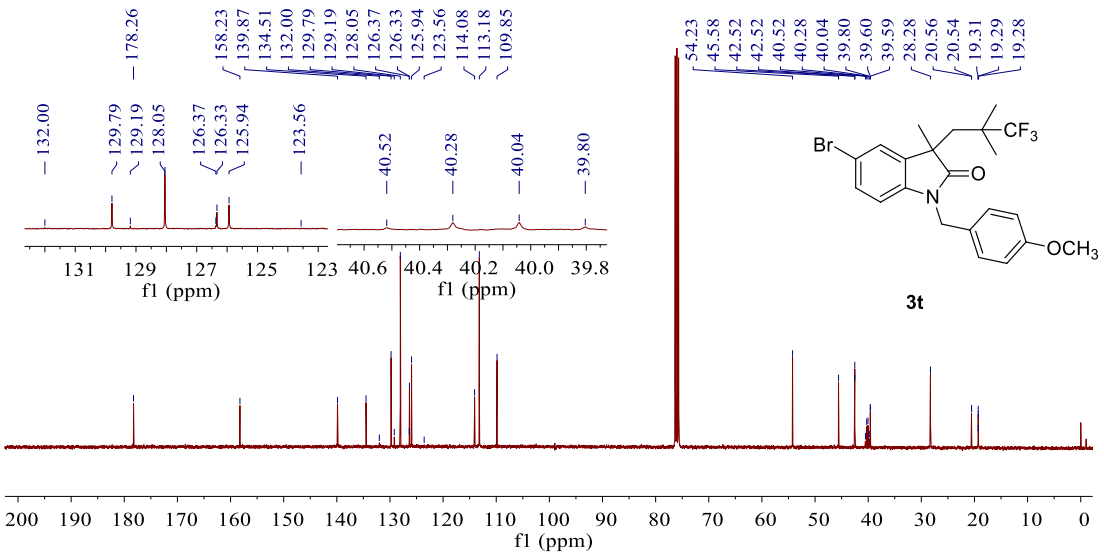
OCH3
3t
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -110 -130 -150 -170
f1 (ppm)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126.33
125.94
123.56
114.08
113.18
109.85
54.23
45.58
42.52
42.52
40.52
40.28
40.04
39.80
39.60
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28.28
20.56
20.54
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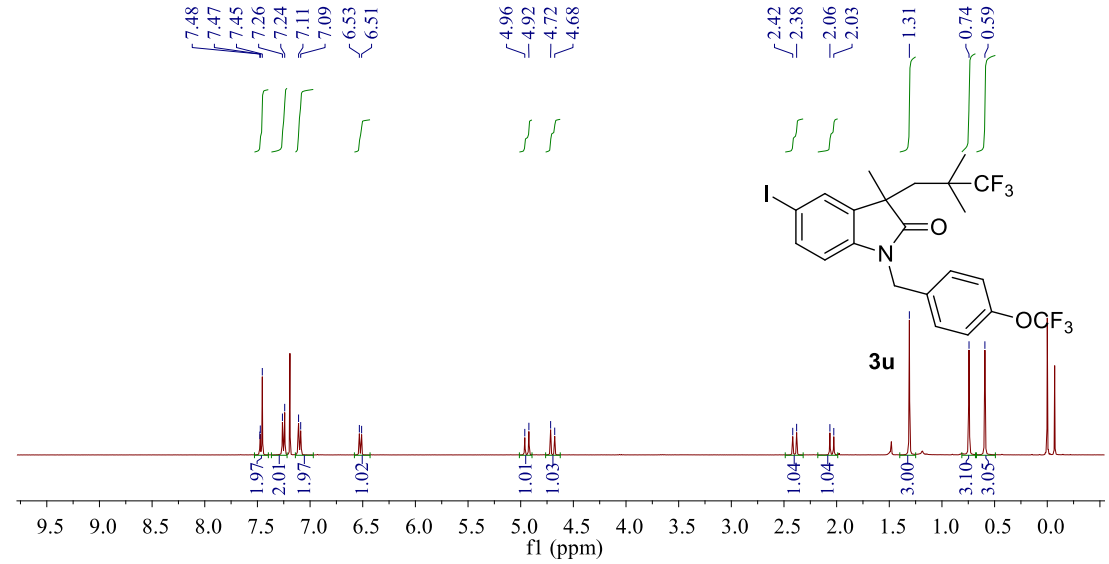
19.28
132.00
129.79
129.19
128.05
126.37
126.33
125.94
123.56
40.52
40.28
40.04
39.80
131 129 127 125 123
f1 (ppm)
40.6 40.4 40.2 40.0 39.8
f1 (ppm)
Br
CF3
O
N
OCH3
3t
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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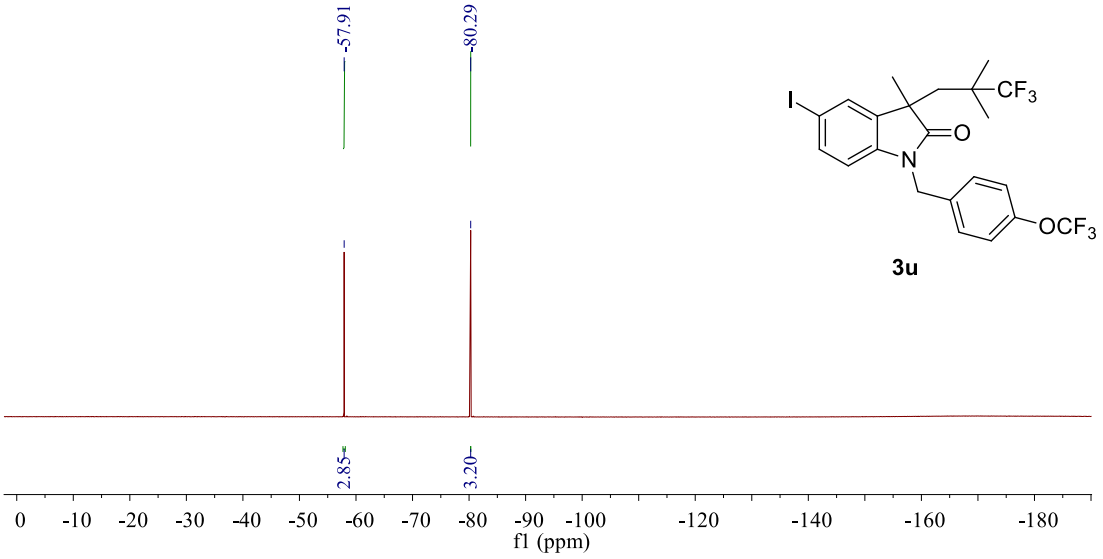
6.51
4.96
4.92
4.72
4.68
2.42
2.38
2.06
2.03
1.31
0.74
0.59
I
CF3
O
N
OCF3
3u
1.97
2.01
1.97
1.02
1.01
1.03
1.04
1.04
3.00
3.10
3.05
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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-80.29
I
CF3
O
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OCF3
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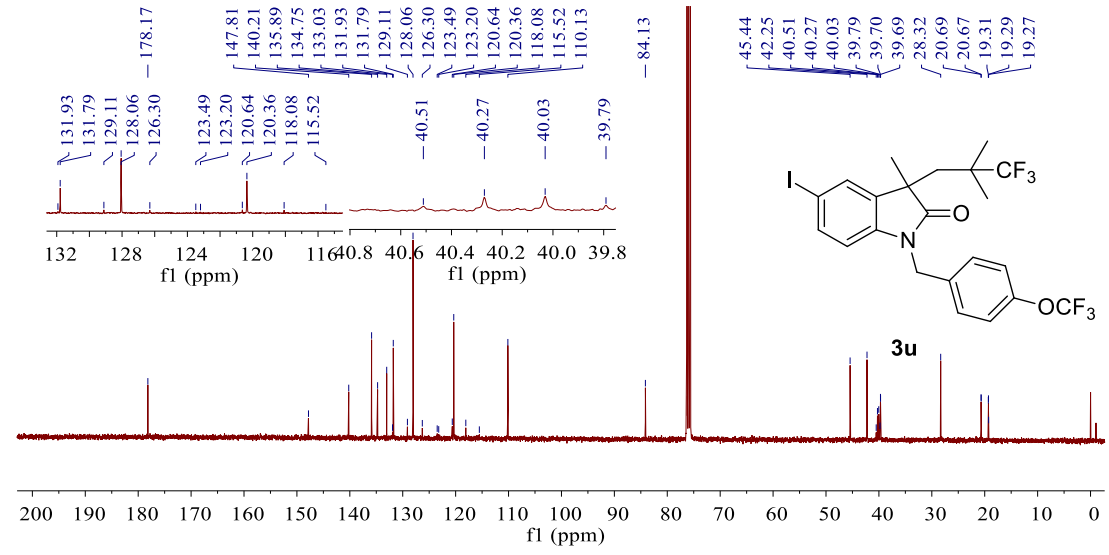
2.85
3.20
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -120 -140 -160 -180
f1 (ppm)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133.03
131.93
131.79
129.11
128.06
126.30
123.49
123.20
120.64
120.36
118.08
115.52
110.13
84.13
45.44
42.25
40.51
40.27
40.03
39.79
39.70
39.69
28.32
20.69
20.67
19.31
19.29
19.27
I
CF3
O
N
OCF3
3u
132 128 124 120 116
f1 (ppm)
40.8 40.6 40.4 40.2 40.0 39.8
f1 (ppm)
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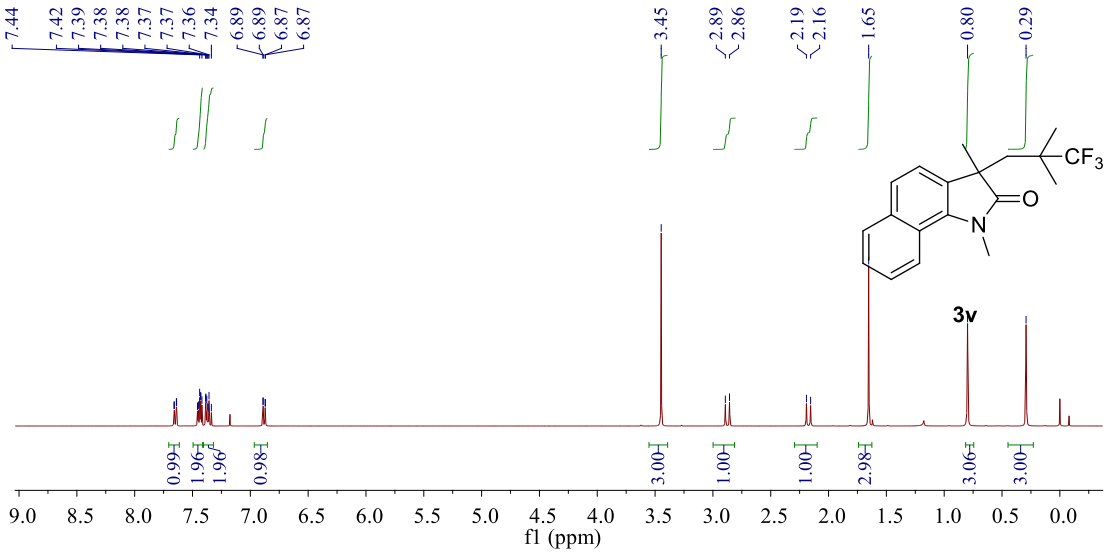
f1 (ppm)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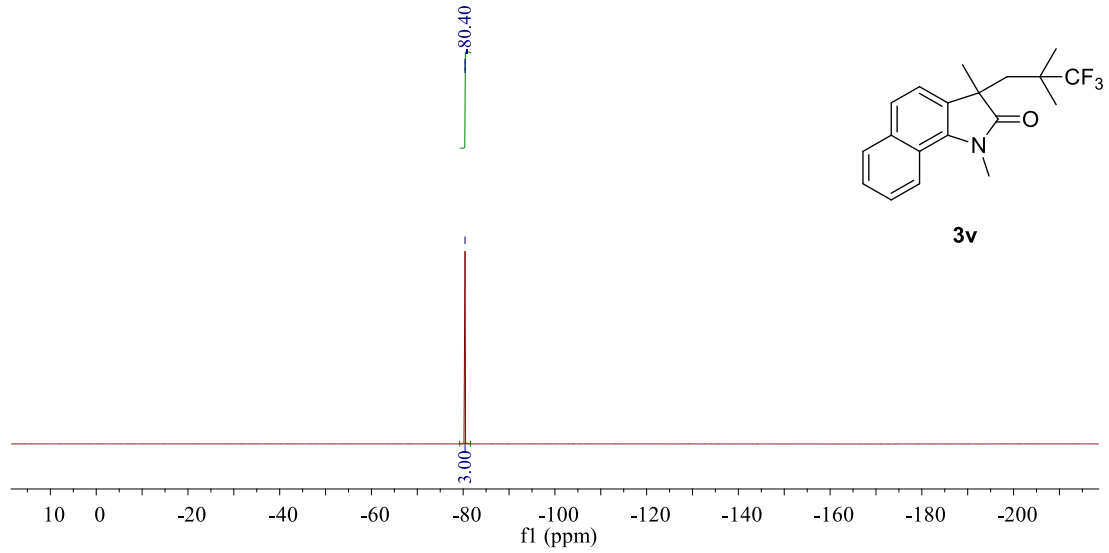
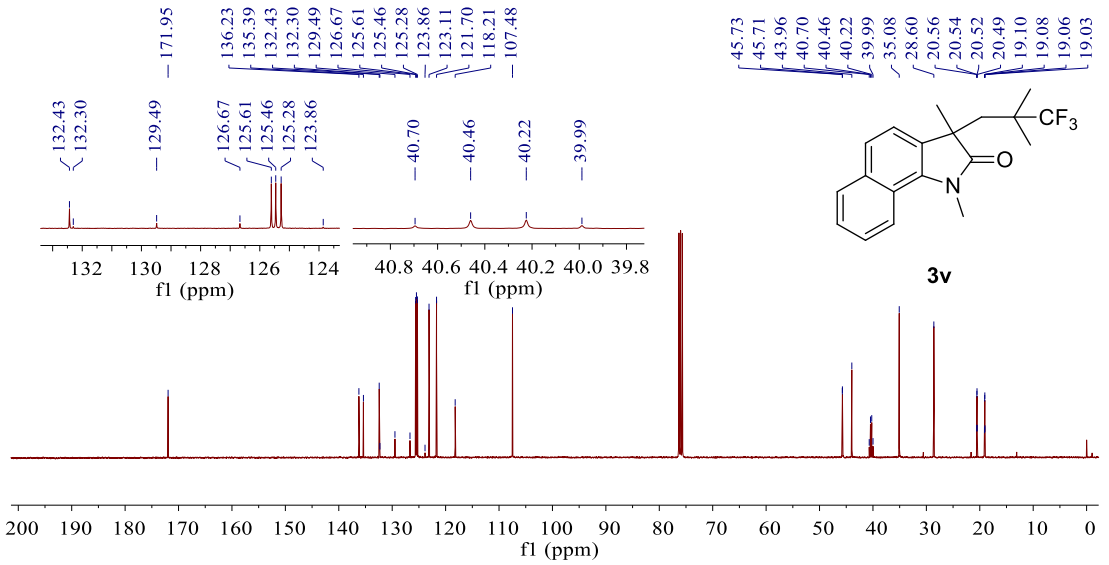
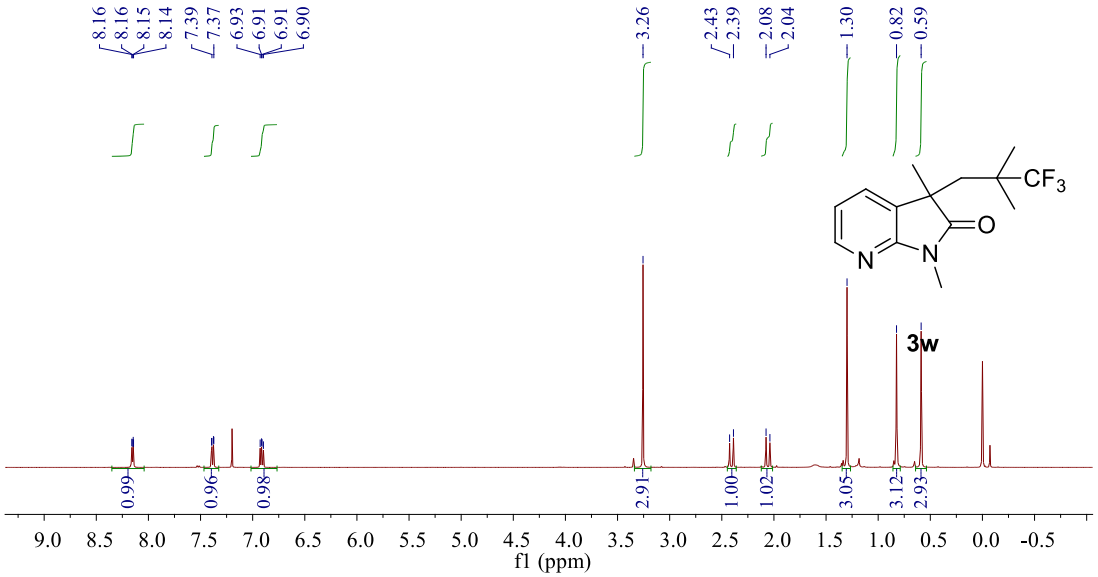
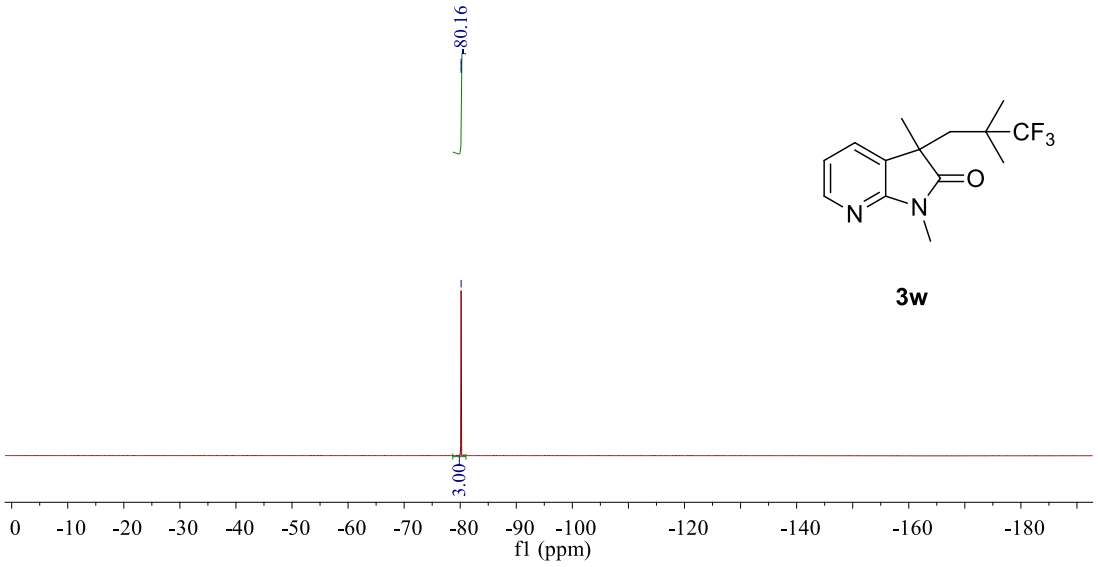
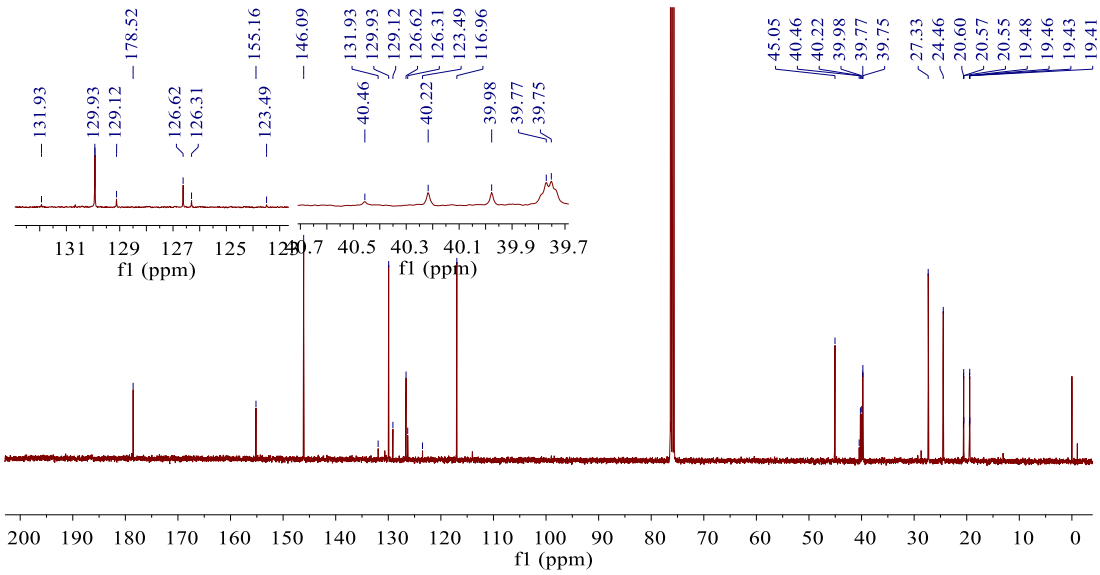
7.38
7.38
7.37
7.37
7.36
7.34
6.89
6.89
6.87
6.87
3.45
2.89
2.86
2.19
2.16
1.65
0.80
0.29
CF3
O
N
3v
0.99
1.96
1.96
0.98
3.00
1.00
1.00
2.98
3.06
3.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


80.40
CF3
O
N
3v
3.00
10 0 -20 -40 -60 -80 -100 -120 -140 -160 -180 -200
f1 (ppm)


171.95
136.23
135.39
132.43
132.30
129.49
126.67
125.61
125.46
125.28
123.86
123.11
121.70
118.21
107.48
45.73
45.71
43.96
40.70
40.46
40.22
39.99
35.08
28.60
20.56
20.54
20.52
20.49
19.10
19.08
19.06
19.03
CF3
O
N
3v
132 130 128 126 124
f1 (ppm)
40.8 40.6 40.4 40.2 40.0 39.8
f1 (ppm)
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


8.16
8.16
8.15
8.14
7.39
7.37
6.93
6.91
6.91
6.90
3.26
2.43
2.39
2.08
2.04
1.30
0.82
0.59
CF3
O
N
N
3w
0.99
0.96
0.98
2.91
1.00
1.02
3.05
3.12
2.93
fl (ppm)


80.16
CF3
O
N
N
3w
3.00
fl (ppm)


131.93
129.93
129.12
178.52
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126.31
155.16
123.49
146.09
131.93
129.93
129.12
126.62
126.31
123.49
116.96
40.46
40.22
39.98
39.77
39.75
45.05
40.46
40.22
39.98
39.77
39.75
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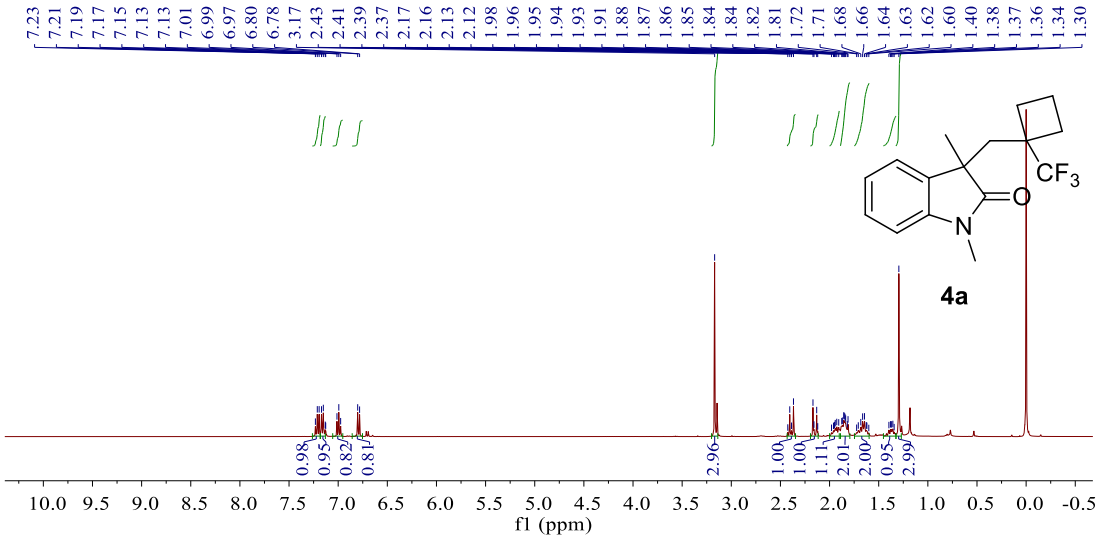
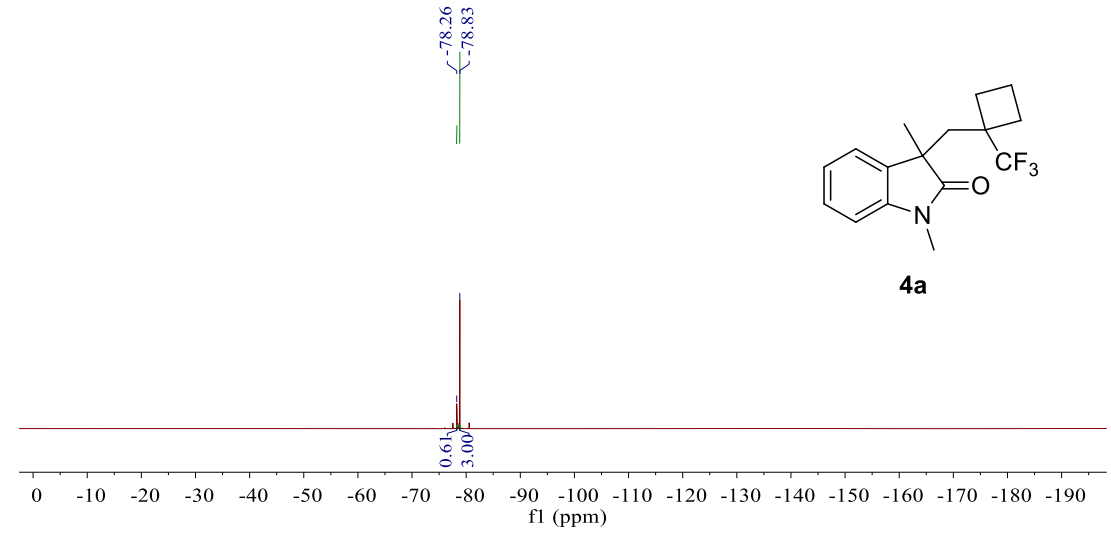
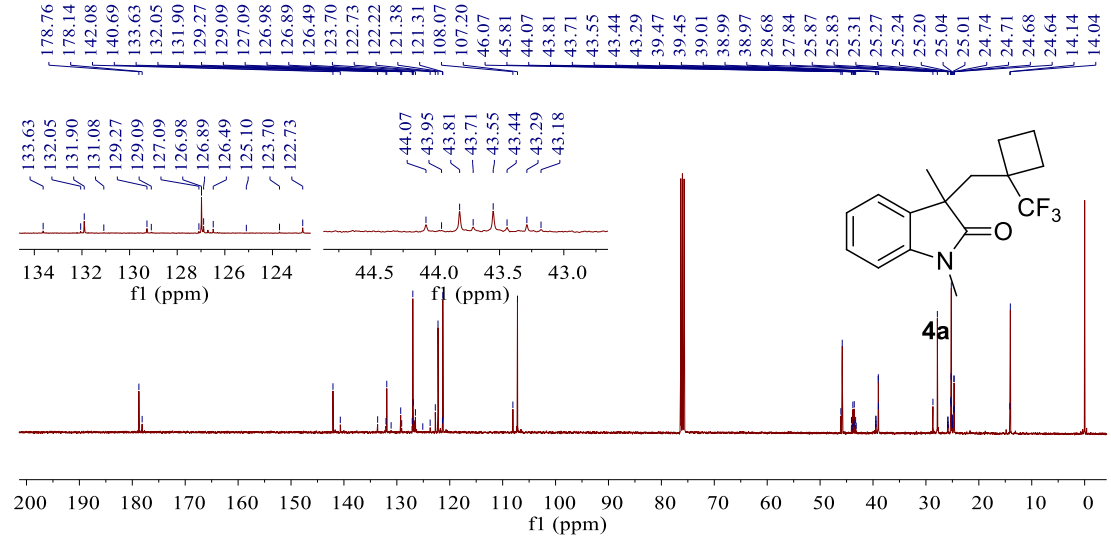
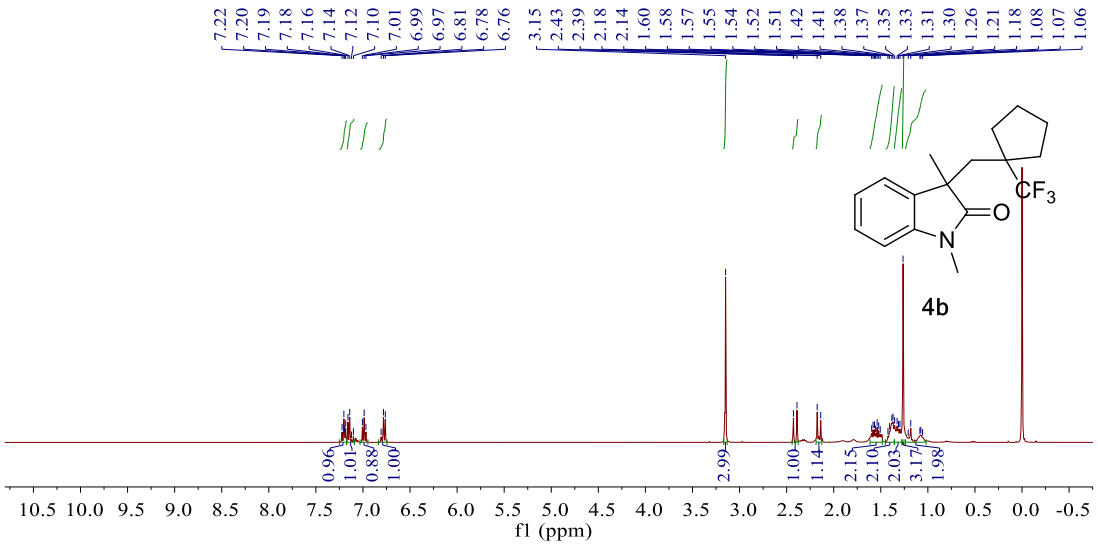
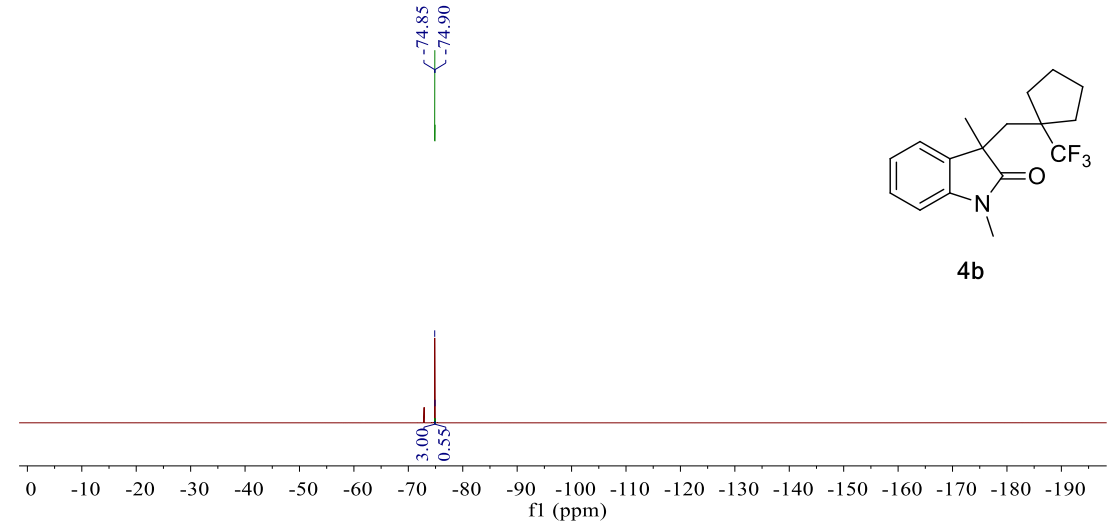
20.55
19.48
19.46
19.43
19.41
fl (ppm)
fl (ppm)


7.23 7.21 7.19 7.17 7.15 7.13 7.13 7.01 6.99 6.97 6.80 6.78 3.17 2.43 2.41 2.39 2.37 2.17 2.16 2.13 2.12 1.98 1.96 1.95 1.94 1.93 1.91 1.88 1.87 1.86 1.85 1.84 1.84 1.82 1.81 1.72 1.71 1.68 1.66 1.64 1.63 1.62 1.60 1.40 1.38 1.37 1.36 1.34 1.30
0.98 0.95 0.82 0.81 2.96 1.00 1.00 1.11 2.01 2.00 0.95 2.99
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)
CF3
O
N
4a


-78.26
-78.83
0.61 3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)
CF3
O
N
4a


178.76 178.14 142.08 140.69 133.63 132.05 131.90 129.27 129.09 127.09 126.98 126.89 126.49 123.70 122.73 122.22 121.38 121.31 108.07 107.20 46.07 45.81 44.07 43.81 43.71 43.55 43.44 43.29 39.47 39.45 39.01 38.99 38.97 28.68 27.84 25.87 25.83 25.31 25.27 25.24 25.20 25.04 25.01 24.74 24.71 24.68 24.64 14.14 14.04
133.63 132.05 131.90 131.08 129.27 129.09 127.09 126.98 126.89 126.49 125.10 123.70 122.73
134 132 130 128 126 124
f1 (ppm)
44.07 43.95 43.81 43.71 43.55 43.44 43.29 43.18
44.5 44.0 43.5 43.0
f1 (ppm)
CF3
O
N
4a
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.22 7.20 7.19 7.18 7.16 7.14 7.12 7.10 7.01 6.99 6.97 6.81 6.78 6.76
3.15 2.43 2.39 2.18 2.14 1.60 1.58 1.57 1.55 1.54 1.52 1.51 1.42 1.41 1.38 1.37 1.35 1.33 1.31 1.30 1.26 1.21 1.18 1.08 1.07 1.06
CF3
O
N
4b
0.96 1.01 0.88 1.00 2.99 1.00 1.14 2.15 2.10 2.03 3.17 1.98
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


-74.85
-74.90
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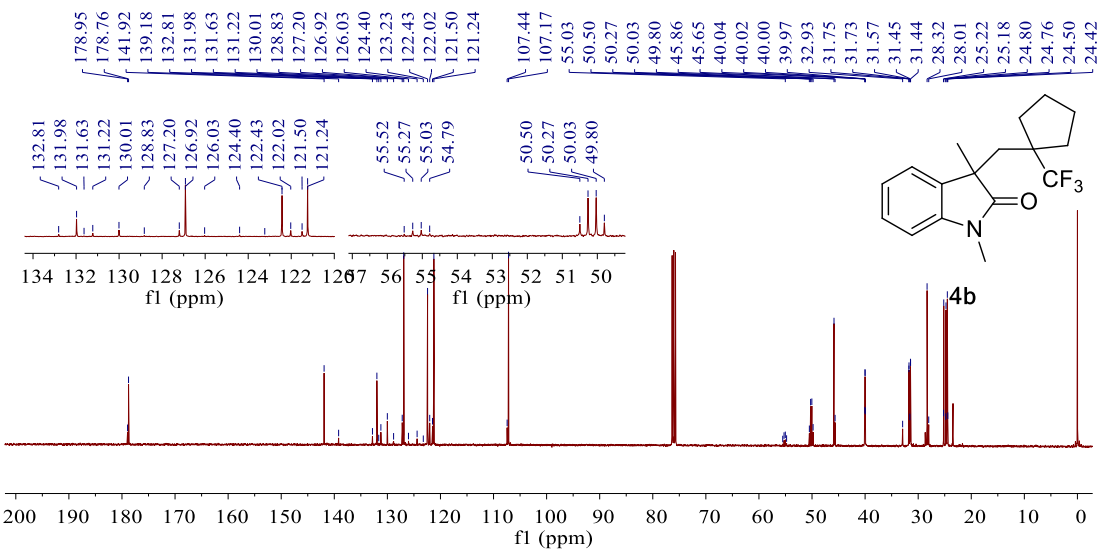
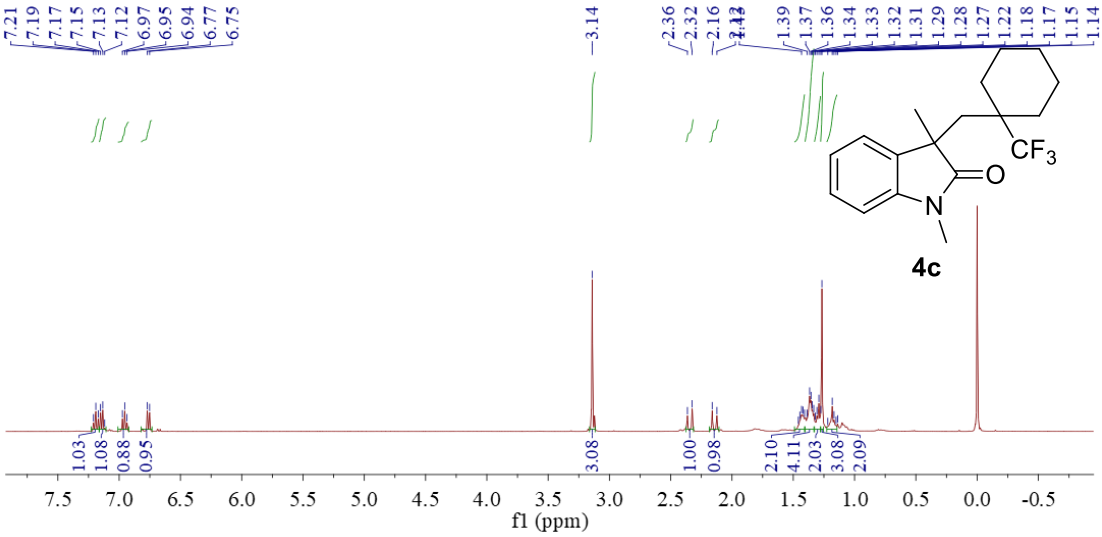
N
4b
3.00 0.55
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)


178.95 178.76 141.92 139.18 132.81 131.98 131.63 131.22 130.01 128.83 127.20 126.92 126.03 124.40 122.43 122.02 121.50 121.24
107.44 107.17 55.03 50.50 50.27 50.03 49.80 45.86 45.65 40.04 40.02 40.00 39.97 32.93 31.75 31.73 31.57 31.45 31.44 28.32 28.01 25.22 25.18 24.80 24.76 24.50 24.42
132.81 131.98 131.63 131.22 130.01 128.83 127.20 126.92 126.03 124.40 122.43 122.02 121.50 121.24
55.52 55.27 55.03 54.79
50.50 50.27 50.03 49.80
134 132 130 128 126 124 122 120
f1 (ppm)
57 56 55 54 53 52 51 50
f1 (ppm)
CF3
O
N
4b
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)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7.12
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6.94
6.77
6.75
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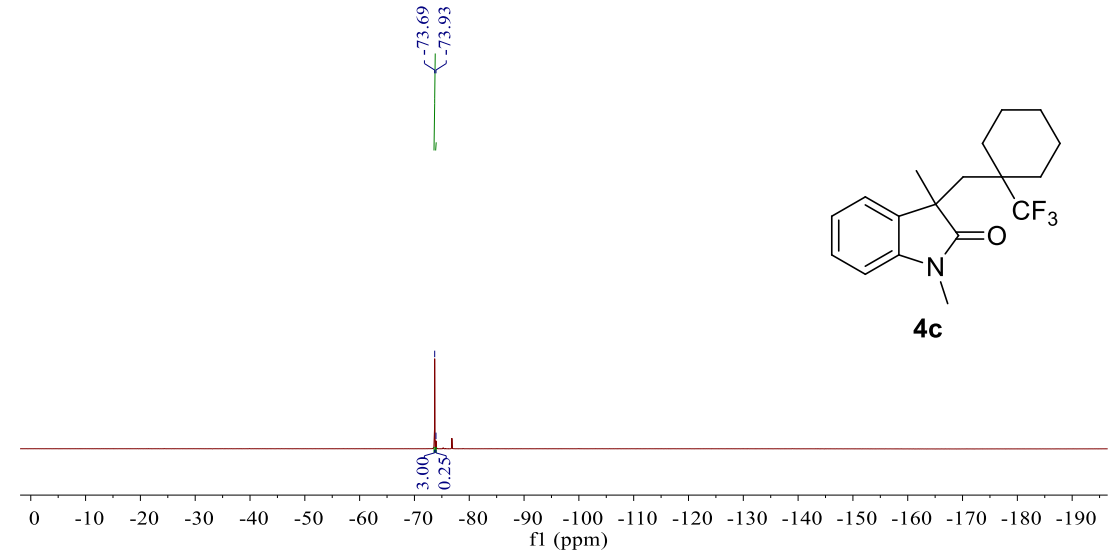
2.36
2.32
2.16
1.39
1.37
1.36
1.34
1.33
1.32
1.31
1.29
1.28
1.27
1.22
1.18
1.17
1.15
1.14
CF3
O
N
4c
1.03
1.08
0.88
0.95
3.08
1.00
0.98
2.10
4.11
2.03
3.08
2.09
7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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-73.93
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4c
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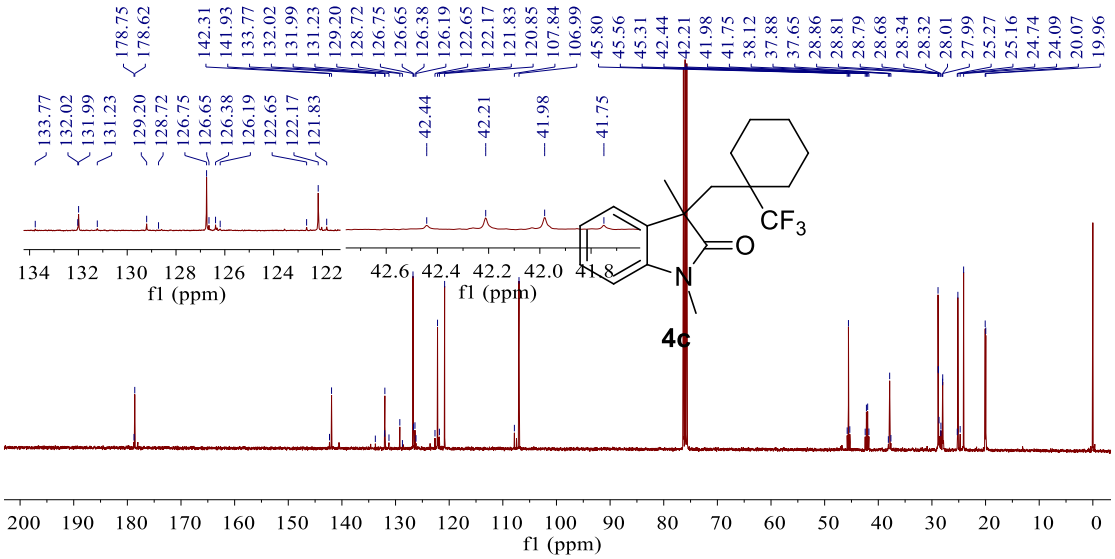
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)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128.72
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122.17
121.83
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107.84
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41.75
38.12
37.88
37.65
28.86
28.81
28.79
28.68
28.34
28.32
28.01
27.99
25.27
25.16
24.74
24.09
20.07
19.96
42.44
42.21
41.98
41.75
CF3
O
N
4c
134 132 130 128 126 124 122
f1 (ppm)
42.6 42.4 42.2 42.0 41.8
f1 (ppm)
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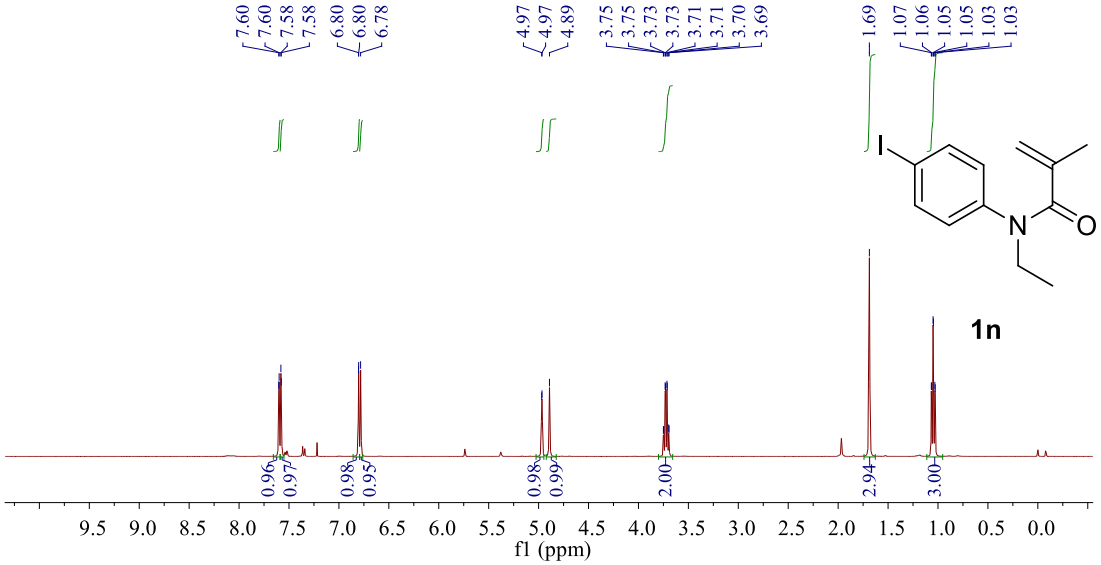
f1 (ppm)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6.80
6.78
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3.75
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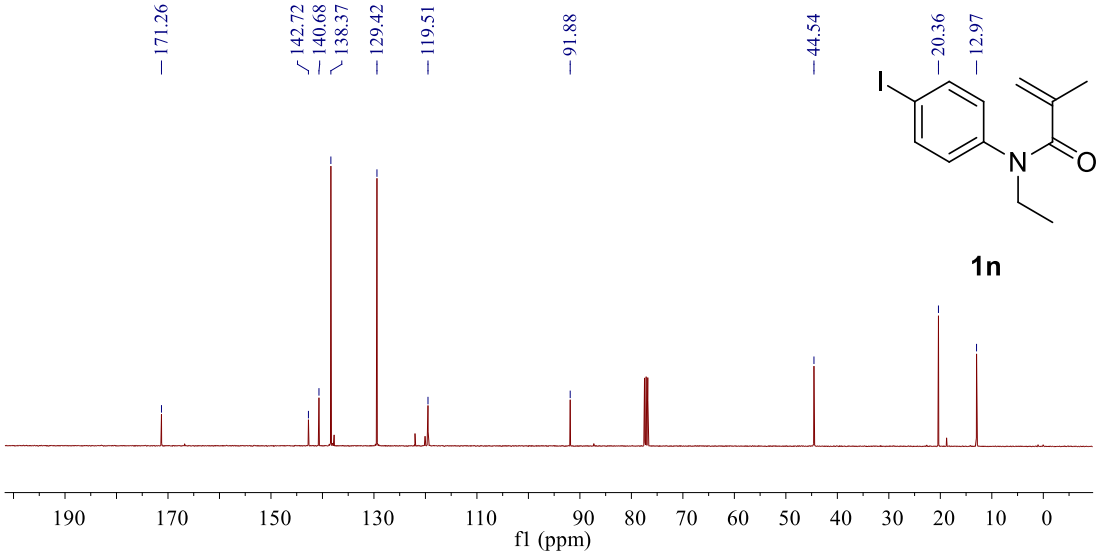
3.73
3.71
3.71
3.70
3.69
1.69
1.07
1.06
1.05
1.05
1.03
1.03
I
N
O
1n
0.96
0.97
0.98
0.95
0.98
0.99
2.00
2.94
3.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)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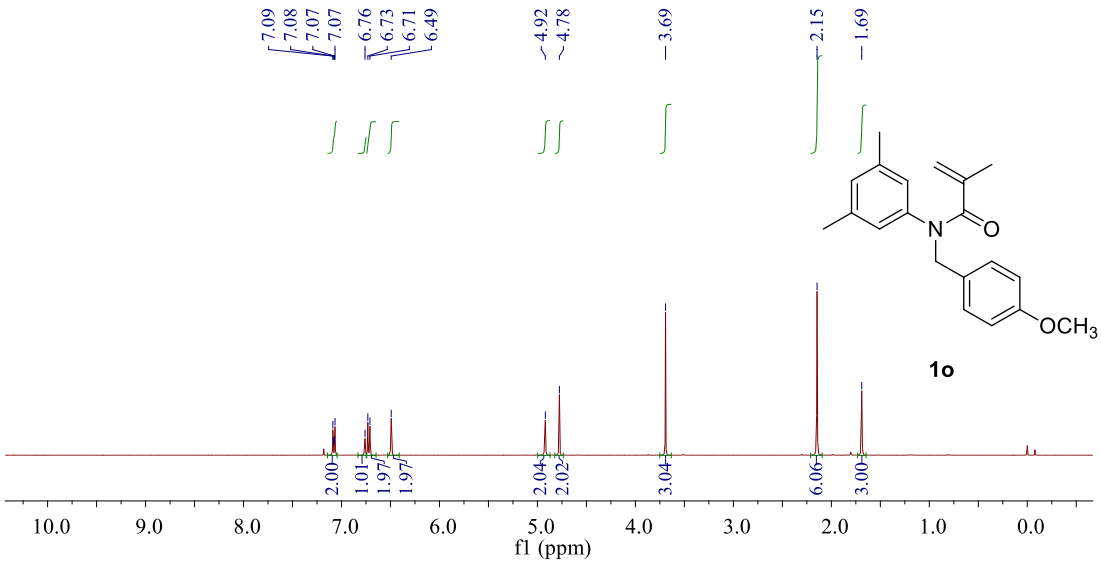
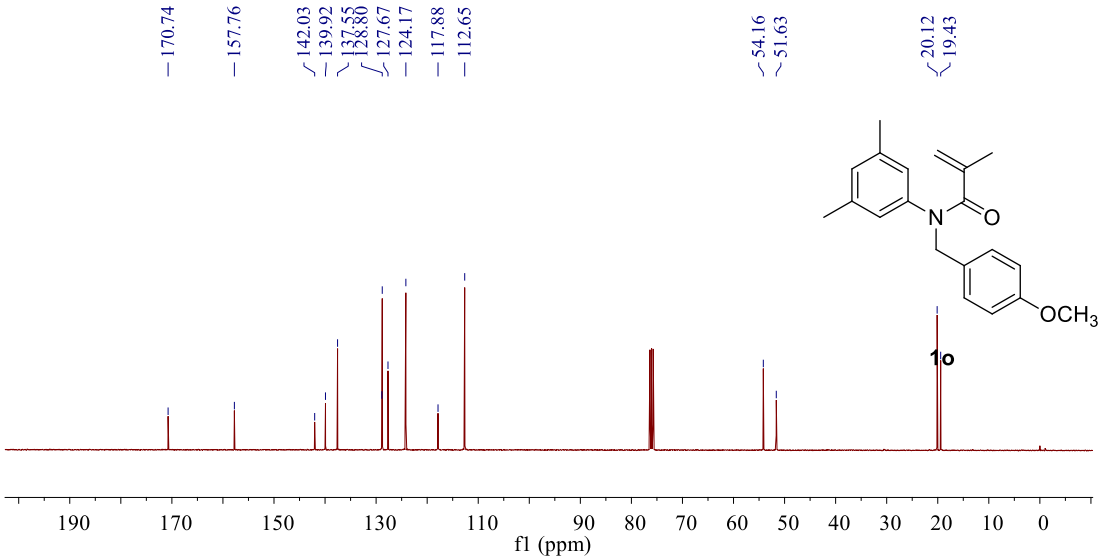
142.72
140.68
138.37
129.42
119.51
91.88
44.54
20.36
12.97
I
N
O
1n
190 170 150 130 110 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.09
7.08
7.07
7.07
6.76
6.73
6.71
6.49
4.92
4.78
3.69
2.15
1.69
N
O
OCH3
1o
2.00
1.01
1.97
1.97
2.04
2.02
3.04
6.06
3.00
10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0
f1 (ppm)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137.55
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127.67
124.17
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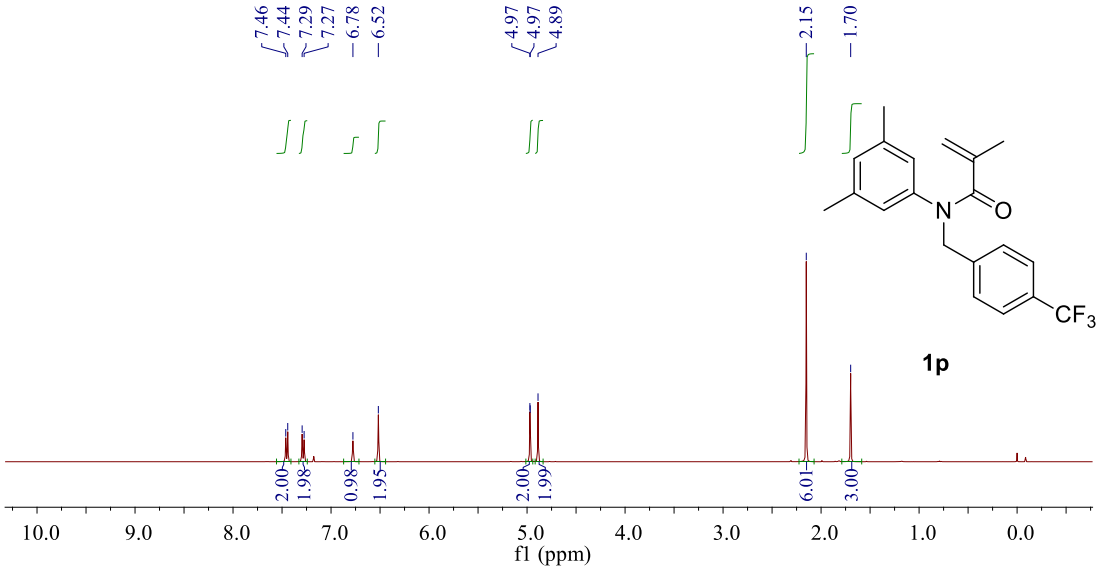
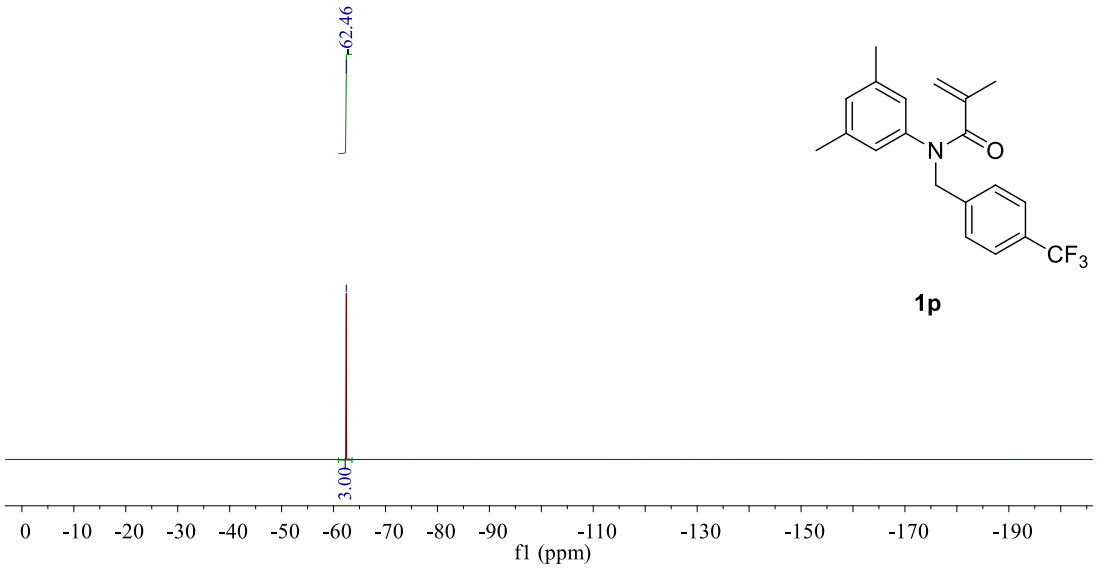
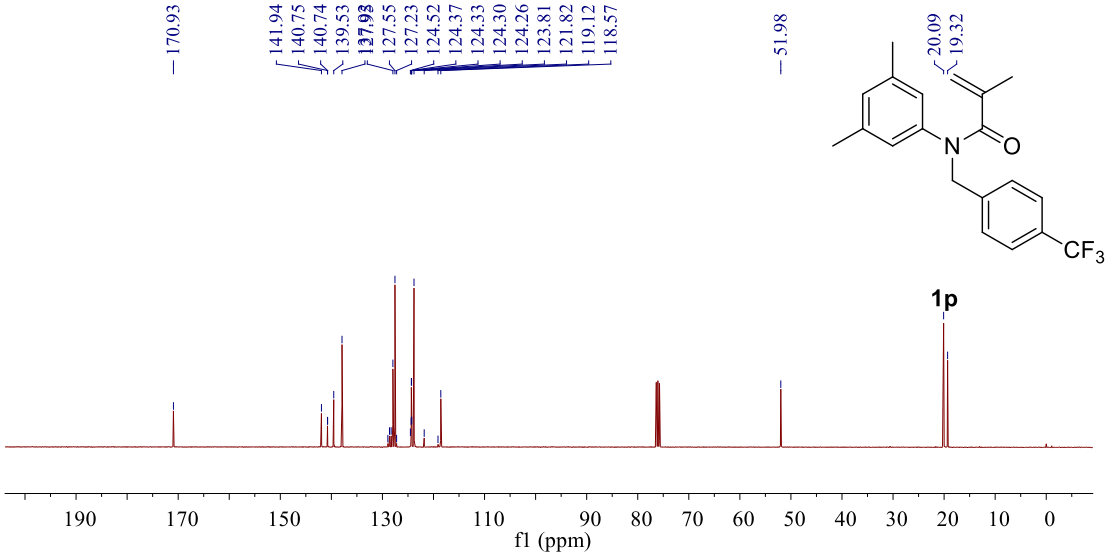
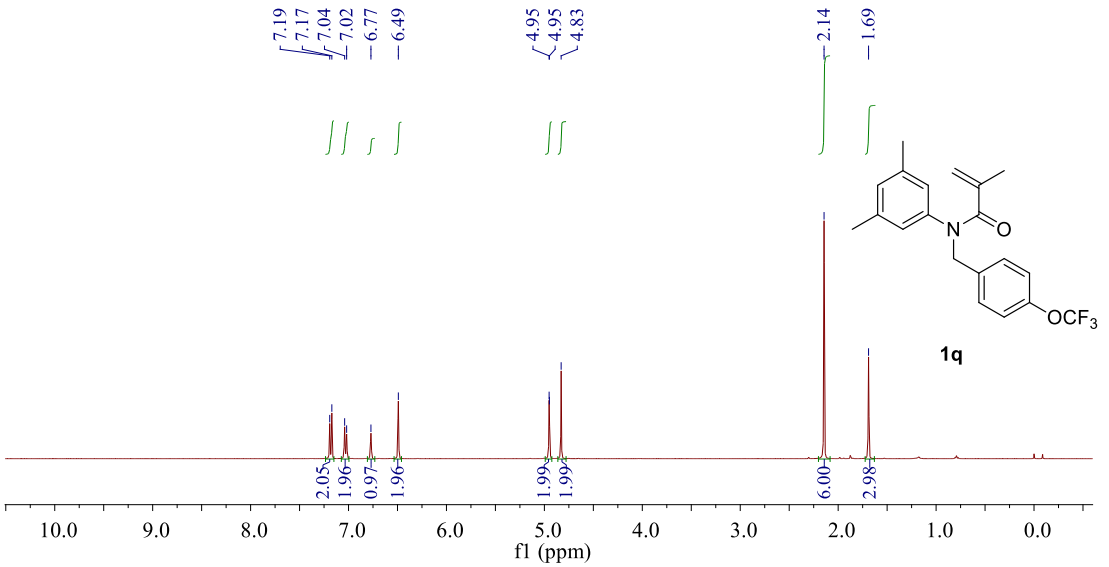
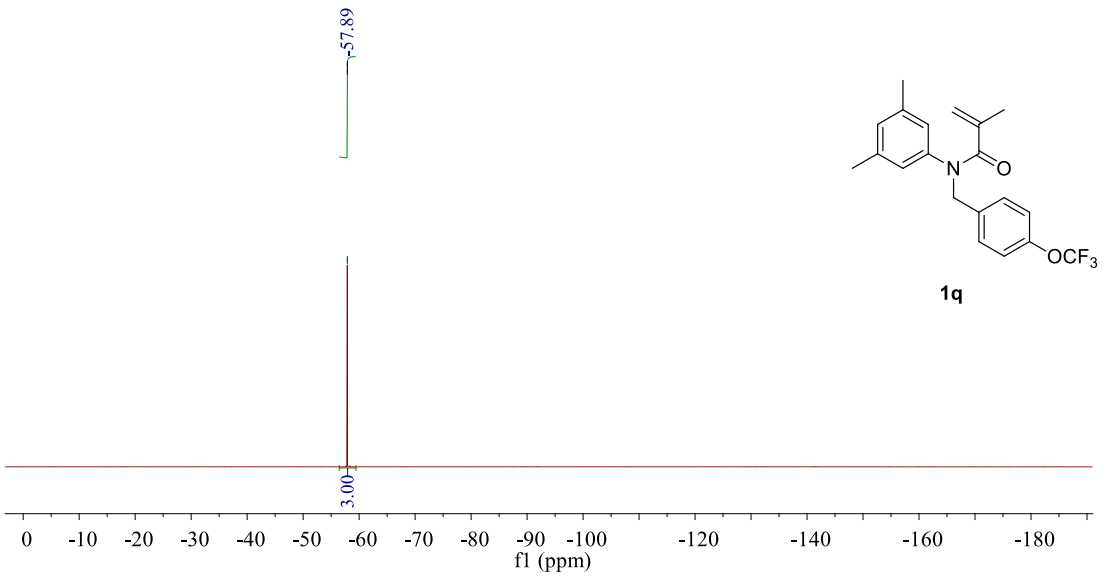
112.65
54.16
51.63
20.12
19.43
N
O
OCH3
1o
190 170 150 130 110 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

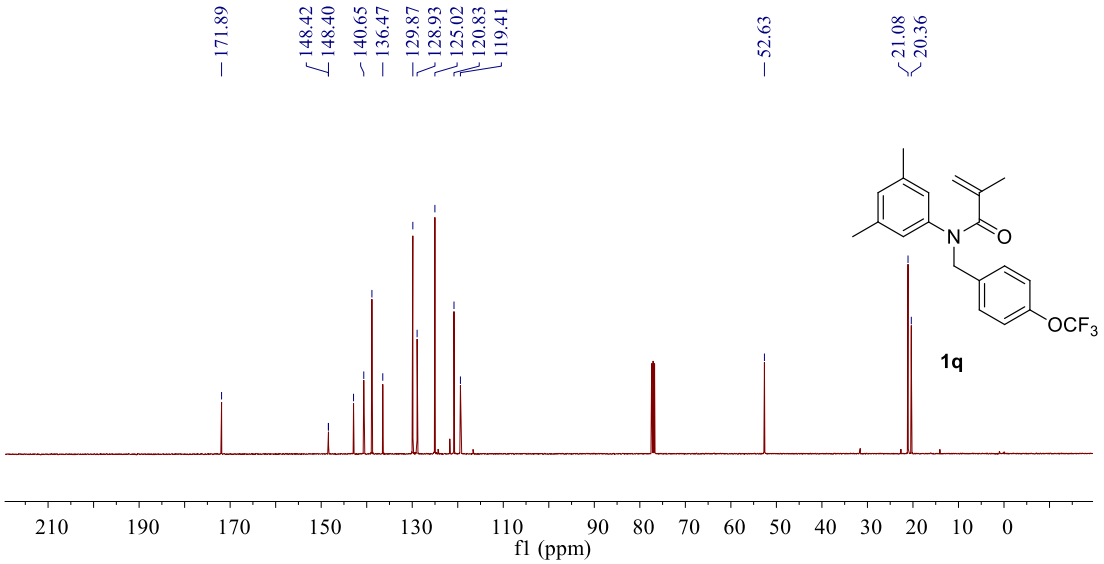

7.46
7.44
7.29
7.27
6.78
6.52
4.97
4.97
4.89
2.15
1.70
N
O
CF3
1p
2.00
1.98
0.98
1.95
2.00
1.99
6.01
3.00
10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0
f1 (ppm)

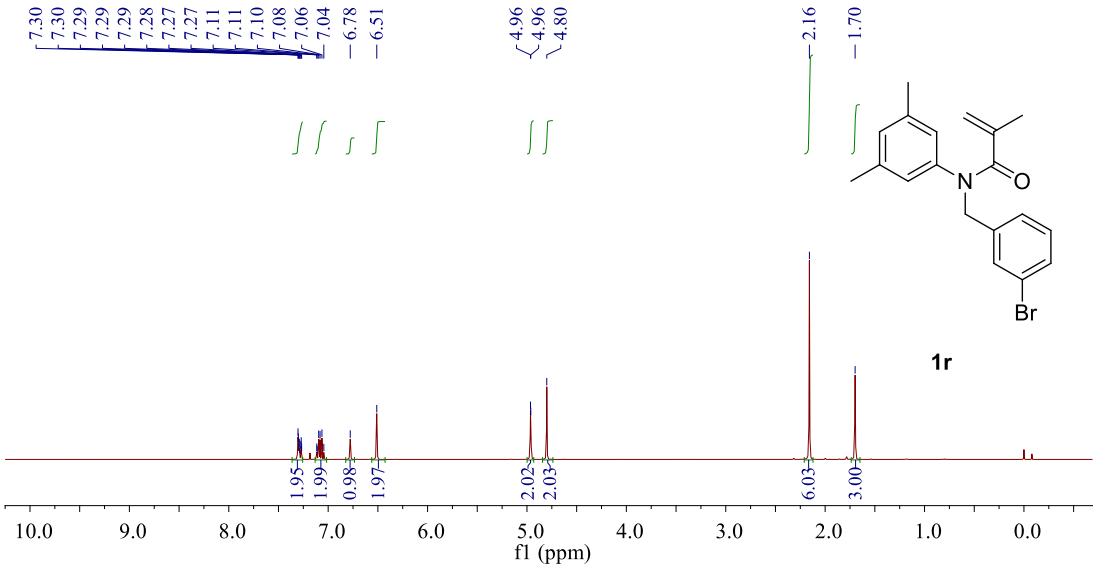

62.46
N
O
CF3
1p
3.00
0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -110 -130 -150 -170 -190
f1 (ppm)

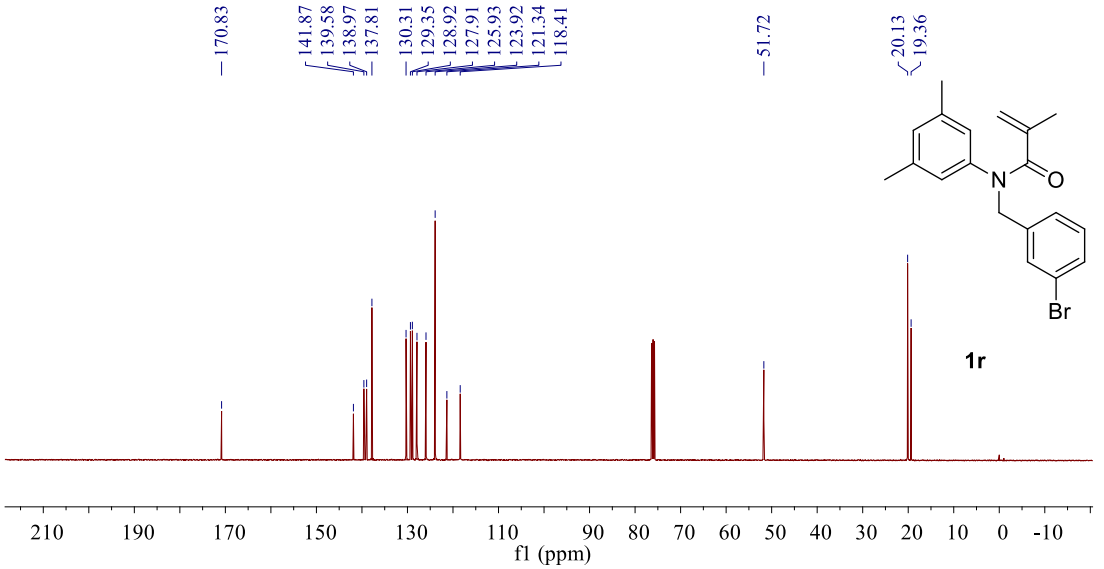

170.93
141.94
140.75
140.74
139.53
127.55
127.23
124.52
124.37
124.33
124.30
124.26
123.81
121.82
119.12
118.57
51.98
20.09
19.32
N
O
CF3
1p
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

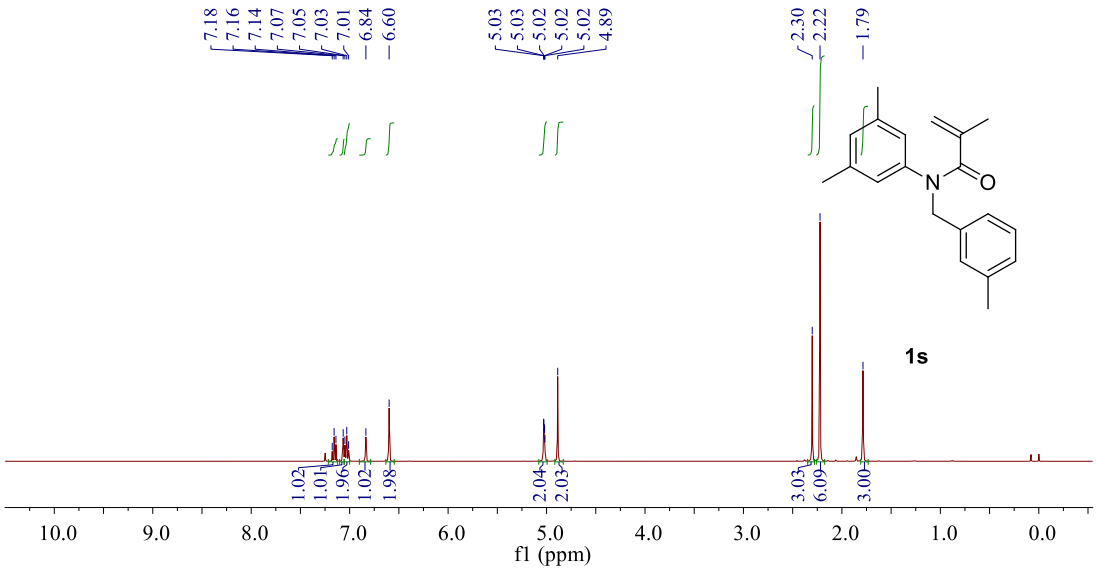

7.19
7.17
7.04
7.02
6.77
6.49
4.95
4.95
4.83
2.14
1.69
2.05
1.96
0.97
1.96
1.99
1.99
6.00
2.98
N
O
OCF3
1q
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
f1 (ppm)

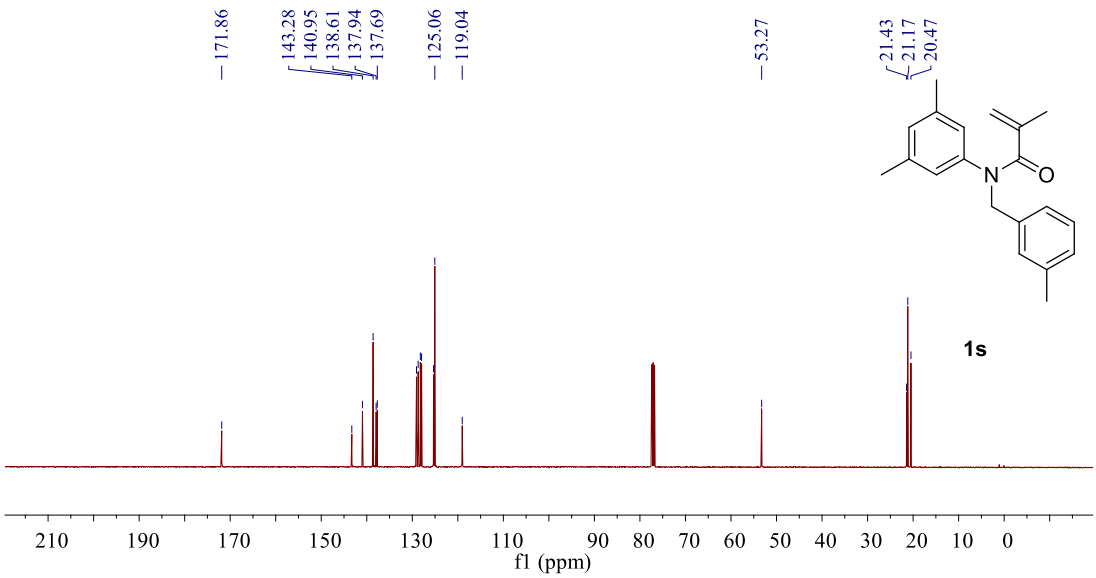

57.89
3.00
N
O
OCF3
1q
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-120
-140
-160
-180
f1 (ppm)

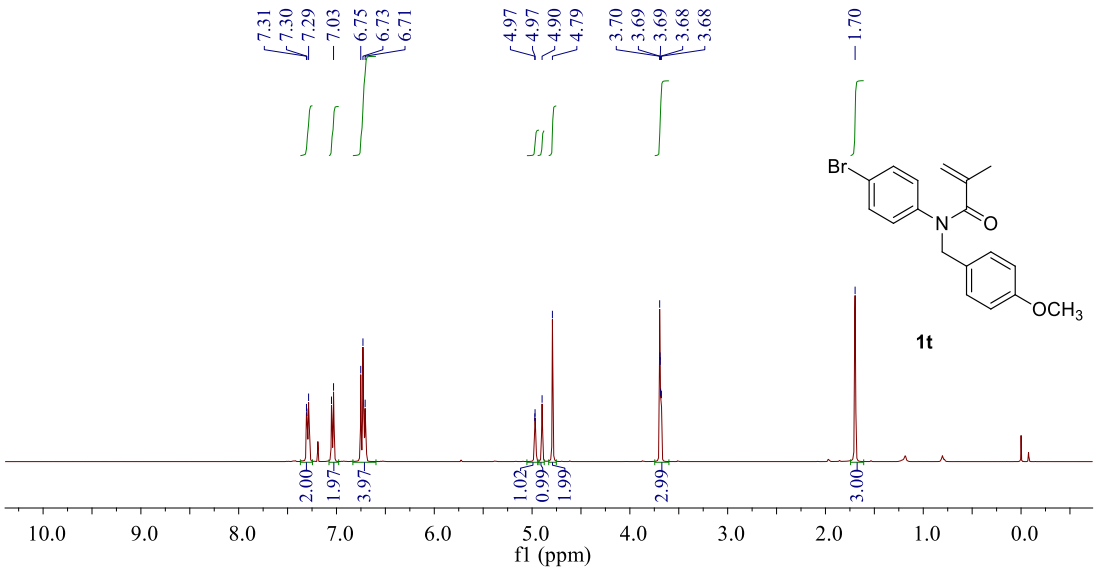

171.89
148.42
148.40
140.65
136.47
129.87
128.93
125.02
120.83
119.41
52.63
21.08
20.36
N
O
OCF3
1q
210 190 170 150 130 110 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

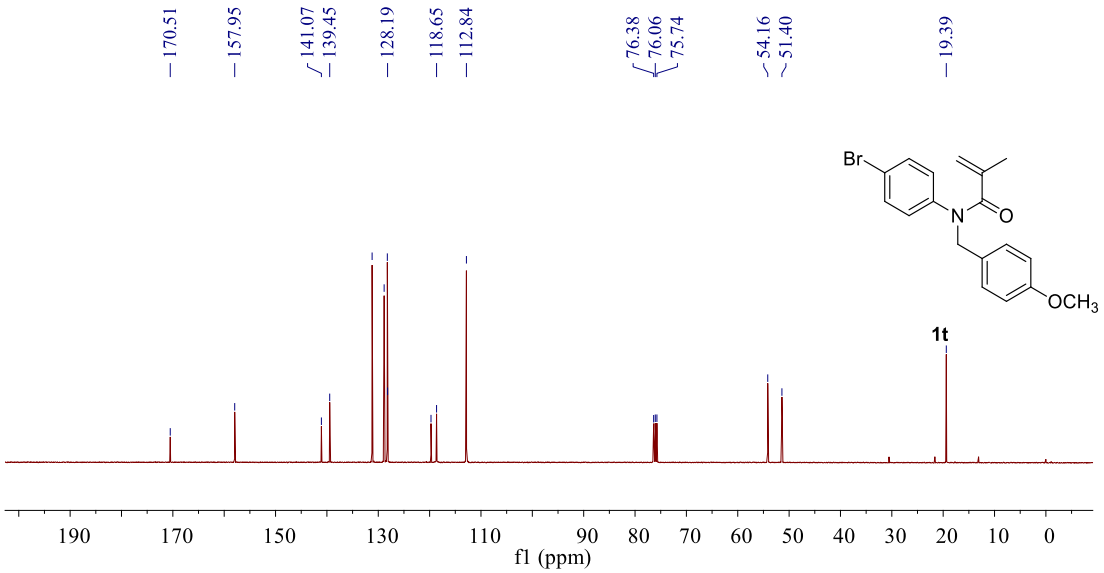

7.30
7.30
7.29
7.29
7.29
7.28
7.27
7.27
7.11
7.11
7.10
7.08
7.06
7.04
6.78
6.51
4.96
4.96
4.80
2.16
1.70
N
O
Br
1r
1.95
1.99
0.98
1.97
2.02
2.03
6.03
3.00
10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0
f1 (ppm)

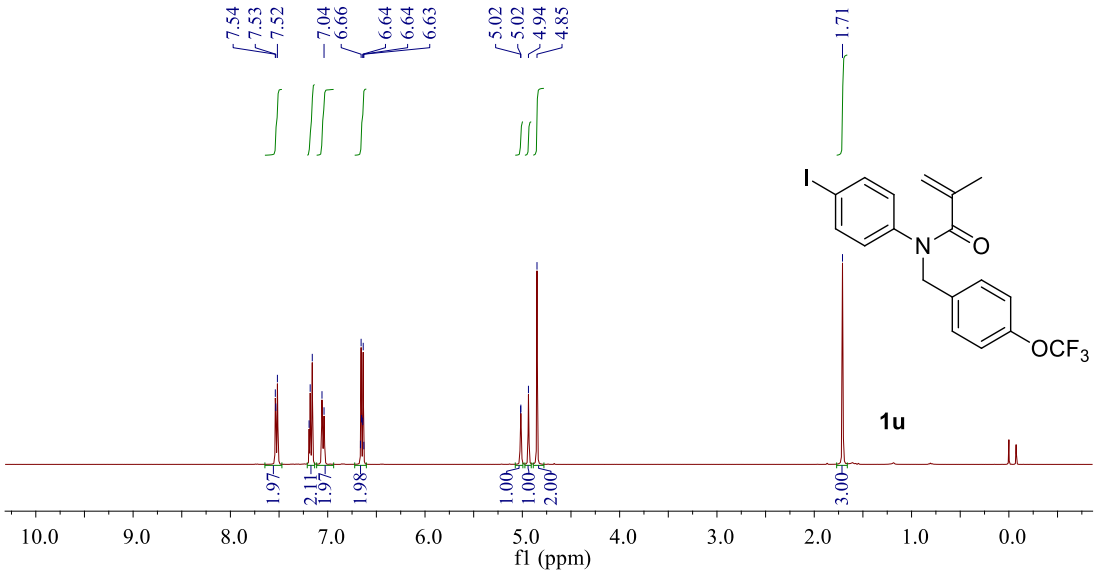

170.83
141.87
139.58
138.97
137.81
130.31
129.35
128.92
127.91
125.93
123.92
121.34
118.41
51.72
20.13
19.36
N
O
Br
1r
210 190 170 150 130 110 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

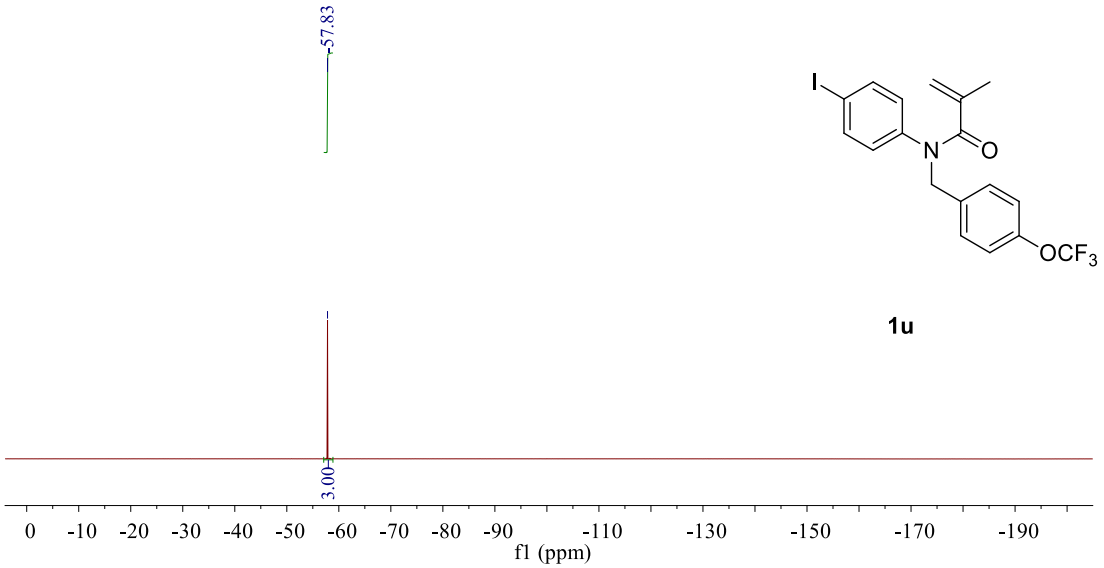

7.18
7.16
7.14
7.07
7.05
7.03
7.01
6.84
6.60
5.03
5.03
5.02
5.02
5.02
4.89
2.30
2.22
1.79
1s
1.02
1.01
1.96
1.02
1.98
2.04
2.03
3.03
6.09
3.00
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
f1 (ppm)

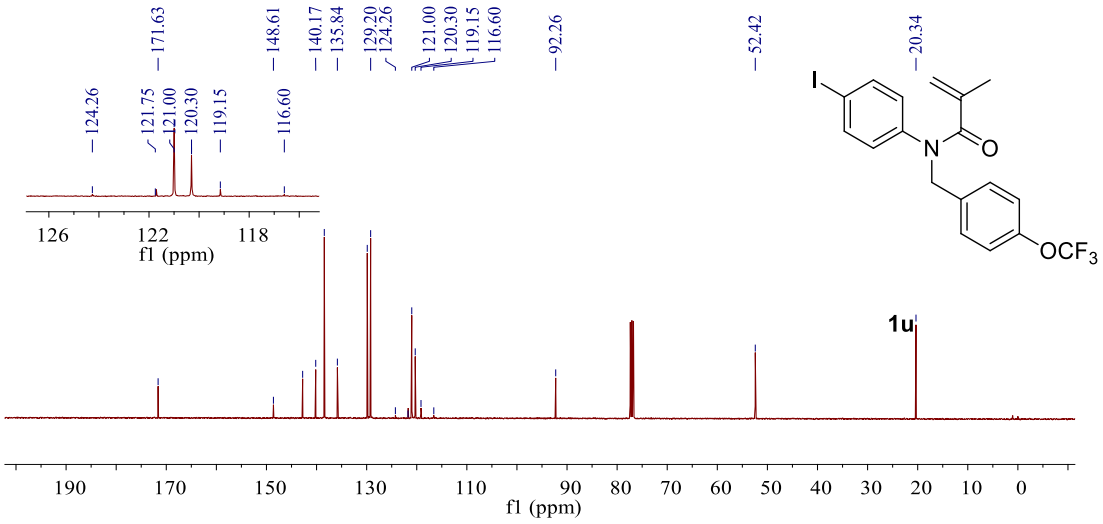

171.86
143.28
140.95
138.61
137.94
137.69
125.06
119.04
53.27
21.43
21.17
20.47
1s
210
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


7.31
7.30
7.29
7.03
6.75
6.73
6.71
4.97
4.97
4.90
4.79
3.70
3.69
3.69
3.68
3.68
1.70
Br
OCH3
1t
2.00
1.97
3.97
1.02
0.99
1.99
2.99
3.00
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
f1 (ppm)


170.51
157.95
141.07
139.45
128.19
118.65
112.84
76.38
76.06
75.74
54.16
51.40
19.39
Br
N
O
OCH3
1t
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


7.54
7.53
7.52
7.04
6.66
6.64
6.64
6.63
5.02
5.02
4.94
4.85
1.71
I
N
O
OCF3
1u
1.97
2.11
1.97
1.98
1.00
1.00
2.00
3.00
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
f1 (ppm)


-57.83
I
N
O
OCF3
1u
3.00
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-110
-130
-150
-170
-190
f1 (ppm)


171.63
148.61
140.17
135.84
129.20
124.26
121.00
120.30
119.15
116.60
92.26
52.42
20.34
124.26
121.75
121.00
120.30
119.15
116.60
126
122
118
f1 (ppm)
I
N
O
OCF3
1u
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)