Supporting Information

Electrochemically enabled functionalization of indole or aniline derivatives with hexafluoroisopropanol

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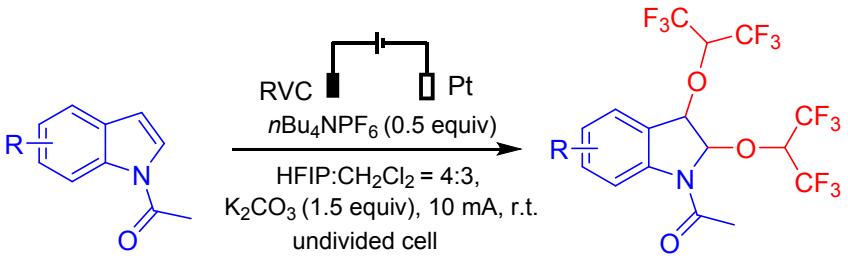
1. General Information

Unless otherwise noted, all reagents and solvents were obtained commercially and used without further purification. Column chromatography on silica gel (300-400 mesh) was carried out using technical grade 60-90 °C petroleum ether and analytical grade EtOAc (without further purification). ^{1}H and ^{13}C spectra were recorded on a 400 MHz or 500 MHz spectrometer. Chemical shifts were reported in ppm. ^{1}H NMR spectra were referenced to $CDCl_3$ (7.26 ppm) and $(CD_3)_2CO$ (2.84 ppm and 2.05 ppm), and ^{13}C-NMR spectra were referenced to $CDCl_3$ (77.0 ppm) and $(CD_3)_2CO$ (206.26 ppm and 29.84 ppm). Peak multiplicities were designated by the following abbreviations: s, singlet; d, doublet; t, triplet; qui, quintet; m, multiplet; brs, broad singlet and J, coupling constant in Hz. HRMS spectra were recorded with Micromass QTOF2 Quadrupole/Time-of-Flight Tandem mass spectrometer using electron spray ionization.

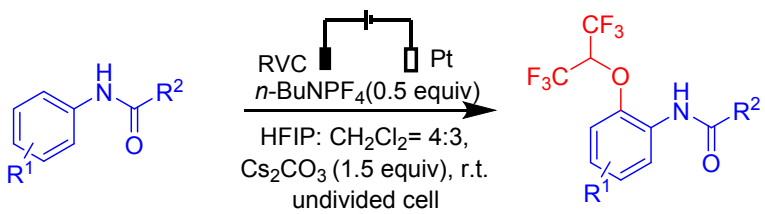
2. Chemical experiment procedure

2.1 Synthesis of fluoroalkylated indoles.



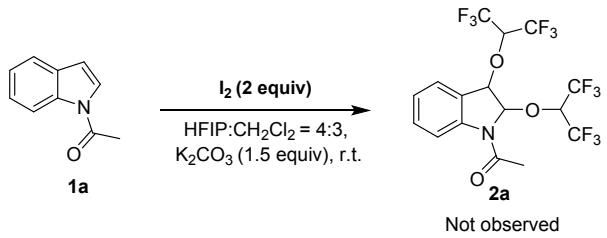
The *N*-acetylindoles (0.5 mmol), K_2CO_3 (0.75 mmol, 1.5 equiv) and nBu_4PF_6 (0.25 mmol, 0.5 equiv) were placed in a 25 mL four-necked round-bottomed flask. The flask was equipped with an RVC (100 PPI, 1 cm x 1 cm x 1.2 cm) anode and a platinum plate (1 cm x 1 cm) cathode. HFIP (4.0 mL) and CH_2Cl_2 (3.0 mL) were added. The electrolysis was carried out at room temperature, which using a constant current of 10 mA until complete consumption of the substrate (monitored by TLC, about 6.0 h). The solvent was concentrated under reduced pressure. Purification with silica gel column chromatography using ethyl cetate/petroleum ether to afford the desired products.

2.2 Synthesis of fluoroalkylated anilines.



The anilines (0.5 mmol), Cs_2CO_3 (0.75 mmol, 1.5 equiv) and nBu_4PF_6 (0.25 mmol, 0.5 equiv) were placed in a 25 mL four-necked round-bottomed flask. The flask was equipped with an RVC (100 PPI, 1 cm x 1 cm x 1.2 cm) anode and a platinum plate (1 cm x 1 cm) cathode. HFIP (4.0 mL) and CH_2Cl_2 (3.0 mL) were added. The electrolysis was carried out at room temperature, which using a constant current of 10 mA until complete consumption of the substrate (monitored by TLC, about 8.0 h). The solvent was concentrated under reduced pressure. Purification with silica gel column chromatography using ethyl cetate/petroleum ether to afford the desired products.

3. Control experiments.



A reaction of **1a** with HFIP was achieved in the presence of I_2, but the desired product **2a** was not observed. This finding suggested that I_2 was not involved in the reaction.

4. General procedure for cyclic voltammetry (CV)

Cyclic voltammetry was performed in a threeelectrode cell connected to a schlenk line under nitrogen at room temperature. The working electrode was a steady glassy carbon disk electrode, the counter electrode a platinum wire. The reference was an Ag/AgCl electrode submerged in saturated aqueous KCl solution, and separated from reaction by a salt bridge. 8.0 mL of HFIP and 2.0 mL of CH_2Cl_2 containing 0.1 M $LiClO_4$ were poured into the electrochemical cell in all experiments. The scan rate is 0.1 V/s, ranging from 0 V to 1.6 V.

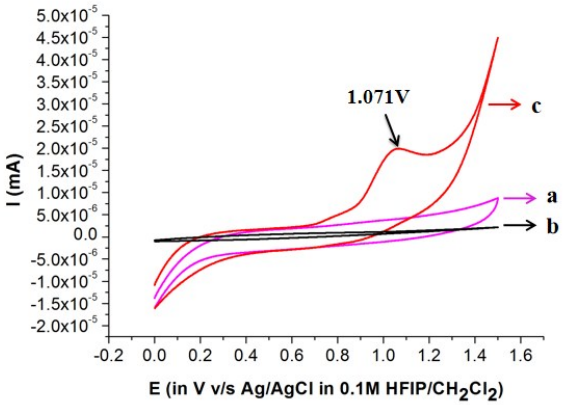


Figure S1. Cyclic voltammograms of reactants and their mixtures in 0.1 M $LiClO_4$, HFIP/CH_2Cl_2 using a glassy carbon disk working electrode (diameter, 3 mm), Pt disk and Ag/AgCl (0.1 M in HFIP/CH_2Cl_2) as counter and reference electrode at 100 mV/s scan rate: (a) nBu_4PF_6 (2 mmol/L), (b) indole **1a** (10 mmol/L), (c) nBu_4PF_6 (2 mmol/L) + indole **1a** (10 mmol/L).

5. The HRMS spectra of compound 3a

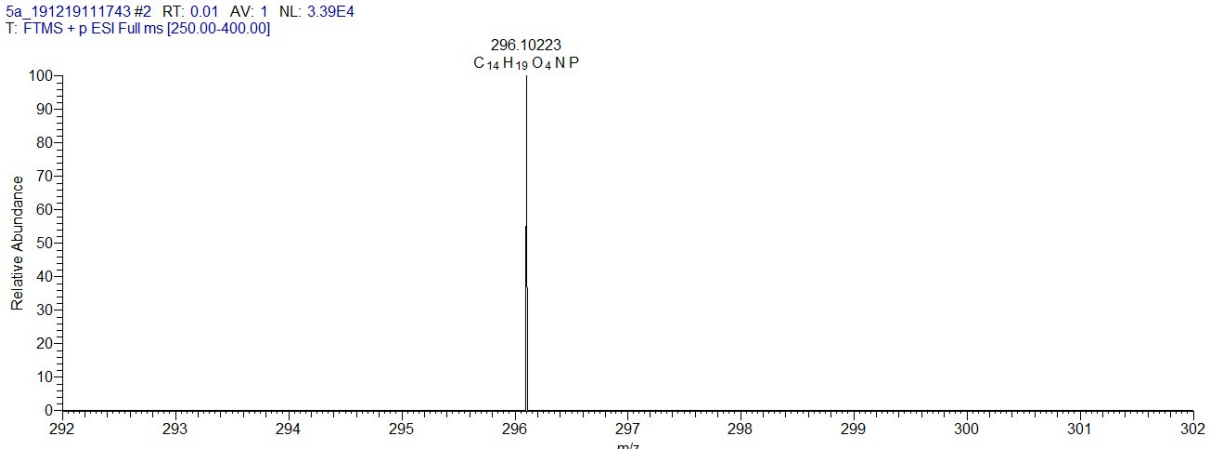


Figure S2. The HRMS spectra of compound **3a**.

6. Characterization data for the compound 2g

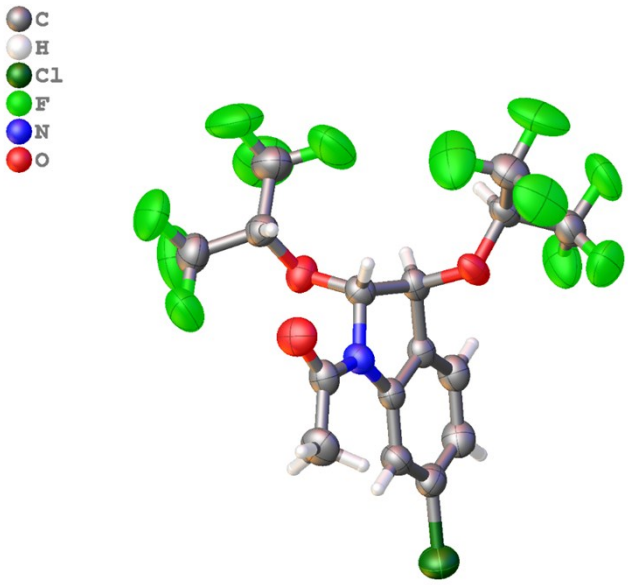


Figure S3. The characterization of the compound **2g** (CCDC: 1999778).

Table S1 Crystal data and structure refinement for compound 2g.

Identification code	compound **2g**
Empirical formula	$C_{16}H_{10}ClF_{12}NO_3$
Formula weight	527.70
Temperature/K	293(2)
Crystal system	monoclinic
Space group	$P2_1/c$
a/Å	7.7099(6)
b/Å	16.5285(15)
c/Å	15.8165(16)
α/°	90

β/°	94.189(7)
γ/°	90
Volume/Å^3	2010.2(3)
Z	4
ρ_{calc}g/cm^3	1.744
μ/mm^{-1}	0.319
F(000)	1048.0
Crystal size/mm^3	0.23 × 0.21 × 0.16
Radiation	Mo Kα (λ = 0.71073)
2Θ range for data collection/°	7.126 to 52
Index ranges	-9 ≤ h ≤ 8, -19 ≤ k ≤ 20, -19 ≤ l ≤ 19
Reflections collected	11847
Independent reflections	3944 [R_{int} = 0.0312, R_{sigma} = 0.0278]
Data/restraints/parameters	3944/0/299
Goodness-of-fit on F^2	1.033
Final R indexes [I>=2σ (I)]	R_1 = 0.0553, wR_2 = 0.1421
Final R indexes [all data]	R_1 = 0.0717, wR_2 = 0.1559
Largest diff. peak/hole / e Å^{-3}	0.28/-0.31

Table S2 Fractional Atomic Coordinates (×10^4) and Equivalent Isotropic Displacement Parameters (Å^2×10^3) for conpound 2g. U_{eq} is defined as 1/3 of of the trace of the orthogonalised U_{IJ} tensor.

Atom	*x*	*y*	*z*	U(eq)
Cl1	4120.6(12)	3569.0(5)	521.1(6)	75.9(3)
F1	-4298(3)	6908.2(17)	1525.0(17)	112.4(8)
F2	-2709(4)	7904.1(18)	1355(2)	132.2(11)
F3	-3833(4)	7734.5(18)	2530.7(17)	127.5(10)
F4	-351(3)	5905.1(15)	3145.2(14)	102.8(8)
F5	-2886(3)	5687.1(13)	2556.4(15)	102.1(7)
F6	-2511(3)	6554.2(15)	3549.9(13)	101.8(7)
F7	582(4)	8785.2(18)	1248.9(17)	131.0(11)
F8	1649(5)	9744.7(15)	544(2)	143.7(12)
F9	3281(4)	9019.3(18)	1363.6(17)	137.1(11)
F10	3368(3)	9338.9(13)	-783.5(15)	107.2(8)
F11	3647(4)	8108.3(15)	-1073.5(16)	111.7(9)
F12	5099(3)	8608.5(19)	-9.2(17)	122.3(10)
O1	-771(2)	6529.2(11)	1537.4(10)	49.4(4)
O2	2413(2)	7633.5(11)	438.4(11)	54.6(5)
O3	375(3)	7149.6(13)	-1210.2(11)	66.9(6)
N1	1241(3)	6401.3(12)	-81.4(12)	45.2(5)
C1	970(3)	7092.9(15)	465.1(15)	44.9(6)

C2	996(3)	6726.4(15)	1360.4(14)	44.1(5)
C3	1963(3)	5949.4(15)	1269.9(14)	42.6(5)
C4	2699(3)	5440.9(17)	1889.4(16)	52.3(6)
C5	3389(4)	4703.5(17)	1658.4(18)	57.0(7)
C6	3321(3)	4502.3(16)	811.3(17)	52.6(6)
C7	2636(3)	5012.2(15)	170.8(16)	50.1(6)
C8	1971(3)	5751.4(14)	411.3(14)	41.5(5)
C9	911(3)	6496.2(17)	-944.4(15)	49.3(6)
C10	1229(5)	5810.3(19)	-1520.9(16)	65.8(8)
C11	2077(4)	8405.6(15)	97.2(17)	53.4(6)
C12	3584(5)	8618.2(19)	-437(2)	69.6(8)
C13	1913(6)	9004(2)	813(2)	83.9(10)
C14	-1473(3)	6906.7(15)	2229.4(15)	46.4(6)
C15	-1829(4)	6260(2)	2870.4(19)	64.5(8)
C16	-3098(4)	7366(2)	1911(2)	72.4(9)

Table S3 Anisotropic Displacement Parameters ($Å^2 \times 10^3$) for compound 2g. The Anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+\ldots]$

Atom	U_{11}	U_{22}	U_{33}	U_{23}	U_{13}	U_{12}
Cl1	80.6(6)	56.9(5)	92.0(6)	3.1(4)	18.0(4)	16.6(4)
F1	54.5(12)	158(2)	120.5(18)	-19.7(16)	-20.5(12)	6.7(13)
F2	102.0(19)	133(2)	163(2)	75(2)	18.6(17)	38.7(16)
F3	118(2)	146(2)	121.0(19)	-34.9(16)	25.4(15)	65.2(18)
F4	87.5(15)	128.7(19)	94.6(14)	52.8(14)	22.2(11)	23.9(13)
F5	106.3(18)	81.9(14)	120.7(18)	-3.7(12)	26.6(13)	-35.6(13)
F6	109.0(18)	130.5(18)	72.7(13)	-2.0(12)	53.3(12)	-7.0(14)
F7	150(3)	143(2)	108.3(19)	-48.6(16)	66.7(18)	-17.0(19)
F8	217(4)	65.7(15)	153(2)	-19.7(15)	46(2)	27.8(17)
F9	165(3)	146(2)	96.0(17)	-47.9(16)	-21.0(18)	-22(2)
F10	136(2)	82.9(14)	105.3(16)	39.4(12)	23.6(14)	-14.5(13)
F11	126(2)	112.7(18)	105.1(17)	-22.6(14)	64.8(15)	-22.4(15)
F12	68.7(14)	186(3)	111.2(18)	47.0(17)	3.5(13)	-24.0(15)
O1	41.3(9)	64.3(11)	43.5(9)	-16.0(8)	9.0(7)	-7.3(8)
O2	48.9(11)	52.5(10)	61.8(11)	12.6(8)	0.5(8)	-2.2(8)
O3	81.3(15)	70.6(13)	47.0(10)	9.5(9)	-7.4(9)	10.3(11)
N1	47.4(12)	50.9(12)	37.5(10)	1.8(8)	4.5(8)	4.5(9)
C1	40.9(13)	49.9(14)	43.9(12)	0.5(10)	2.5(10)	2.3(11)
C2	39.9(13)	54.0(14)	38.6(12)	-1.9(10)	4.1(9)	-5.6(11)
C3	36.7(12)	51.3(14)	39.8(12)	0.9(10)	2.8(9)	-3.4(10)
C4	49.9(15)	65.6(17)	40.8(13)	6.0(11)	-0.4(11)	-0.6(12)

C5	48.7(15)	63.6(17)	58.2(16)	13.6(13)	0.0(12)	5.8(13)
C6	44.5(14)	51.3(15)	62.8(16)	7.0(12)	7.9(12)	2.6(11)
C7	52.0(15)	53.5(15)	45.8(13)	-1.5(11)	9.1(11)	1.9(12)
C8	36.6(12)	49.5(13)	38.4(11)	3.2(10)	4.1(9)	-3.0(10)
C9	46.2(14)	62.9(16)	38.3(12)	5.1(11)	0.2(10)	-3.5(12)
C10	79(2)	78(2)	39.6(14)	-5.1(13)	-0.2(13)	-1.1(16)
C11	62.4(17)	46.2(14)	51.5(14)	3.9(11)	4.4(12)	2.1(12)
C12	79(2)	64.9(19)	65.8(19)	11.8(15)	9.2(16)	-8.3(16)
C13	107(3)	67(2)	79(2)	-7.9(17)	20(2)	1(2)
C14	43.1(14)	55.0(14)	41.7(12)	-11.5(10)	7.3(10)	-3.7(11)
C15	60.9(19)	74(2)	60.9(17)	-2.9(14)	19.0(14)	-5.6(16)
C16	62(2)	80(2)	75(2)	-4.9(17)	10.9(16)	13.5(17)

Table S4 Bond Lengths for compound 2g.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
Cl1	C6	1.735(3)	O3	C9	1.220(3)
F1	C16	1.311(4)	N1	C1	1.457(3)
F2	C16	1.301(4)	N1	C8	1.419(3)
F3	C16	1.316(4)	N1	C9	1.379(3)
F4	C15	1.326(4)	C1	C2	1.539(3)
F5	C15	1.322(4)	C2	C3	1.497(4)
F6	C15	1.323(3)	C3	C4	1.381(3)
F7	C13	1.327(5)	C3	C8	1.397(3)
F8	C13	1.308(4)	C4	C5	1.389(4)
F9	C13	1.318(5)	C5	C6	1.378(4)
F10	C12	1.317(4)	C6	C7	1.392(4)
F11	C12	1.317(4)	C7	C8	1.389(4)
F12	C12	1.306(4)	C9	C10	1.487(4)
O1	C2	1.448(3)	C11	C12	1.526(4)
O1	C14	1.402(3)	C11	C13	1.515(4)
O2	C1	1.430(3)	C14	C15	1.512(4)
O2	C11	1.402(3)	C14	C16	1.519(4)

Table S5 Bond Angles for compound 2g.

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
C14	O1	C2	118.24(18)	C13	C11	C12	111.8(3)
C11	O2	C1	117.2(2)	F10	C12	F11	105.7(3)
C8	N1	C1	109.66(18)	F10	C12	C11	111.1(3)
C9	N1	C1	118.3(2)	F11	C12	C11	110.3(3)
C9	N1	C8	131.8(2)	F12	C12	F10	107.9(3)

O2	C1	N1	109.1(2)	F12	C12	F11	107.9(3)
O2	C1	C2	108.37(18)	F12	C12	C11	113.5(3)
N1	C1	C2	104.13(19)	F7	C13	C11	108.7(3)
O1	C2	C1	108.50(19)	F8	C13	F7	108.5(4)
O1	C2	C3	107.93(19)	F8	C13	F9	107.2(4)
C3	C2	C1	102.88(19)	F8	C13	C11	112.8(3)
C4	C3	C2	129.5(2)	F9	C13	F7	105.9(3)
C4	C3	C8	121.1(2)	F9	C13	C11	113.6(3)
C8	C3	C2	109.3(2)	O1	C14	C15	107.9(2)
C3	C4	C5	119.5(2)	O1	C14	C16	108.6(2)
C6	C5	C4	118.7(2)	C15	C14	C16	113.0(2)
C5	C6	Cl1	118.9(2)	F4	C15	C14	109.8(2)
C5	C6	C7	123.2(2)	F5	C15	F4	107.3(3)
C7	C6	Cl1	118.0(2)	F5	C15	F6	107.3(3)
C8	C7	C6	117.5(2)	F5	C15	C14	113.0(3)
C3	C8	N1	109.1(2)	F6	C15	F4	106.2(3)
C7	C8	N1	130.9(2)	F6	C15	C14	112.8(3)
C7	C8	C3	120.0(2)	F1	C16	F3	106.6(3)
O3	C9	N1	118.4(2)	F1	C16	C14	113.7(3)
O3	C9	C10	122.1(2)	F2	C16	F1	105.6(3)
N1	C9	C10	119.6(2)	F2	C16	F3	108.7(3)
O2	C11	C12	107.2(2)	F2	C16	C14	109.9(3)
O2	C11	C13	109.2(2)	F3	C16	C14	111.9(3)

Table S6 Torsion Angles for compound 2g.

A	B	C	D	Angle/°	A	B	C	D	Angle/°
Cl1	C6	C7	C8	178.85(19)	C4	C3	C8	N1	-176.1(2)
O1	C2	C3	C4	-80.1(3)	C4	C3	C8	C7	3.7(4)
O1	C2	C3	C8	96.7(2)	C4	C5	C6	Cl1	-178.1(2)
O1	C14	C15	F4	62.2(3)	C4	C5	C6	C7	1.8(4)
O1	C14	C15	F5	-57.5(3)	C5	C6	C7	C8	-1.0(4)
O1	C14	C15	F6	-179.5(2)	C6	C7	C8	N1	178.0(2)
O1	C14	C16	F1	58.8(3)	C6	C7	C8	C3	-1.7(4)
O1	C14	C16	F2	-59.4(3)	C8	N1	C1	O2	96.5(2)
O1	C14	C16	F3	179.7(3)	C8	N1	C1	C2	-19.0(2)
O2	C1	C2	O1	151.58(19)	C8	N1	C9	O3	-175.0(2)
O2	C1	C2	C3	-94.2(2)	C8	N1	C9	C10	4.5(4)
O2	C11	C12	F10	179.9(3)	C8	C3	C4	C5	-2.9(4)
O2	C11	C12	F11	63.0(3)	C9	N1	C1	O2	-78.4(3)
O2	C11	C12	F12	-58.2(3)	C9	N1	C1	C2	166.1(2)

O2	C11	C13	F7	-61.6(4)	C9	N1	C8	C3	-177.8(2)
O2	C11	C13	F8	178.1(3)	C9	N1	C8	C7	2.4(4)
O2	C11	C13	F9	55.9(4)	C11	O2	C1	N1	115.9(2)
N1	C1	C2	O1	-92.4(2)	C11	O2	C1	C2	-131.4(2)
N1	C1	C2	C3	21.8(2)	C12	C11	C13	F7	179.9(3)
C1	O2	C11	C12	-140.0(2)	C12	C11	C13	F8	59.6(5)
C1	O2	C11	C13	98.7(3)	C12	C11	C13	F9	-62.5(4)
C1	N1	C8	C3	8.2(3)	C13	C11	C12	F10	-60.4(4)
C1	N1	C8	C7	-171.6(2)	C13	C11	C12	F11	-177.3(3)
C1	N1	C9	O3	-1.4(4)	C13	C11	C12	F12	61.5(4)
C1	N1	C9	C10	178.0(2)	C14	O1	C2	C1	-119.6(2)
C1	C2	C3	C4	165.3(2)	C14	O1	C2	C3	129.6(2)
C1	C2	C3	C8	-17.9(3)	C15	C14	C16	F1	-60.9(3)
C2	O1	C14	C15	-115.6(2)	C15	C14	C16	F2	-179.1(3)
C2	O1	C14	C16	121.6(2)	C15	C14	C16	F3	60.0(4)
C2	C3	C4	C5	173.5(2)	C16	C14	C15	F4	-177.6(3)
C2	C3	C8	N1	6.8(3)	C16	C14	C15	F5	62.6(3)
C2	C3	C8	C7	-173.3(2)	C16	C14	C15	F6	-59.3(3)
C3	C4	C5	C6	0.2(4)					

Table S7 Hydrogen Atom Coordinates (Å×10^4) and Isotropic Displacement Parameters (Å^2×10^3) for compound 2g.

Atom	*x*	*y*	*z*	U(eq)
H1	-135.3	7365.6	306.68	54
H2	1564.95	7081.94	1792.02	53
H4	2731.99	5591	2457.01	63
H5	3885.67	4352.83	2067.31	68
H7	2624.26	4863.54	-396.69	60
H10A	2458.75	5727.22	-1537.38	99
H10B	732.29	5931.92	-2080.7	99
H10C	702.56	5328.72	-1316.99	99
H11	989.7	8394.59	-264.85	64
H14	-620.45	7289.79	2487.2	56

Crystal structure determination of compound 2g.

Crystal Data for $C_{16}H_{10}ClF_{12}NO_3$ (*M* =527.70 g/mol): monoclinic, space group $P2_1/c$ (no. 14), *a* = 7.7099(6) Å, *b* = 16.5285(15) Å, *c* = 15.8165(16) Å, *β* = 94.189(7), *V* = 2010.2(3) Å^3, *Z* = 4, *T* = 293(2) K, μ(Mo Kα) = 0.319 mm^{-1}, *Dcalc* = 1.744 g/cm^3, 11847 reflections measured (7.126° ≤ 2Θ ≤ 52°), 3944 unique (R_{int} = 0.0312, R_{sigma} = 0.0278) which were used in all calculations. The final R_1 was 0.0553 (I > 2σ(I)) and wR_2 was 0.1559 (all data).

7. Study on anti-tumor activity

Anticancer activity assay

The 180 μL cell suspensions (4500-5000 cells/mL) was seeded in 96-well plates and incubated for 24 h. All compounds and 5-FU were dissolved in the Phosphate Buffered Saline (PBS) with 1% DMSO to give various concentrations (2.5, 5, 10, 20, and 40 μM, respectively) to 96-well plates and control wells contained supplemented media with 1% DMSO. Continue incubating for 48 h at 37 ^{o}C in 5% CO_2 atmosphere and then the MTT solution (10 μL, 5 mg/mL) was added into each well and the cultures were incubated further for 4~6 h. After removal of the supernatant, DMSO (100 μL) was added to dissolve the formazan crystals. The absorbance was read by enzyme labeling instrument with 570/630 nm double wavelength measurement. The cytotoxicity was estimated based on the percentage cell survival in a dose dependent manner relative to the negative control. The final IC_{50} (a drug concentration killing 50% cells) values were calculated by the Bliss method. All the tests were repeated in at least three independent experiments.

Cells morphological analysis

The HeLa cells was seeded in 6-well plates and incubated for 24 h. Then, the cells were treated with different concentrations (0 and 10 μM) of the compound **2i** and incubated for 12 h. Finally, control and treated cells were observed with fluorescence microscope (Cytation 5 Cell Imaging Multi-Mode Reader, BioTek Instruments, Inc., USA.). The results shown that the cells were shrink, round and even die after treament with compound **2i**, which revealed that the compound **2i** has a good inhibitory effect on HeLa cells.

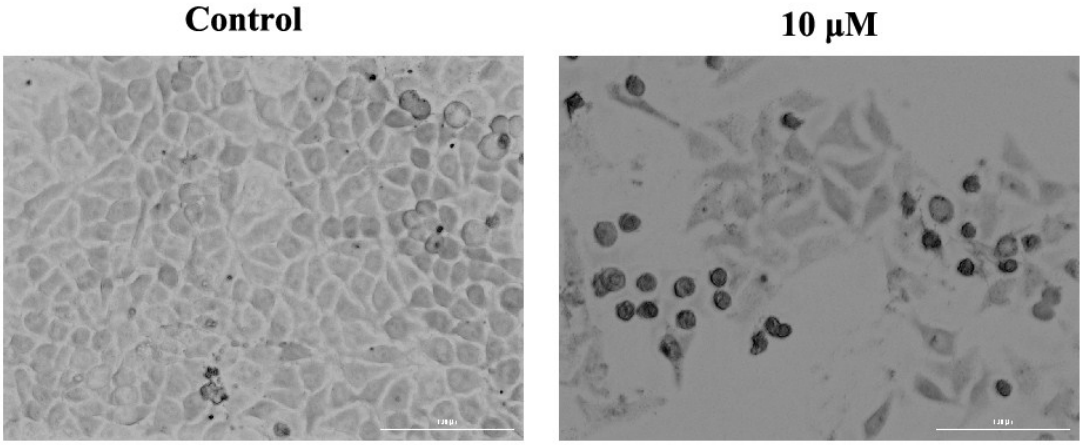


Figure S4. Changes of HeLa cell morphology after 12 h with treatment of compound **2i.**

Hoechst 33342nucleic acid staining

Nuclear morphological changes were observed through Hoechst 33342 staining. After treatment with compound **2i** for 24 h in HeLa cells, cells were washed with PBS and permeabilized with 0.1% Tween 20 for 10 min followed by staining with Hoechst 33342 (2.5 μg/mL). Control and treated cells were observed with fluorescence microscope (Cytation 5 Cell Imaging Multi-Mode Reader, BioTek Instruments, Inc., USA.). The results from Fig. S5 illustrated that the nuclear structure of untreated cells was intact whereas compound **2i** treated cells exhibitedcondensed, or fragmented nuclei.

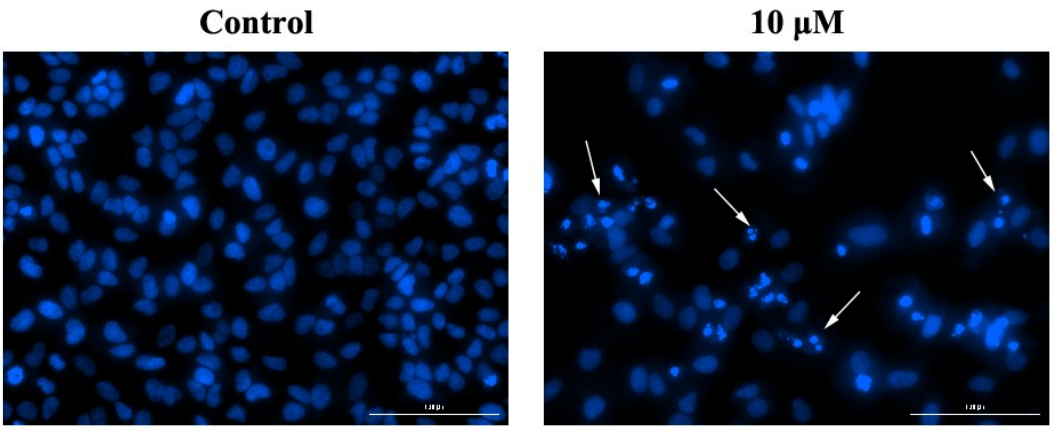


Figure S5. Assessment of nuclear morphological changes by Hoechst 33342 staining in HeLa cells after 24 h. Compound **2i** treated HeLa cells have displayed nuclear apoptotic characteristics such as nuclear fragmentation and shrunken nuclei.

Measurement of intracellular reactive oxygen species

Intracellular reactive oxygen species (ROS) was detected by using fluorescence microscope by with 2′,7′-dichlorofluorescein diacetate (DCHF-DA) staining kit. HeLa cells were seeded at 2×106/well in 10% FBS/DMEM into 6-well plates and treated with different concentrations of compound **2i** (0 and 10 μM) for 24 h, then cells were washed twice with serum free DMEM and incubated with DCHF-DA for 30 minutes at 37 ºC in dark. The fluorescence microscope was used to measure the enhanced green flourescent intensity in cells, the intensity of the microscope is 488 nm, and the emission wavelength is 525 nm. As shown in Fig. S6, after treatment with compound **2i** (0 and 10 μM), the green fluorescence intensit y increased significantly in HeLa cells. Hence, compound **2i** can increase the intracellular levels of ROS.

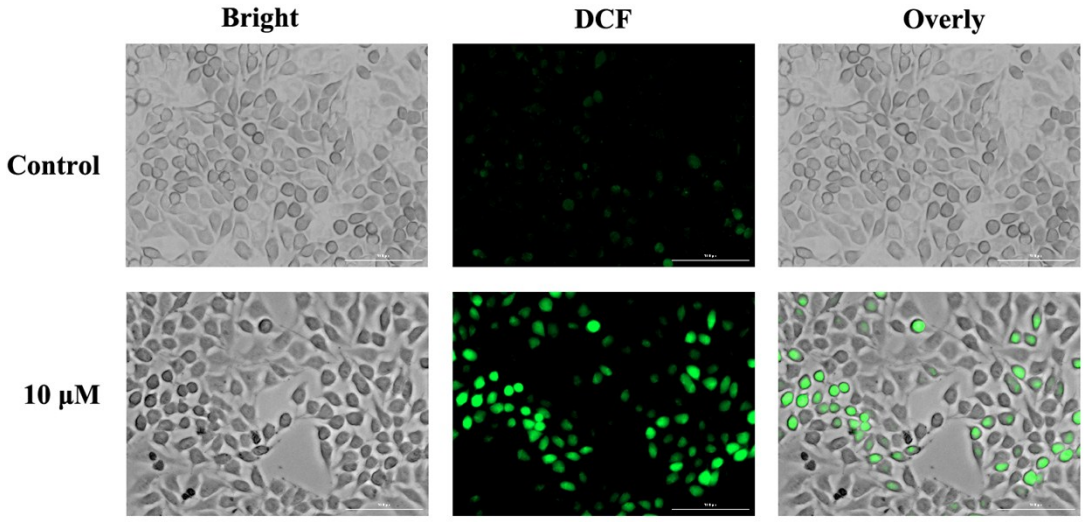
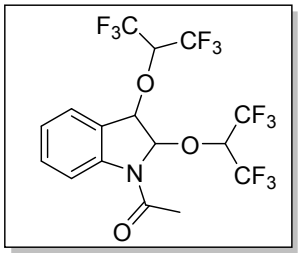
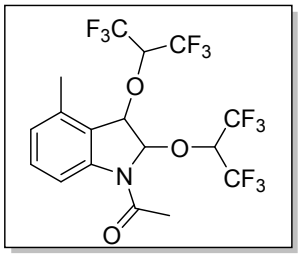


Figure S6. Changes in ROS concentration in HeLa cells treated with compound **2i** determined with a DCFH-DA staining kit under a fluorescence microscope. Scale bar: 100 μm.

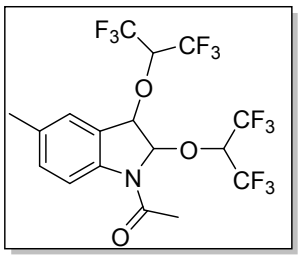
8. Characterization data for the fluoroalkylated indoles and anilines.



1-**(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2a).** White solid (197.2 mg, 73%). mp:84.3-85.5 °C. **^{1}H NMR** (400 MHz, $CDCl_3$), δ 7.55 – 7.45 (m, 2H), 7.30 – 7.18 (m, 2H), 6.13 (s, 1H), 5.40 (s, 1H), 4.97 (s, 1H), 4.42 – 4.26 (m, 1H), 2.48 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 171.04, 141.81, 132.15, 128.00, 127.09, 125.23, 122.63, 122.26, 119.81, 119.44, 116.22, 93.89, 84.52, 74.52 (qui, *J* = 33.0 Hz), 23.53. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.45 – (-73.63) (m, 3F), -74.00 – (-74.10) (m, 3F), -74.35 (d, *J* = 52.0 Hz, 6F). **HRMS** (m/z) (ESI): calcd for $C_{16}H_{12}F_{12}NO_3$ $[M+H]^+$ 494.0626, found 494.0625.



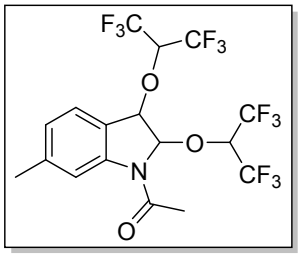
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methylindolin-1-yl)ethan-1-one (2b). Yellow oil (152.1 mg, 60%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.41 – 7.35 (m, 1H), 7.15 – 6.92 (m, 2H), 6.16 (s, 1H), 5.41 (s, 1H), 5.02 (s, 1H), 4.39 – 4.22 (m, 1H), 2.48 (s, 3H), 2.40 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 171.26, 141.82, 138.77, 131.99, 126.81, 126.06, 122.94, 122.32, 120. 09, 119.51, 113.65, 92.41, 83.28, 74.41 (qui, *J* = 33.7 Hz), 23.37, 18.12. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.20-(-73.50) (m, 6F), -74.05-(-74.55) (m, 6F). **HRMS** (m/z) (ESI): calcd for $C_{17}H_{14}F_{12}NO_3$ $[M+H]^+$ 508.0782, found 508.0773.



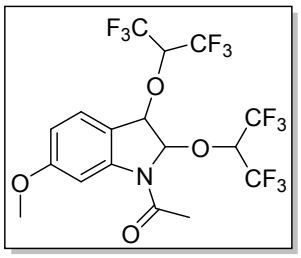
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-5-methylindolin-1-yl)ethan-1-one (2c). Yellow oil (164.8 g, 65%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.32 – 7.26 (m, 2H), 7.18 – 7.02 (m, 1H), 6.12 (s,

1H), 5.39 (s, 1H), 4.92 (s, 1H), 4.35 – 4.28 (m, 1H), 2.48 – 2.43 (m, 3H), 2.40 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 170.70, 157.04, 139.20, 134.96, 132.38, 128.10, 125.87, 117.81, 115.68, 93.62, 84.26, 74.05 (qui, *J* = 32.0 Hz), 23.12, 20.72. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.3-(-73.7) (m, 3F), -73. 8-(-74. 15) (m, 3F), -74.38 (d, *J* = 41.4 Hz).

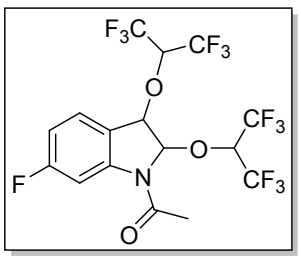
HRMS (m/z) (ESI): calcd for $C_{17}H_{13}F_{12}NO_3Na$ $[M+Na]^+$ 530.0602, found 530.0589.



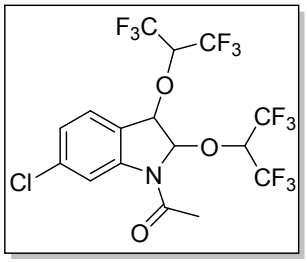
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-6-methylindolin-1-yl)ethan-1-one (2d). Yellow oil (167.3 mg, 66%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.39 – 7.33 (m, 1H), 7.09 – 7.00 (m, 2H), 6.11 (s, 1H), 5.40 (s, 1H), 4.95 (s, 1H), 4.36 – 4.24 (m, 1H), 2.48 (s, 3H), 2.44 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 171.34 , 143.24 , 142.44, 127.99, 126.35, 122.96,12.60, 122.58, 120.16, 119.79, 117.27, 94.70, 84.50, 74.41 (qui, *J* = 33.0 Hz), 23.87, 22.58. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.58 (s, 1F), -74.00 – (-74.20) (m, 3F), -74.39 (d, *J* = 40.1 Hz, 6F). **HRMS** (m/z) (ESI): calcd for $C_{17}H_{14}F_{12}NO_3$ $[M+H]^+$ 508.0782, found 508.0769.



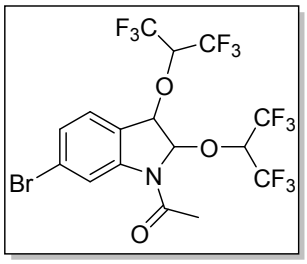
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-6-methoxyindolin-1-yl)ethan-1-one (2e). Colorless oil (235.4 mg, 90%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.44 – 7.33 (m, 1H), 6.85 – 6.60 (m, 2.0 Hz, 2H), 6.11 (s, 1H), 5.38 (s, 1H), 4.94 (s, 1H), 4.35 – 4.23 (m, 1H), 3.85 (s, 3H), 2.46 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 170.99, 163.05 , 143.36, 128.85, 125.49, 122.68, 122.35, 119.92, 119.07, 109.39, 103.90, 94.92, 83.96, 74.18 (qui, *J* = 32.9 Hz), 55.87, 23.47. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.64 (s, 3F), -74.10 – (-74.30) (m, 3F), -74.47 (d, *J* = 34.0 Hz, 6F). **HRMS** (m/z) (ESI): calcd for $C_{17}H_{14}F_{12}NO_4$ $[M+H]^+$ 524.0726, found 524.0731.



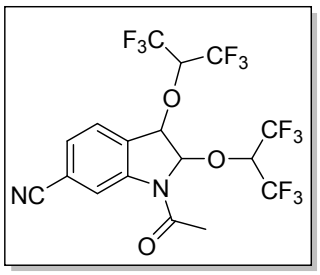
1-**(6-fluoro-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2f).** Colorless oil (173.5 g, 68%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.50 – 7.40 (m, 1H), 7.10 – 6.75 (m, 2H), 6.12 (s, 1H), 5.37 (s, 1H), 4.93 (s, 1H), 4.36 – 4.24 (m, 1H), 2.47 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 170.64, 165.13 (d, *J* = 250.4 Hz), 143.21, 129.24, 122.61, 122.21, 119.80, 119.36, 112.24 (d, *J* = 23.1 Hz), 104.72, 104.43, 94.61, 84.06, 74.70 (qui, *J* = 30.7 Hz), 23.56. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.62 (s, 3F), -74.0 – (-74.13) (m, 3F), -74.38 (d, *J* = 48.8 Hz, 6F), -105.90 (s, 1F). **HRMS** (m/z) (ESI): calcd for $C_{16}H_{11}F_{13}NO_3$ $[M+H]^+$ 512.0531, found 512.0525.



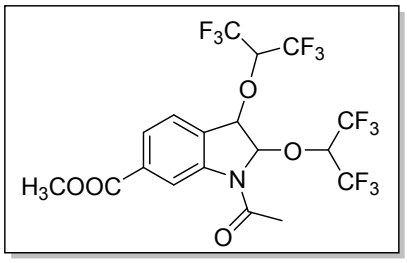
1-(6-chloro-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2g). Yellow solid (163.4 mg, 62%). mp: 71.2-72.3 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.42 (d, *J* = 8.1 Hz, 1H), 7.31 – 7.17 (m, 2H), 6.11 (s, 1H), 5.36 (s, 1H), 4.93 (s, 1H), 4.37 – 4.27 (m, 1H), 2.49 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) 170.70, 142.79, 138.22, 128.71, 125.44, 122.57, 122.20, 119.77, 119.39, 116.61, 94.25, 84.09, 74.86 (qui, *J* = 33.5 Hz), 23.63. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.69 (s, 3F), -74.00 – (-74.15) (m, 3F), -74.41 (d, *J* = 37.6 Hz, 6F). **HRMS** (m/z) (ESI): calcd for $C_{16}H_{11}ClF_{12}NO_3[M+H]^+$ 528.0236, found 528.0229.



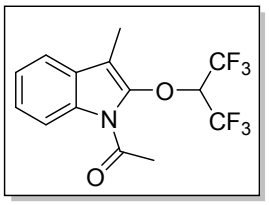
1-(6-bromo-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2h). Yellow solid (165.03 mg, 58%). mp: 76.4-77.5 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.58 – 7.27 (m, 3H), 6.10 (s, 1H), 5.56 – 5.14 (m, 1H), 4.92 (s, 1H), 4.40 – 4.25 (m, 1H), 2.48 (s, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 170.63, 143.03, 128.95, 128.39, 126.20, 122.61, 122.21, 119.81, 119.40, 94.22, 84.12, 74.47 (qui, *J* = 33.2 Hz), 23.54. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.73 (d, *J* = 4.9 Hz, 3F), -74.05 – (-74.20) (m, 3F), -74.44 (d, *J* = 26.3 Hz, 6F). **HRMS** (m/z) (ESI): calcd for $C_{16}H_{11}BrF_{12}NO_2$ $[M+H]^+$ 571.9731 and 573.9710, found 571.9726 and 573.9703.



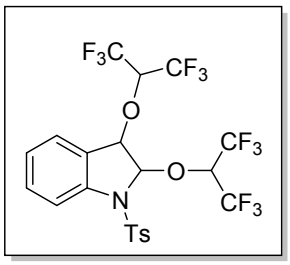
1-acetyl-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indoline-6-carbonitrile (2i). Colorless oil (161.2 mg, 62%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.65 – 7.59 (m, 1H), 7.58 – 7.40 (m, 2H), 6.13 (s, 1H), 5.57 – 5.17 (m, 1H), 4.99 (s, 1H), 4.50 – 4.30 (m, 1H), 2.51 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 170.48, 142.07, 132.05, 129.11, 128.71, 122.49, 122.27, 119.45, 118.87, 117.76, 116.01, 93.57, 84.14, 23.62. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.67 (s, 3F), -73.88 – (-73.98) (m, 3F), -74.33 (d, J = 48.9 Hz, 6F). **HRMS** (m/z) (ESI): calcd for $C_{17}H_{10}F_{12}N_2O_3Na$ $[M+Na]^+$ 541.0398, found 541.0392.



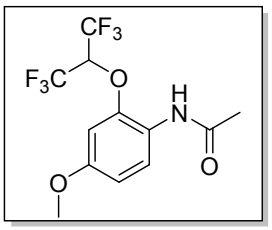
methyl 1-acetyl-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indoline-6-carboxylate (2j). Colorless oil (169.3 mg, 59%). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.0 – 7.85 (m, 2H), 7.65 – 7.45 (m, 1H), 6.16 (s, 1H), 5.39 (s, 1H), 4.98 (s, 1H), 4.43 – 4.27 (m, 1H), 3.97 (s, 3H), 2.55 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.73, 133.89, 127.63, 126.46, 116.71, 93.69, 84.08, 52.73, 23.48. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.50-(-73.75) (m, 3F), -73.92 – (-74.04) (m, 3F), -74.35 (d, J = 48.9 Hz, 6F). **HRMS** (m/z) (ESI): calcd for $C_{18}H_{13}F_{12}NO_5Na$ $[M+Na]^+$ 574.0500, found 574.0493.



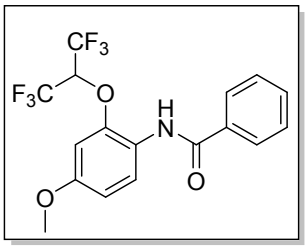
1-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-3-methyl-1H-indol-1-yl)ethan-1-one (2k). Yellow soild (119 mg, 70%). mp: 65.7 – 66.6 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.32 – 8.20 (m, 1H), 7.48 – 7.39 (m, 1H), 7.37 – 7.27 (m, 2H), 5.05 – 4.96 (m, 1H), 2.64 (s, 3H), 2.28 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.09, 144.02, 131.77, 127.94, 125.36, 123.74, 122.08, 119.28, 118.12, 115.89, 99.94, 78.58 (qui, J = 33.2 Hz), 26.16, 7.33. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -72.54 (s, 6F). **HRMS** (m/z) (ESI): calcd for $C_{14}H_{12}F_6NO_2$ $[M+H]^+$ 340.0772, found 340.0774.



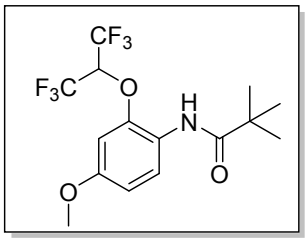
2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-1-tosylindoline (2l). White soild (212.4 mg, 70%). mp: 103.1 – 104.5 °C. **^{1}H NMR** (400 MHz, Acetone-d_6) δ 7.78 – 7.71 (m, 1H), 7.68 – 7.52 (m, 4H), 7.36 – 7.26 (m, 3H), 5.86 (s, 1H), 5.64 – 5.47 (m, 2H), 5.26 (s, 1H), 2.34 (s, 3H). **^{13}C NMR** (100 MHz, Acetone-d_6) δ 145.57, 141.33, 133.56, 132.05, 129.88, 128.20, 127.27, 127.18, 126.15, 123.40, 122.46, 120.58, 119.60, 117.09, 96.89, 85.78, 75.19 (qui, J = 32.7 Hz), 71.48 (qui, J = 33.1 Hz), 20.46. **^{19}F NMR** (376 MHz, Acetone-d_6) δ -74.25 – (-74.40) (m, 3F), -74.47 – (-74.64) (m, 6F), -74.90 – (-75.02) (m, 3F). **HRMS** (m/z) (ESI): calcd for $C_{21}H_{15}F_{12}NO_4SNa$ $[M+Na]^+$ 628.0428, found 628.0427.



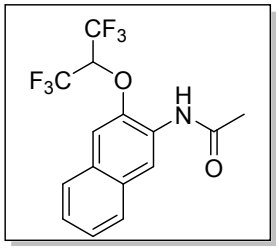
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methoxyphenyl)acetamide (2m). Colorless oil (104.6 mg, 63%). mp: 85.6 – 86.3 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.23 – 8.12 (m, 1H), 7.33 (s, 1H), 6.72 – 6.65 (m, 1H), 6.61 – 6.54 (m, 1H), 4.88 – 4.78 (m, 1H), 3.79 (s, 3H), 2.18 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 168.14, 156.56, 147.28, 123.27, 122.44, 119.45, 109.02, 102.56, 55.72, 24.43. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.51 (s, 6F). **HRMS** (m/z) (ESI): calcd for $C_{12}H_{12}F_6NO_3$ $[M+H]^+$ 332.0721, found 332.0736.



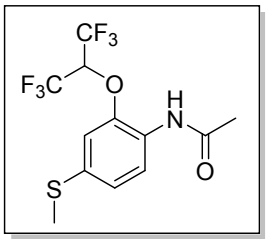
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methoxyphenyl)benzamide (2n). Colorless oil (116.5 mg, 59%). mp: 102.3 – 102.6 °C. **^{1}H NMR** (400 MHz, Acetone-d_6) δ 8.80 (s, 1H), 8.01 – 7.85 (m, 3H), 7.60 – 7.41 (m, 3H), 6.96 – 6.88 (m, 1H), 6.82 – 6.66 (m, 1H), 6.13 – 5.93 (m, 1H), 3.77 (s, 3H). **^{13}C NMR** (100 MHz, Acetone-d_6) δ165.89, 158.49, 150.08, 135.85, 132.46, 129.45, 127.97, 126.44, 123.74, 122.78, 120.92, 109.89, 102.82, 75.43 (qui, J = 33.1 Hz), 56.06. **^{19}F NMR** (376 MHz, Acetone-d_6) δ -74.30 (s, 6F). **HRMS** (m/z) (ESI): calcd for $C_{17}H_{14}F_6NO_3Na$ $[M+Na]^+$ 416.0697, found 416.0692.



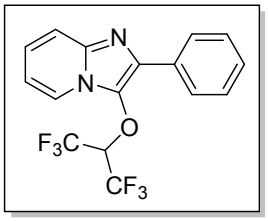
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methoxyphenyl)pivalamide (2o). Colorless oil (129.1 mg, 69%). mp: 97.0 – 98.0 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.40 – 8.16 (m, 1H), 7.77 (s, 1H), 6.78 – 6.63 (m, 1H), 6.61 – 6.46 (m, 1H), 4.94 – 4.80 (m, 1H), 3.79 (s, 3H), 1.30 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 176.59, 156.32, 147.29, 122.85, 122.64, 122.40, 119.59, 108.72, 102.09, 76.62 (qui, J = 33.1 Hz), 55.87, 40.00, 27.55. **^{19}F NMR** (376 MHz, $CDCl_3$) δ -73.61 (s, 6F). **HRMS** (m/z) (ESI): calcd for $C_{15}H_{18}F_6NO_3$ $[M+H]^+$ 374.1191, found 374.1185.



N-(3-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)naphthalen-2-yl)acetamide (2p). White soild (94.8 mg, 54%). mp: 155.1 – 156.5 °C. **^{1}H NMR** (400 MHz, Acetone-d_6) δ 8.80 (s, 1H), 8.06-8.00 (m, 1H), 7.91 – 7.81 (m, 2H), 7.76 – 7.69 (m, 1H), 7.58 – 7.45 (m, 2H), 5.85 – 5.65 (m, 1H), 2.14 (s, 3H). **^{13}C NMR** (100 MHz, Acetone-d_6) δ 169.78, 144.15, 133.23, 128.93, 127.92, 127.72, 126.87, 126.67, 125.63, 121.66, 76.54 (qui, J = 32.0 Hz), 23.73. **^{19}F NMR** (376 MHz, Acetone-d_6) δ -72.79 (s, 6F). **HRMS** (m/z) (ESI): calcd for $C_{15}H_{12}F_6NO_2$ $[M+H]^+$ 352.0772, found 352.0768.



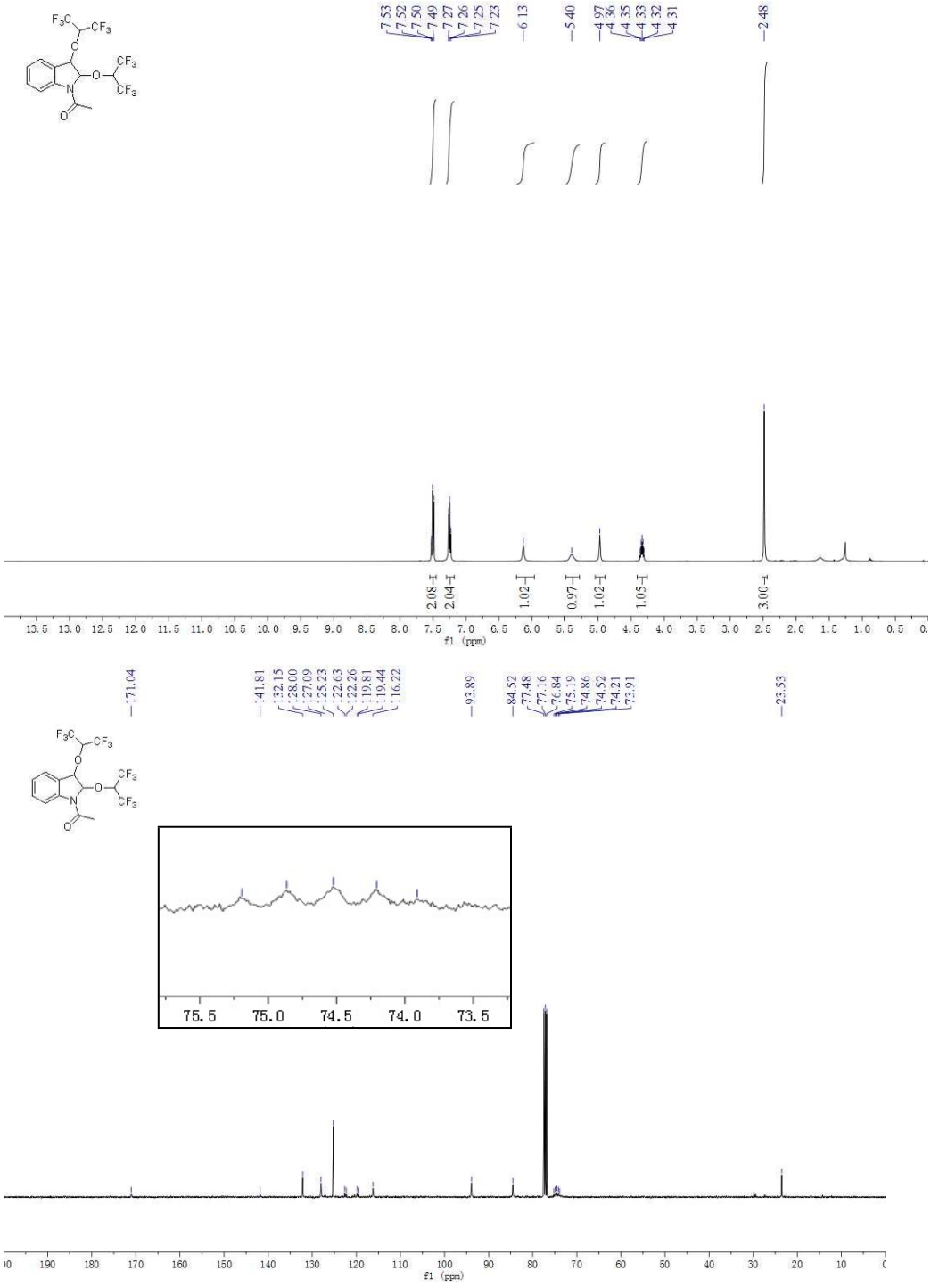
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-(methylthio)phenyl)acetamide (2q). White soild (69.6 mg, 40%). mp: 116.6 – 117.4 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.26 – 8.16 (m, 1H), 7.92 (s, 1H), 7.21 – 7.11 (m, 1H), 7.02 – 6.91 (m, 1H), 4.80 – 4.69 (m, 1H), 2.42 (s, 3H), 2.22 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 168.51, 153.93, 134.50, 128.52, 122.83, 122.54, 120.79, 119.72, 116.65, 76.74 (qui, J = 33.3 Hz), 24.77, 18.29. **^{19}F NMR** (376 MHz, Acetone-d_6) δ -72.75 (s, 6F). **HRMS** (m/z) (ESI): calcd for $C_{12}H_{12}F_6NO_2S$ $[M+H]^+$ 348.0493, found 348.0489.

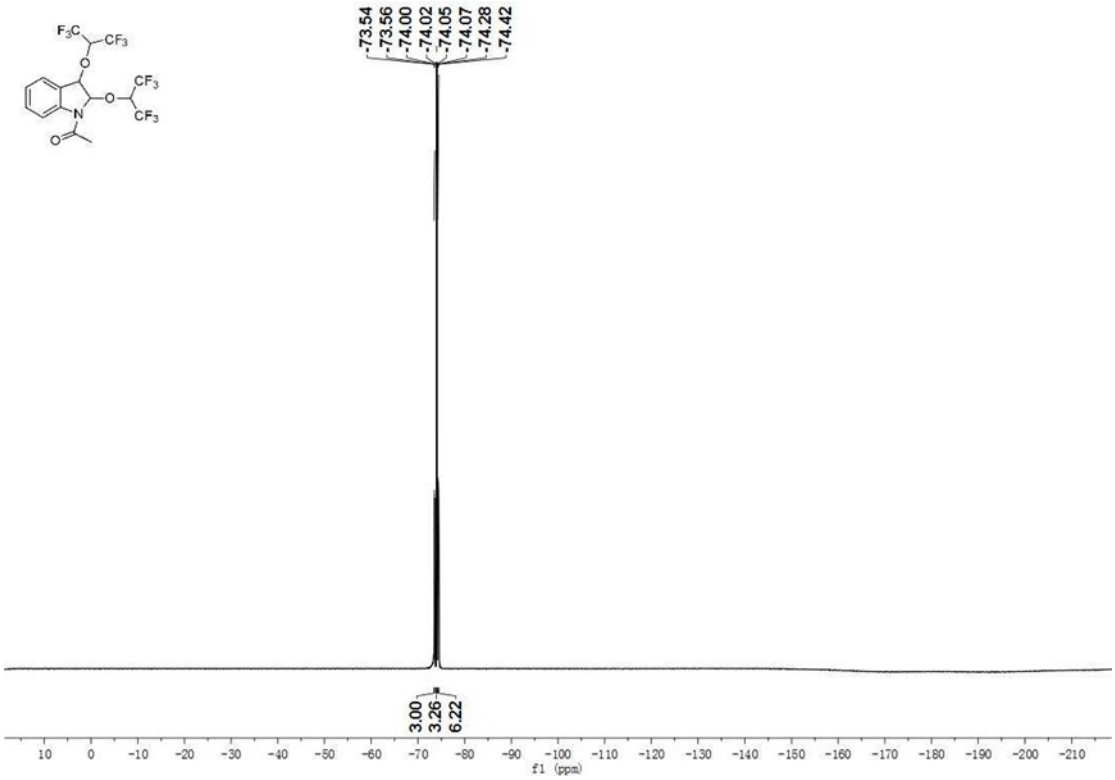


3-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-2-phenylimidazo[1,2-a]pyridine (2r). White soild (153.0 mg, 85%). mp: 150.2 – 151.4 °C. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.04 – 7.95 (m, 1H), 7.95 – 7.82 (m, 2H), 7.65 – 7.53(m, 1H), 7.52 – 7.45 (m, 2H), 7.43 – 7.35 (m, 1H), 7.23 – 7.15 (m, 1H), 6.92 – 6.82 (m, 1H), 4.75 – 4.63 (m, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 139.52, 132.03, 129.24, 129.07, 128.68 , 127.82, 124.75, 121.62, 118.01, 112.82, 76.36 (qui, J = 32.5 Hz). **^{19}F NMR** (376 MHz, $CDCl_3$) δ -72.71 (s, 6F). **HRMS** (m/z) (ESI): calcd for $C_{16}H_{12}F_6N_2O$ $[M+H]^+$ 361.0776, found 361.0771.

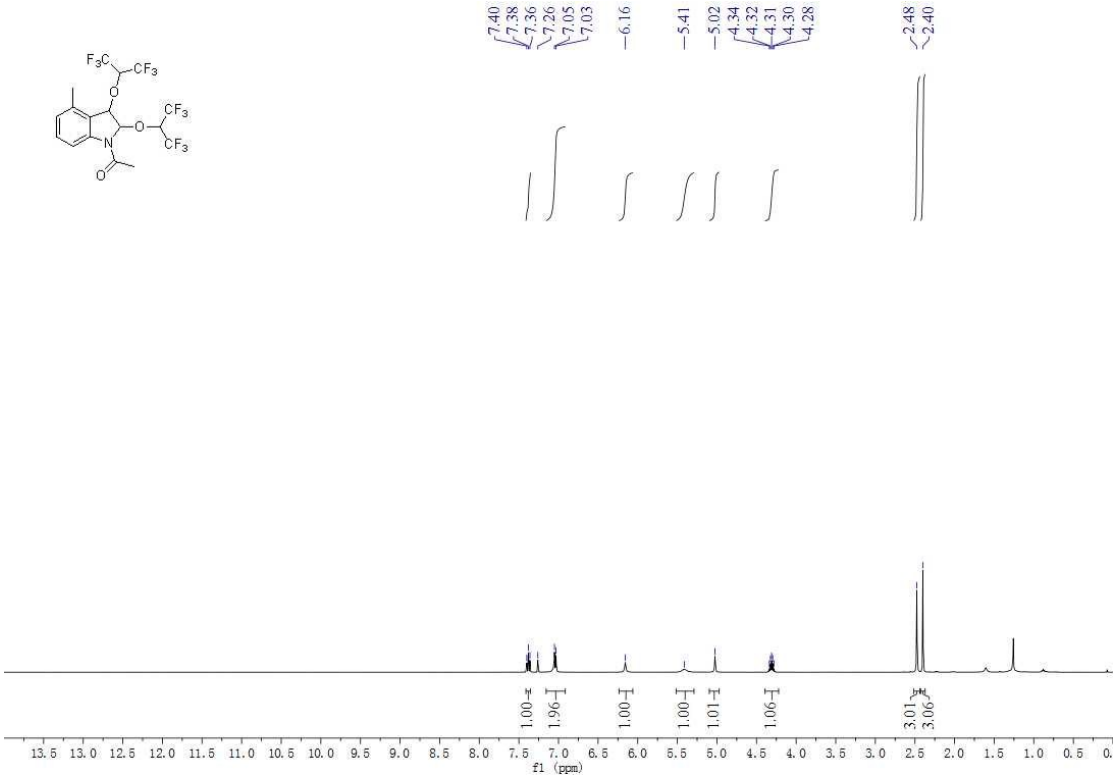
9. Copies of ^{1}H NMR and ^{13}C NMR for the fluoroalkylated indoles and anilines.

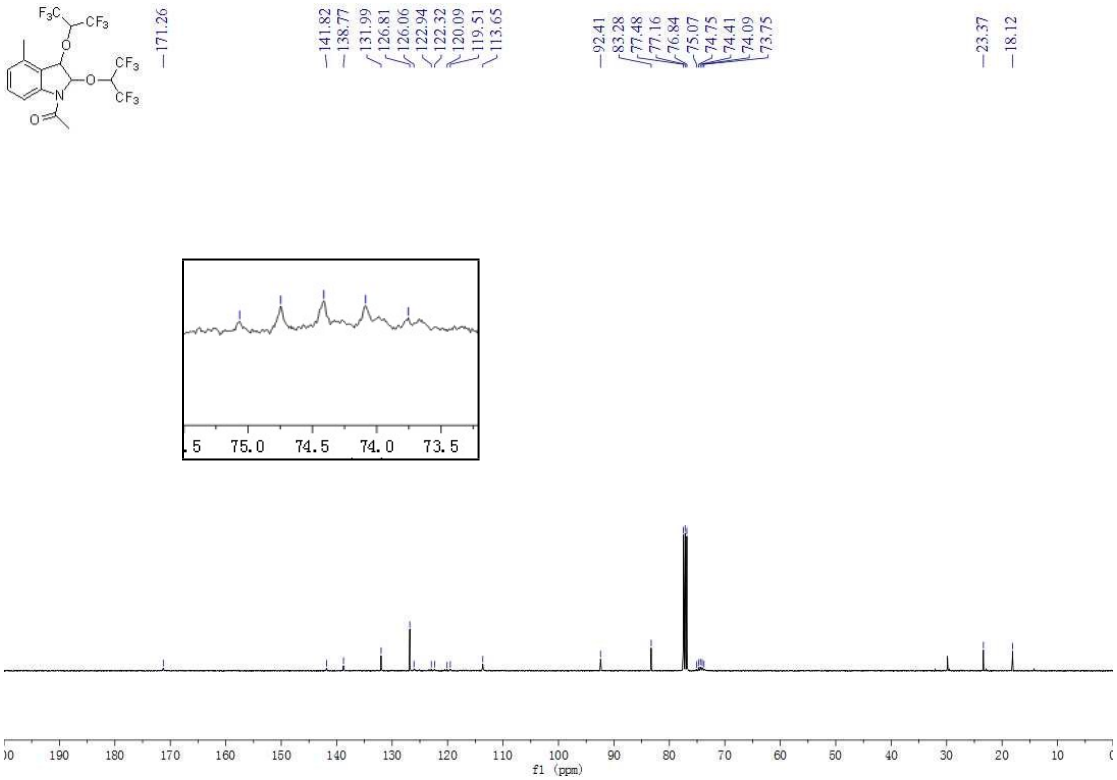
2-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2a)

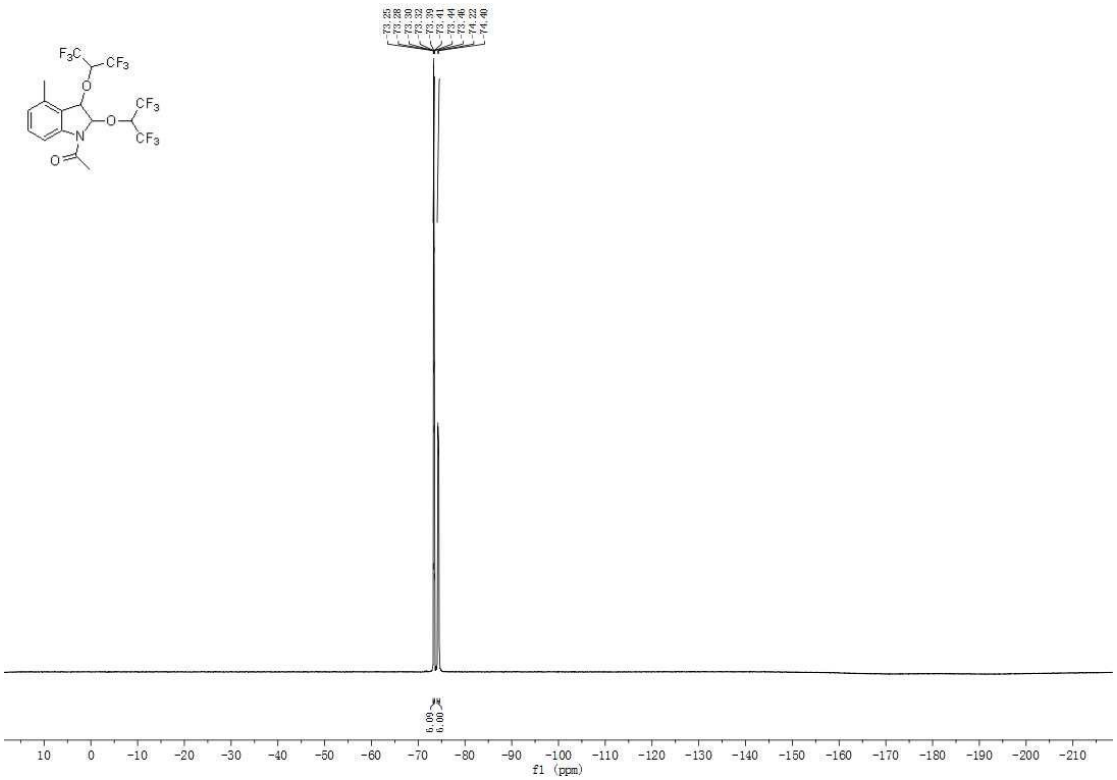




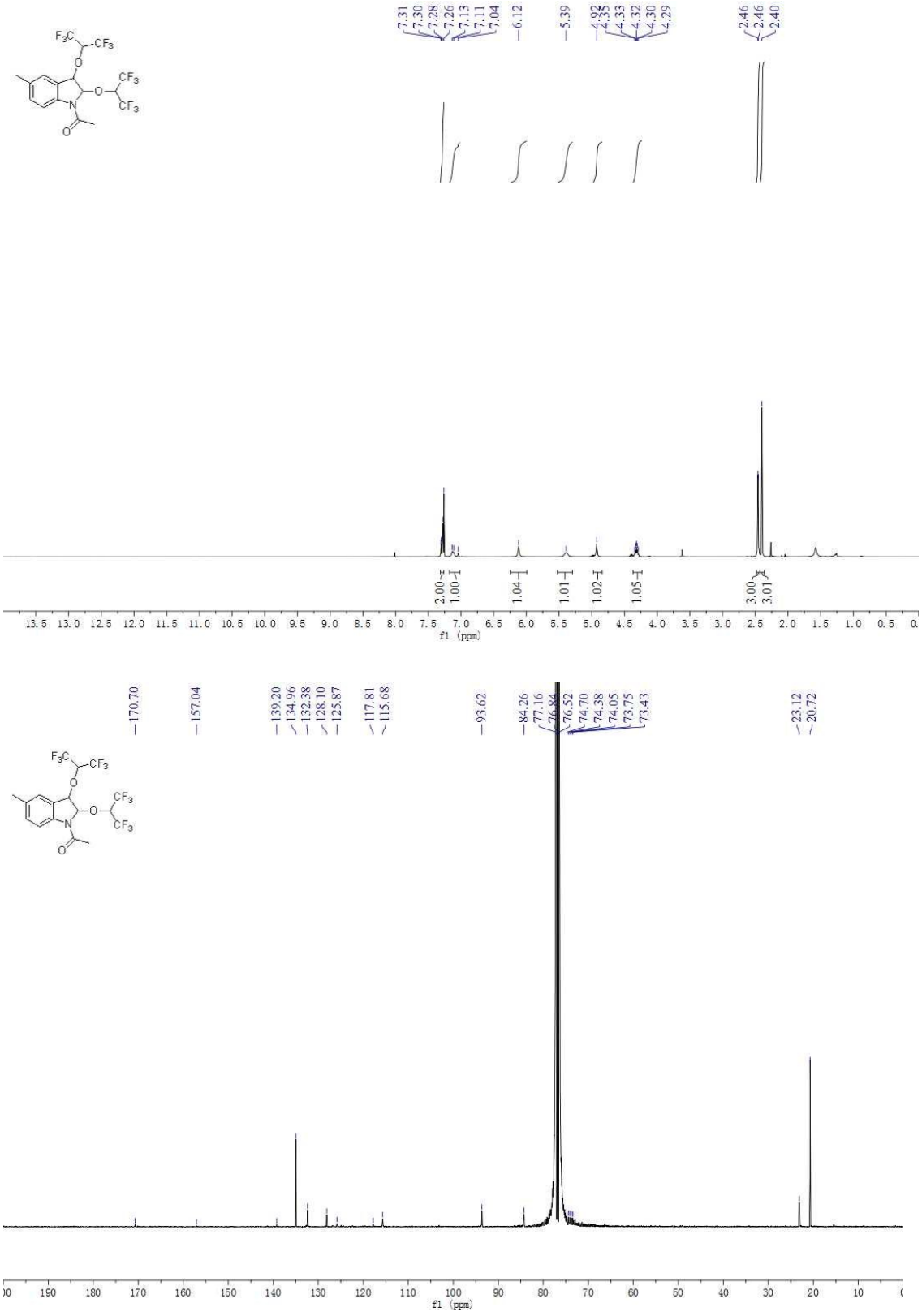
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methylindolin-1-yl)ethan-1-one (2b)

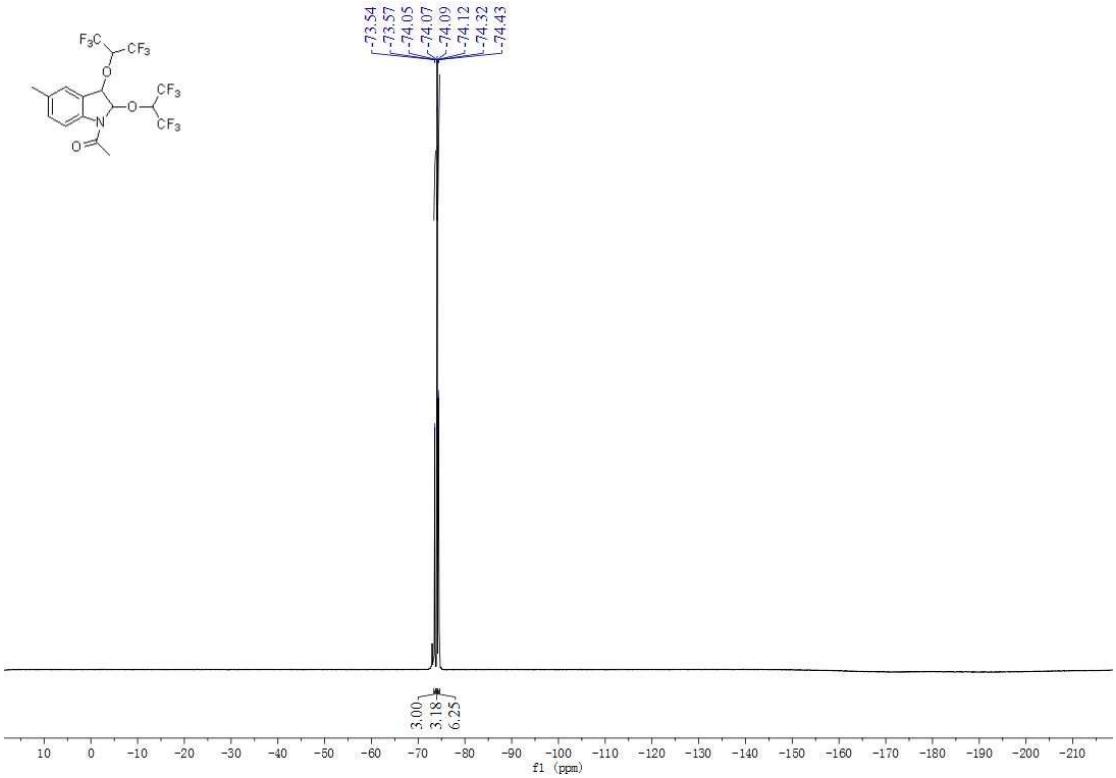



171.26
141.82
138.77
131.99
126.81
126.06
122.94
122.32
120.09
119.51
113.65
92.41
83.28
77.48
77.16
76.84
75.07
74.75
74.41
74.09
73.75
23.37
18.12
75.0
74.5
74.0
73.5
f1 (ppm)

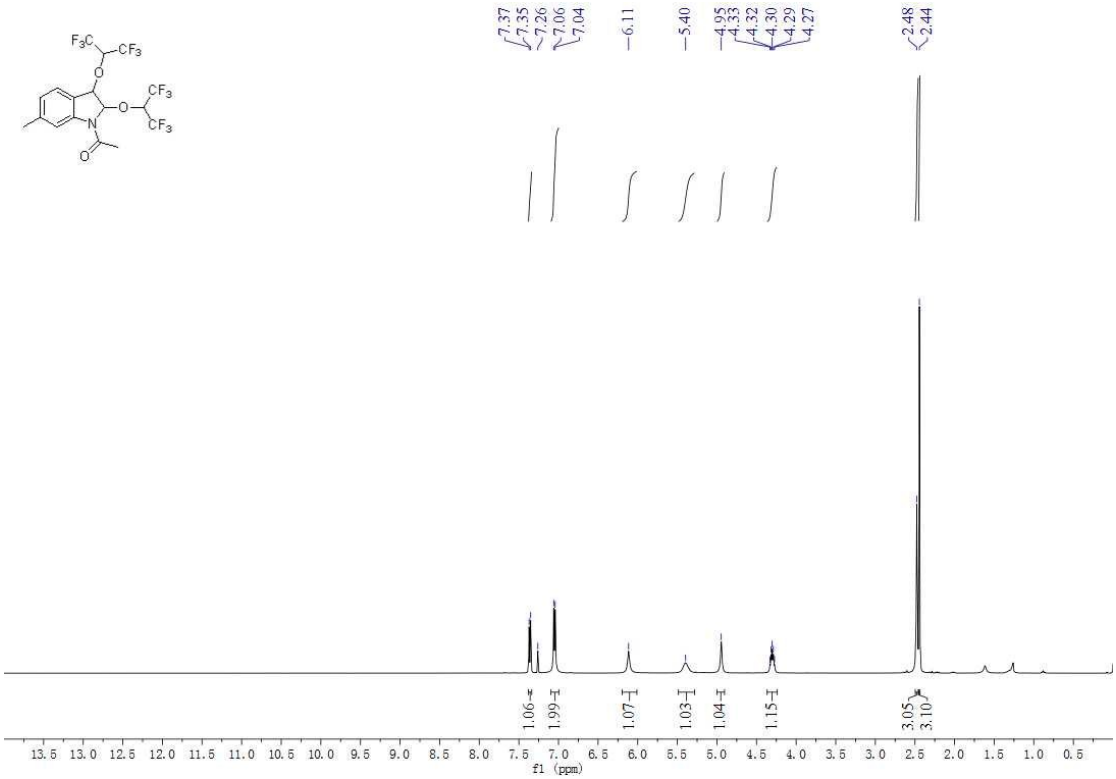

73.25
73.28
73.30
73.32
73.39
73.41
73.44
73.46
74.22
74.40
6.09
6.00
f1 (ppm)

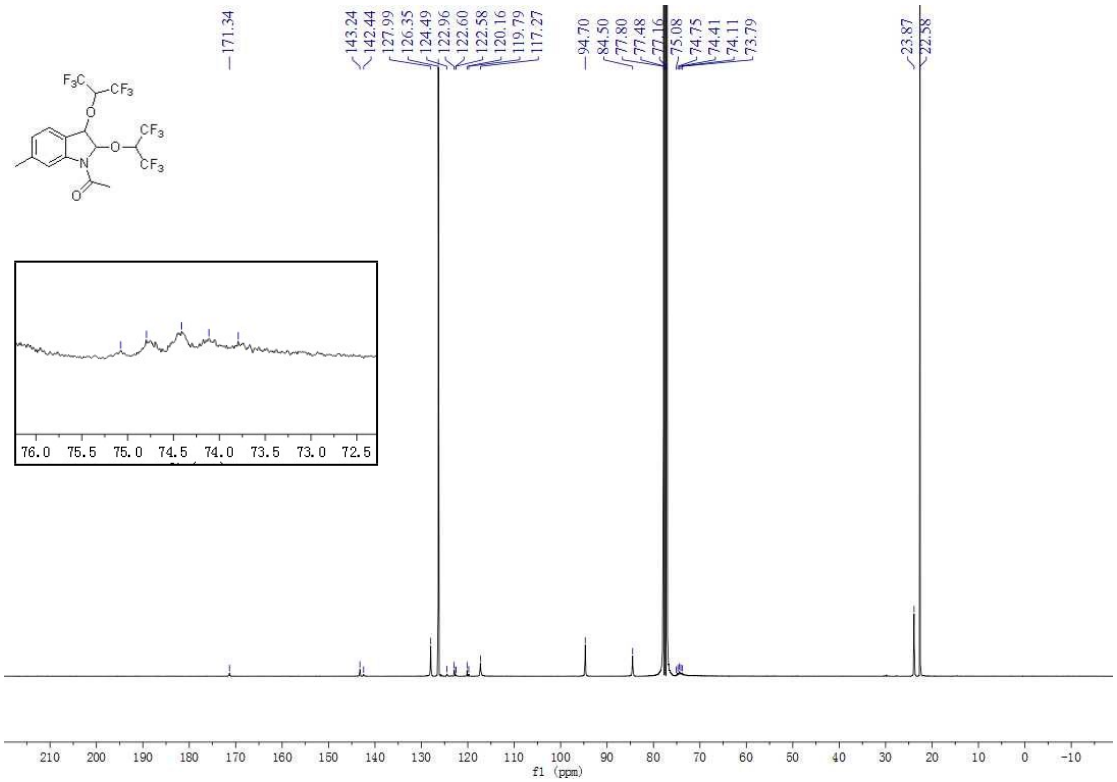
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-5-methylindolin-1-yl)ethan-1-one (2c)

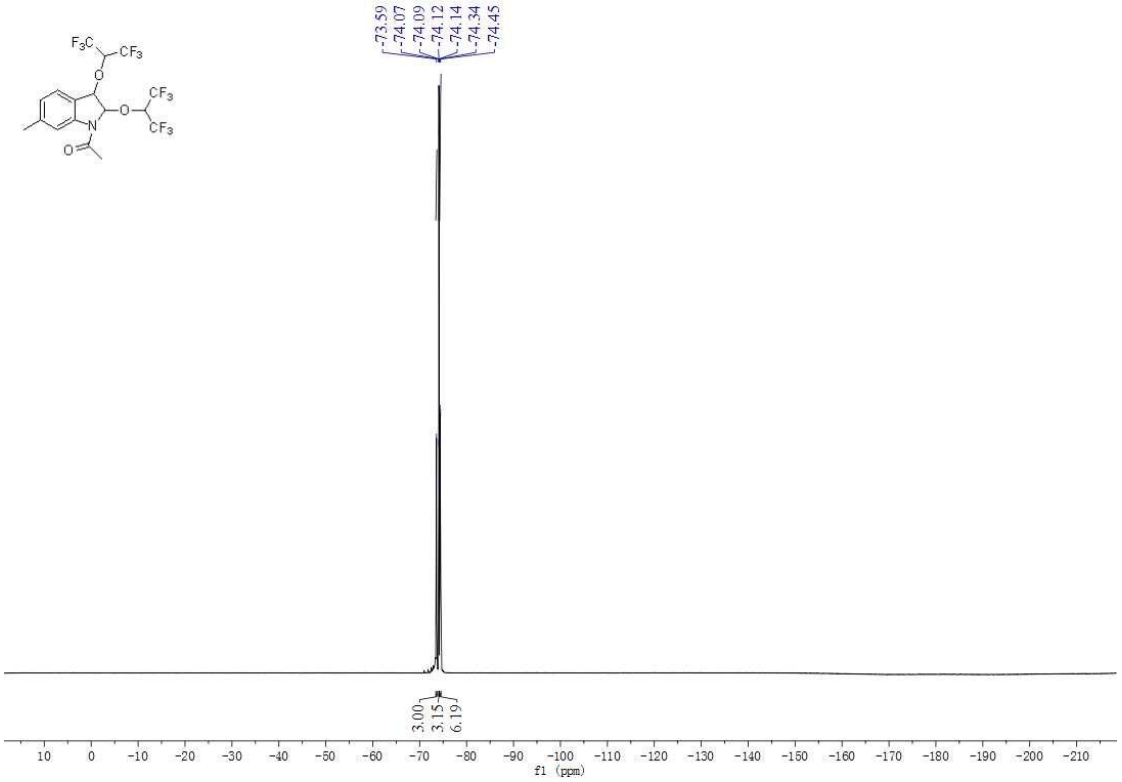




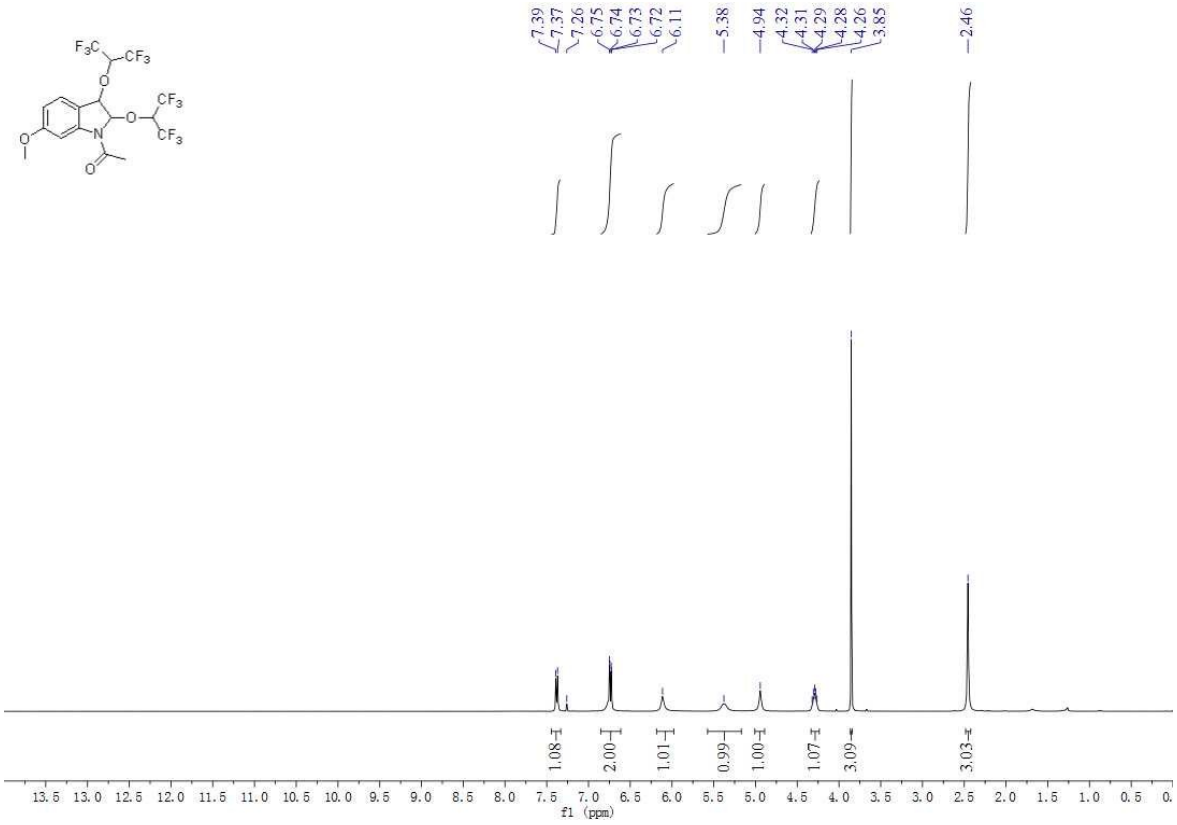
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-6-methylindolin-1-yl)ethan-1-one (2d)

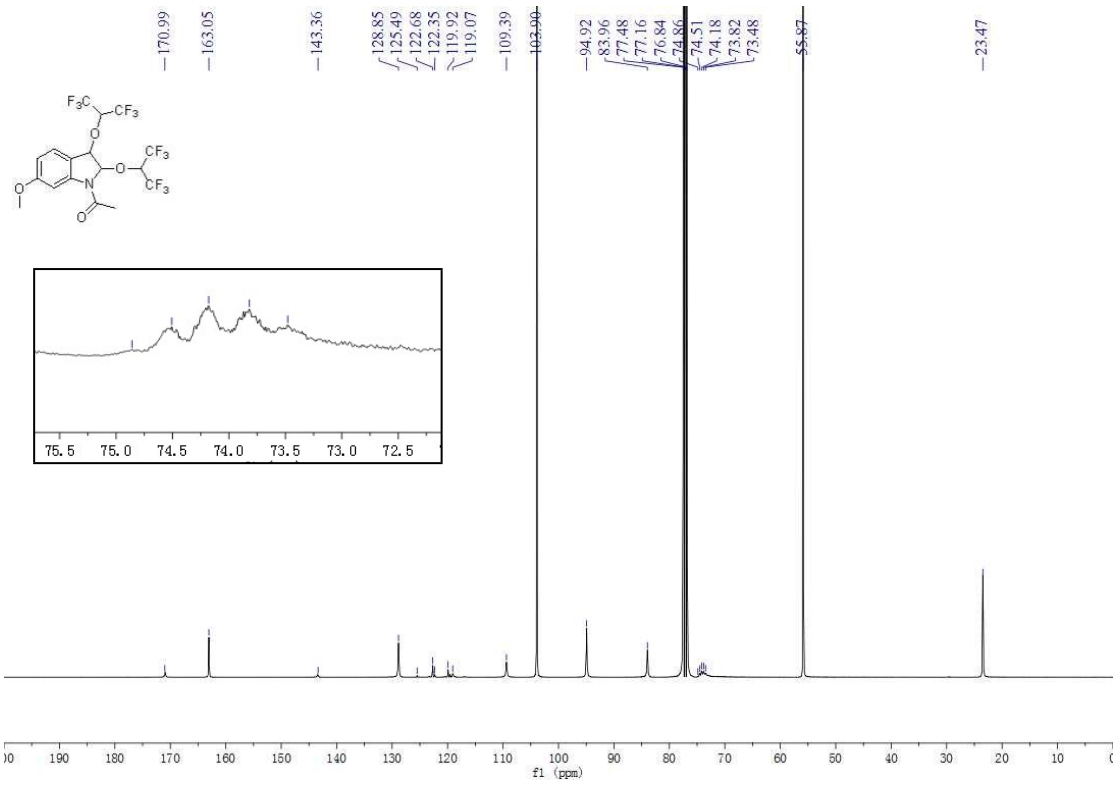


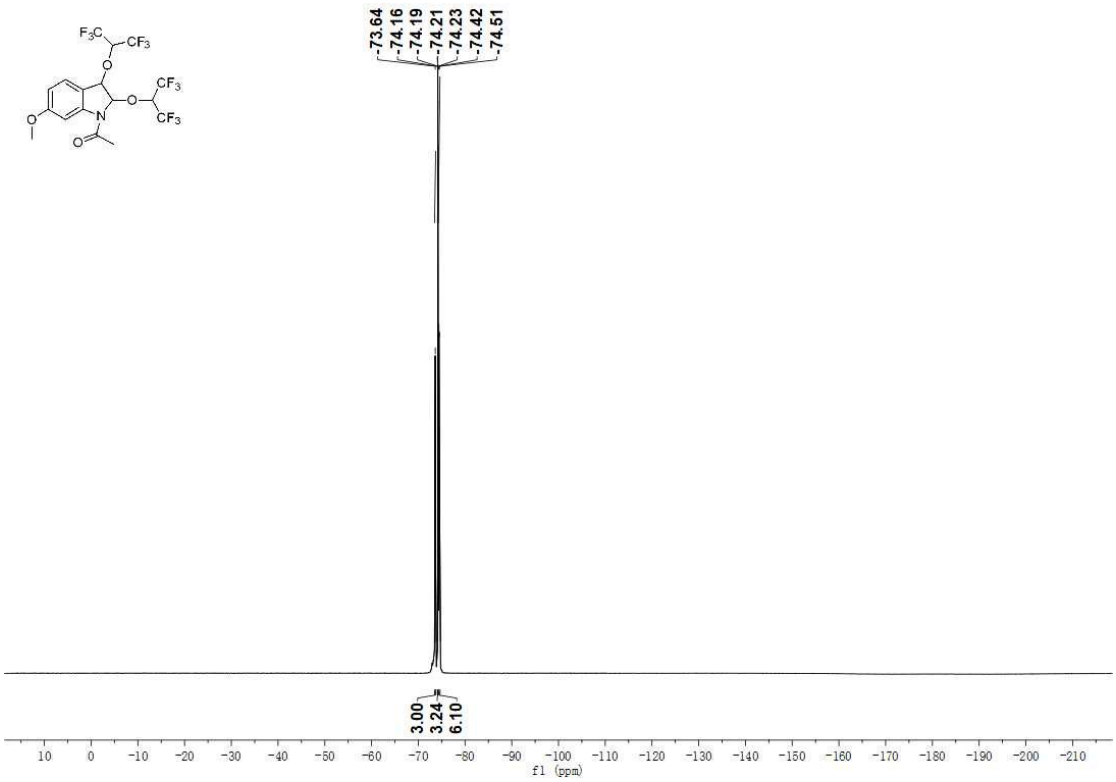

171.34
143.24
142.44
127.99
126.35
124.49
122.96
122.60
122.58
120.16
119.79
117.27
94.70
84.50
77.80
77.48
77.16
75.08
74.75
74.41
74.11
73.79
23.87
22.58
76.0 75.5 75.0 74.5 74.0 73.5 73.0 72.5
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


-73.59
-74.07
-74.09
-74.12
-74.14
-74.34
-74.45
3.00
3.15
6.19
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)

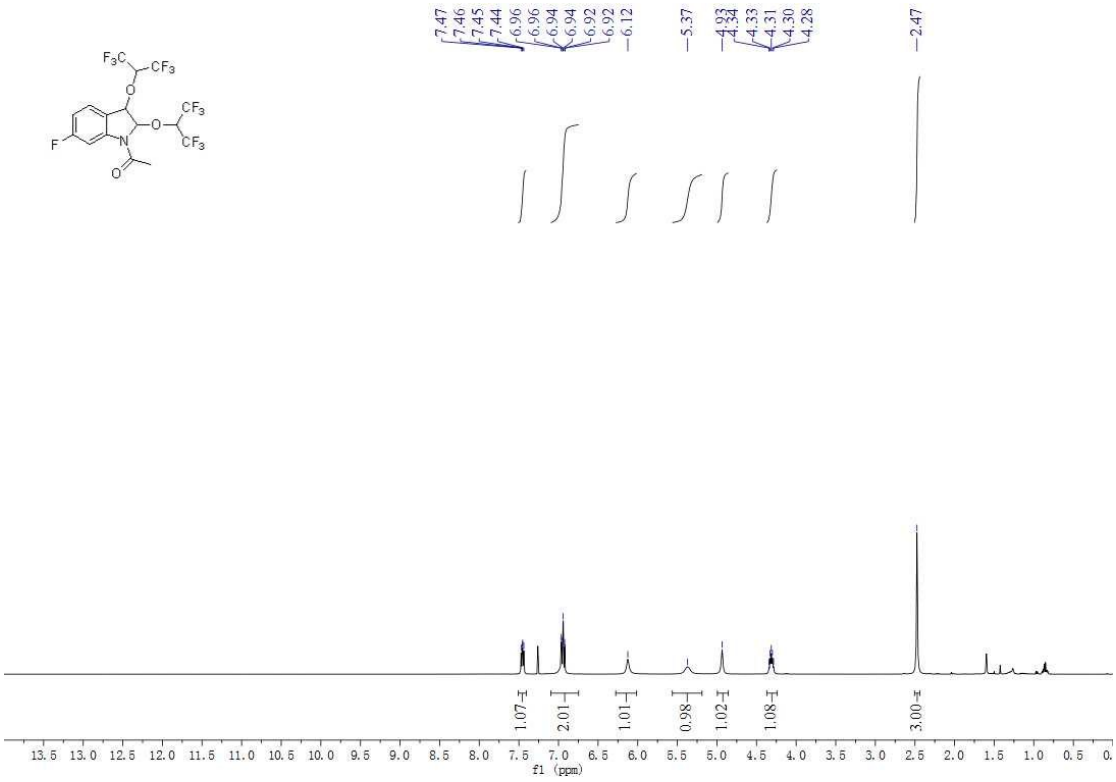
1-(2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-6-methoxyindolin-1-yl)ethan-1-one (2e)

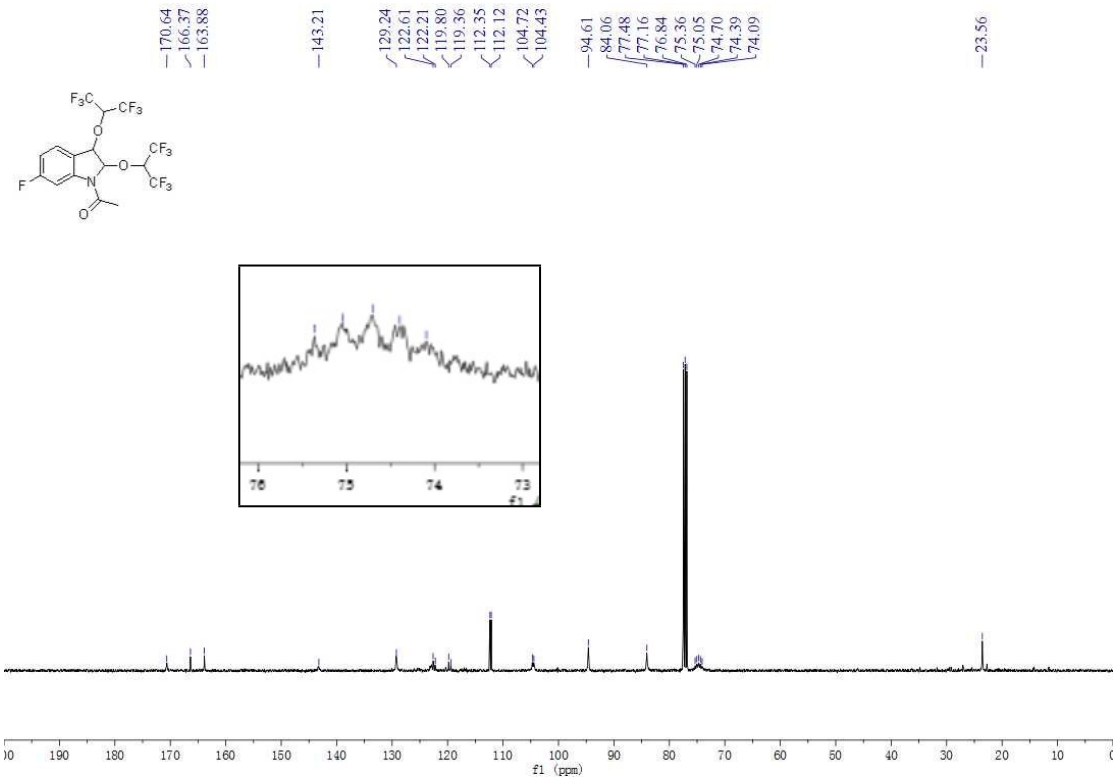


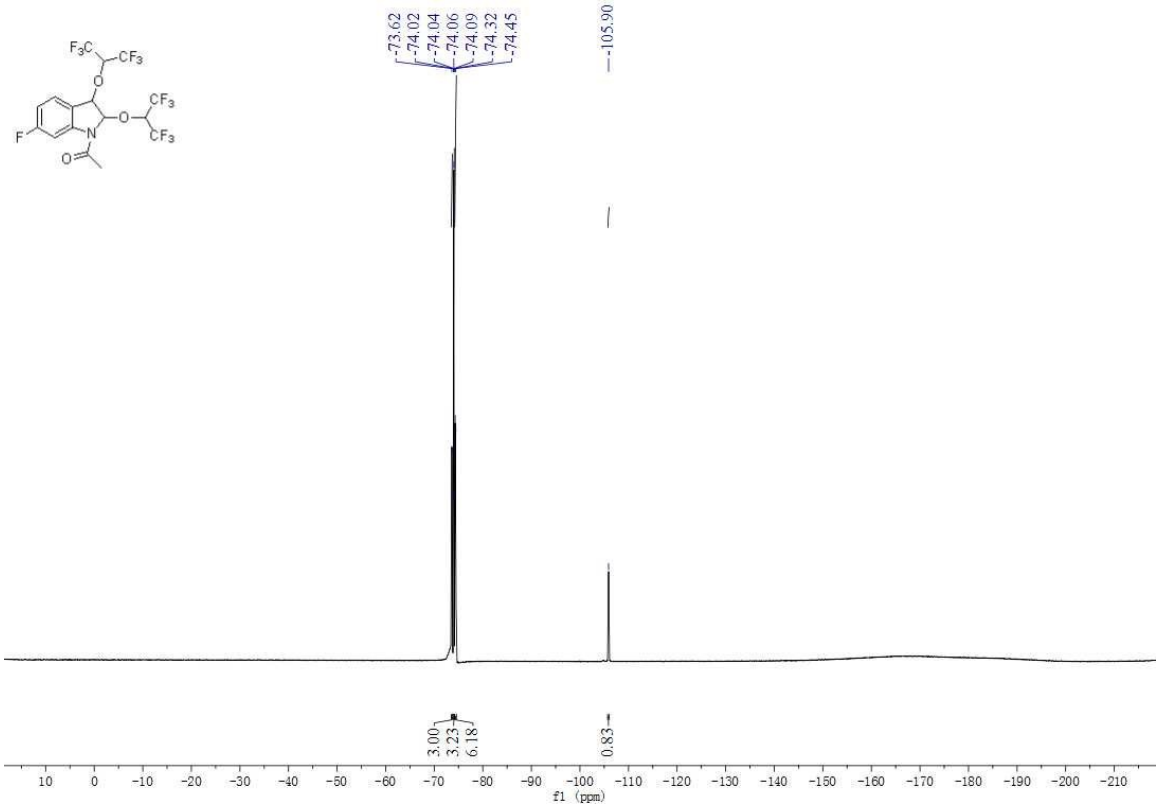




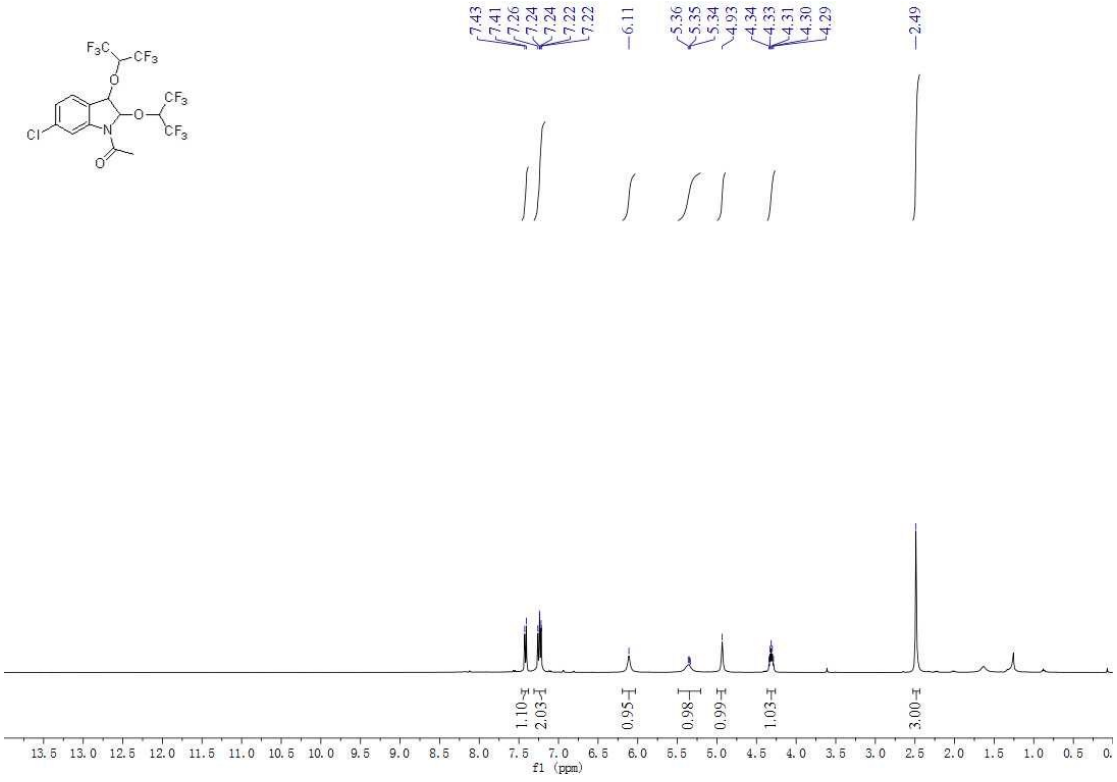
1-(6-fluoro-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2f)

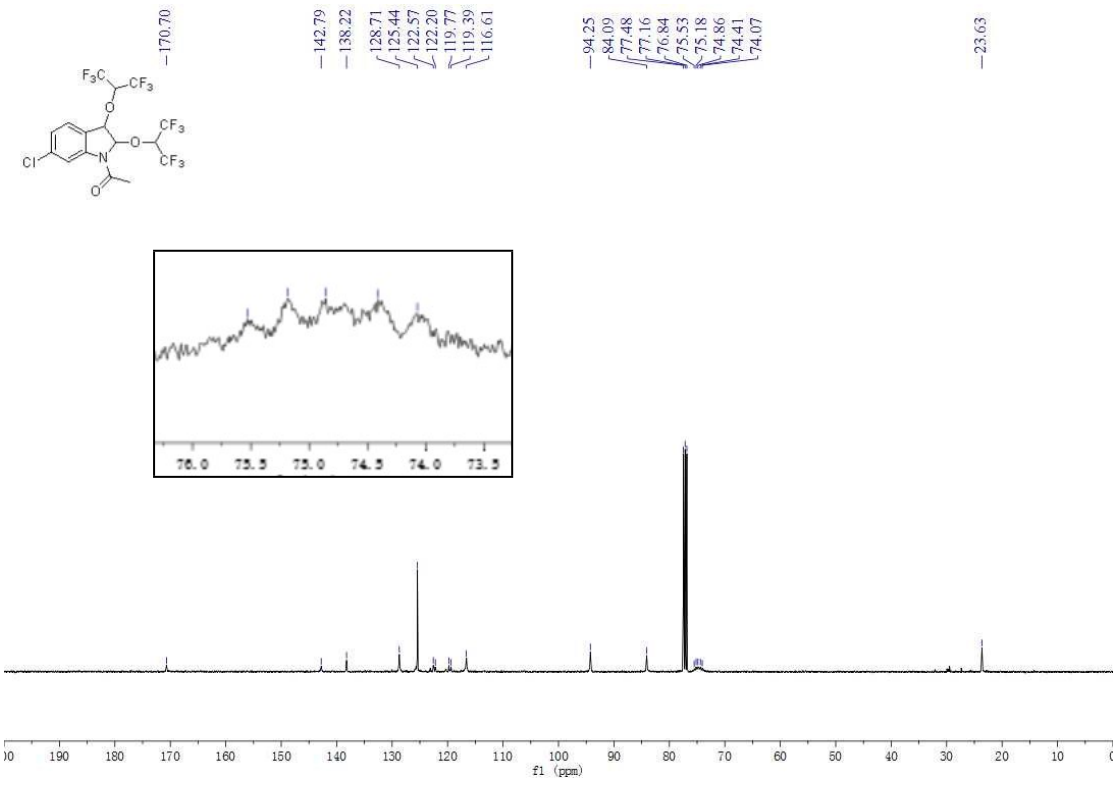


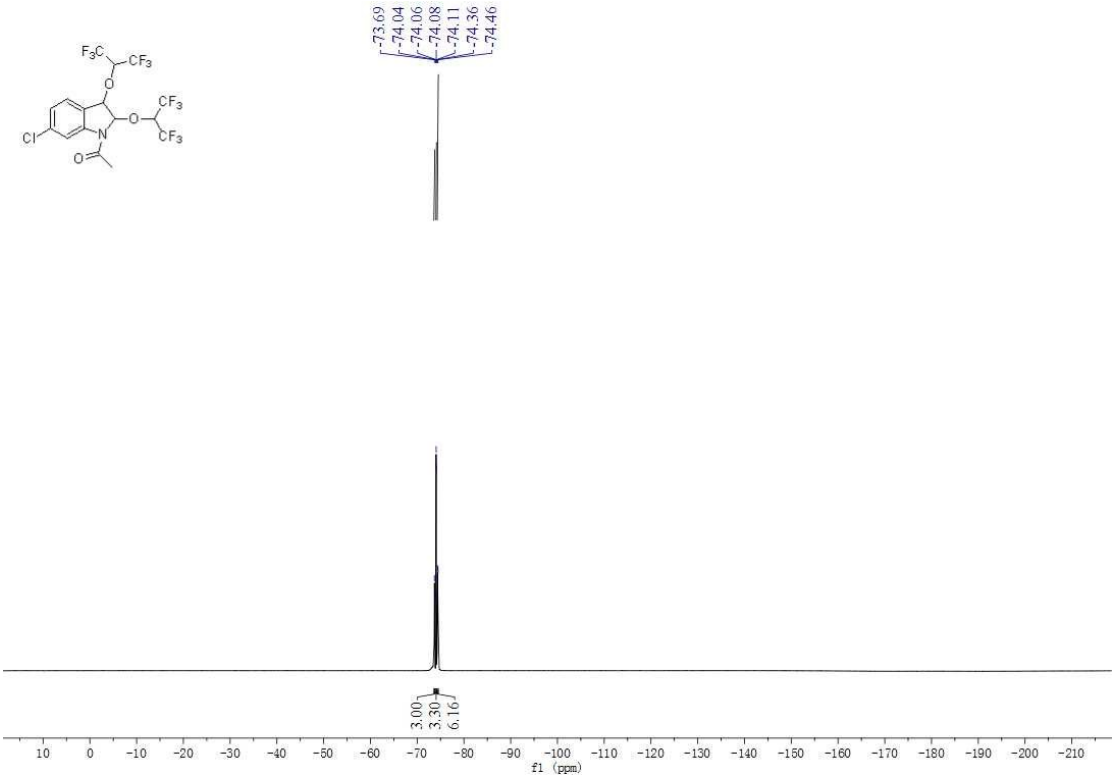

170.64
166.37
163.88
143.21
129.24
122.61
122.21
119.80
119.36
112.35
112.12
104.72
104.43
94.61
84.06
77.48
77.16
76.84
75.36
75.05
74.70
74.39
74.09
23.56
F3C
CF3
O
CF3
CF3
F
N
O
76
75
74
73
f1
f1 (ppm)


-73.62
-74.02
-74.04
-74.06
-74.09
-74.32
-74.45
-105.90
F3C
CF3
O
CF3
CF3
F
N
O
3.00
3.23
6.18
0.83
f1 (ppm)

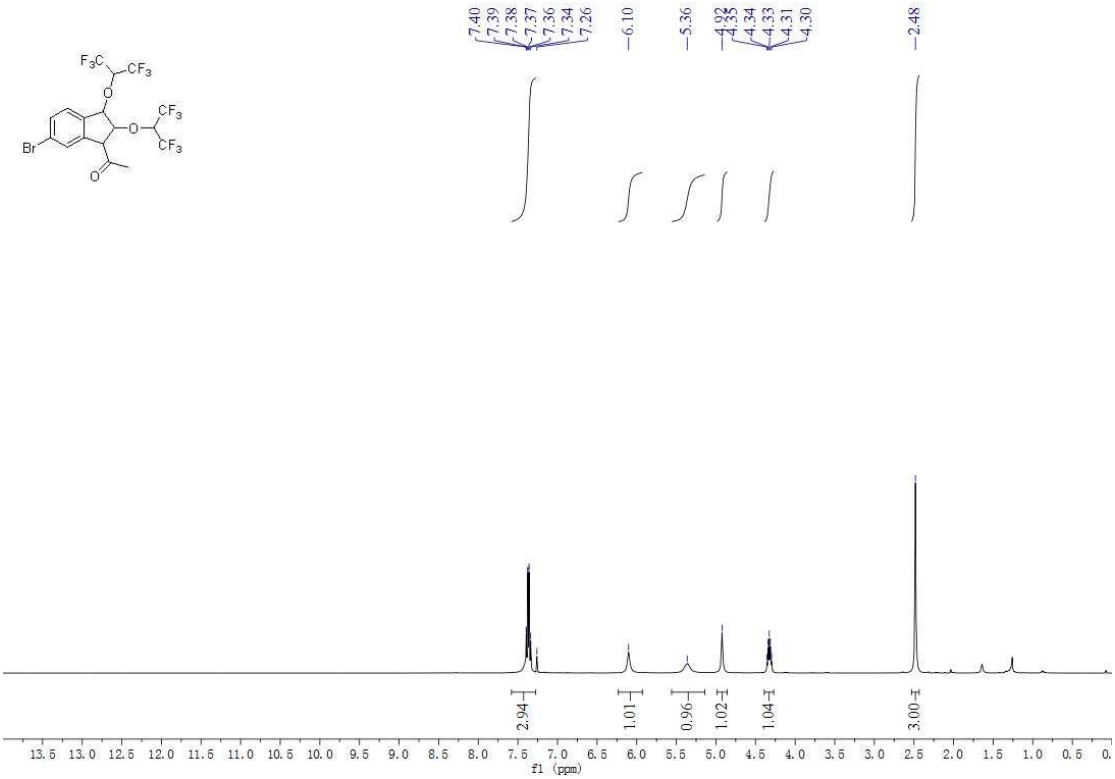
1-(6-chloro-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2g)

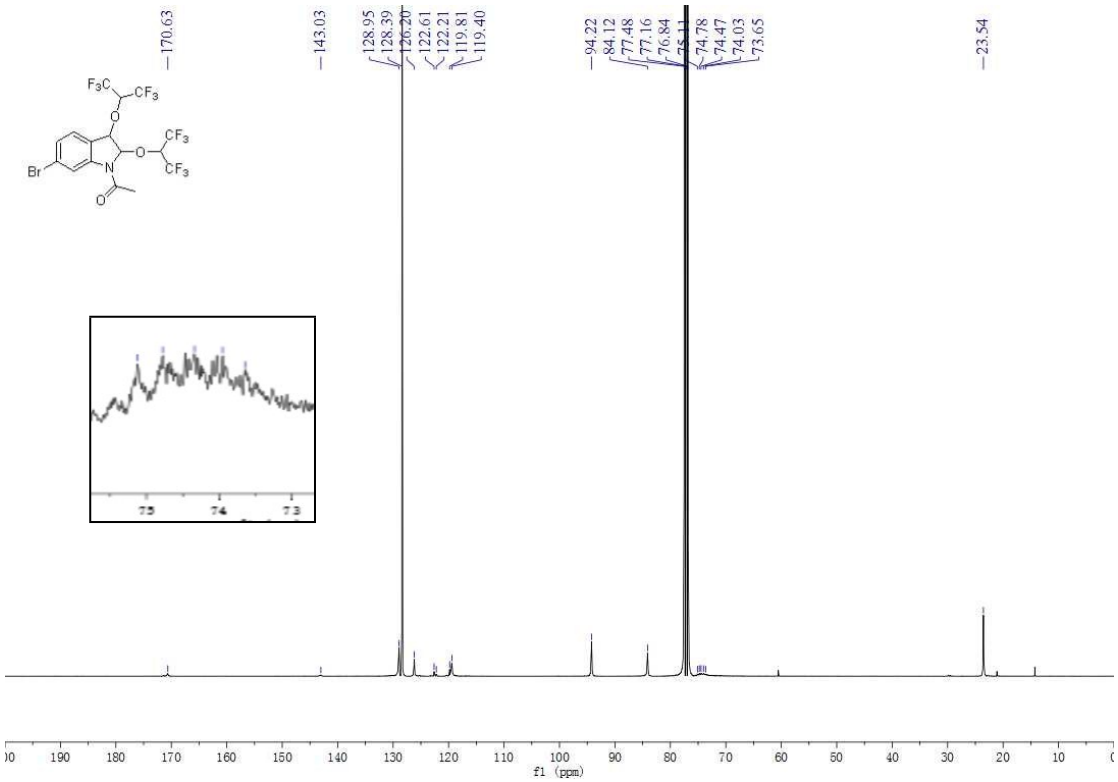


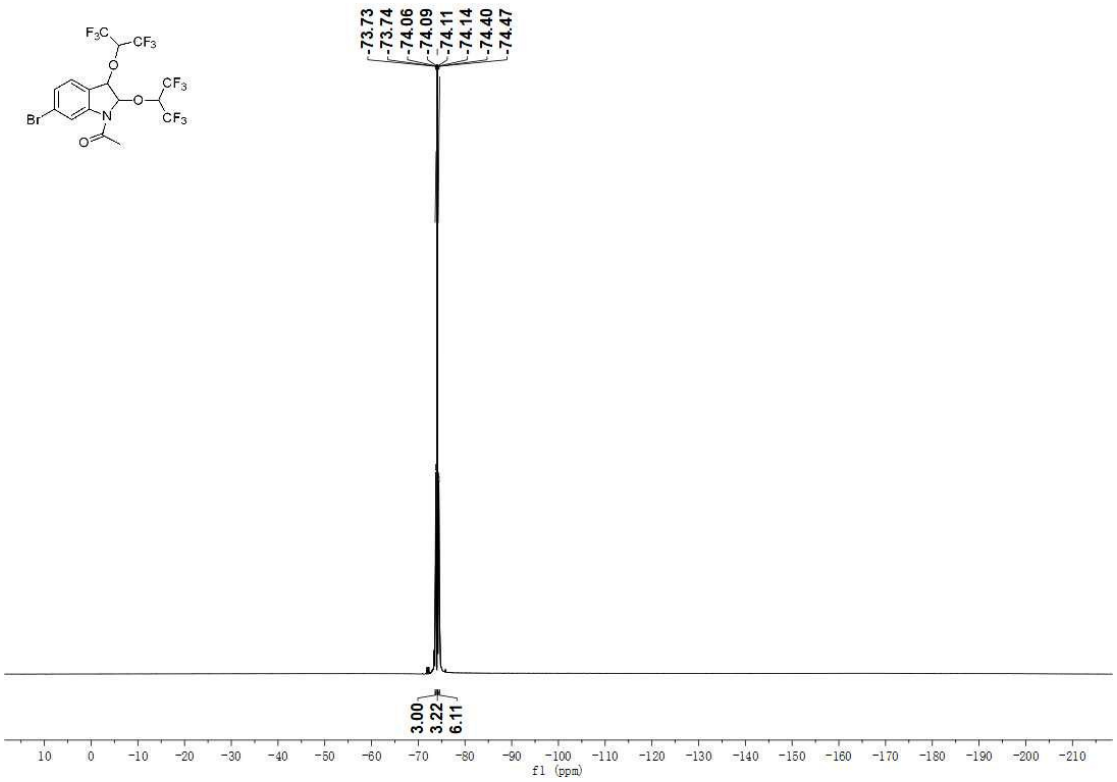




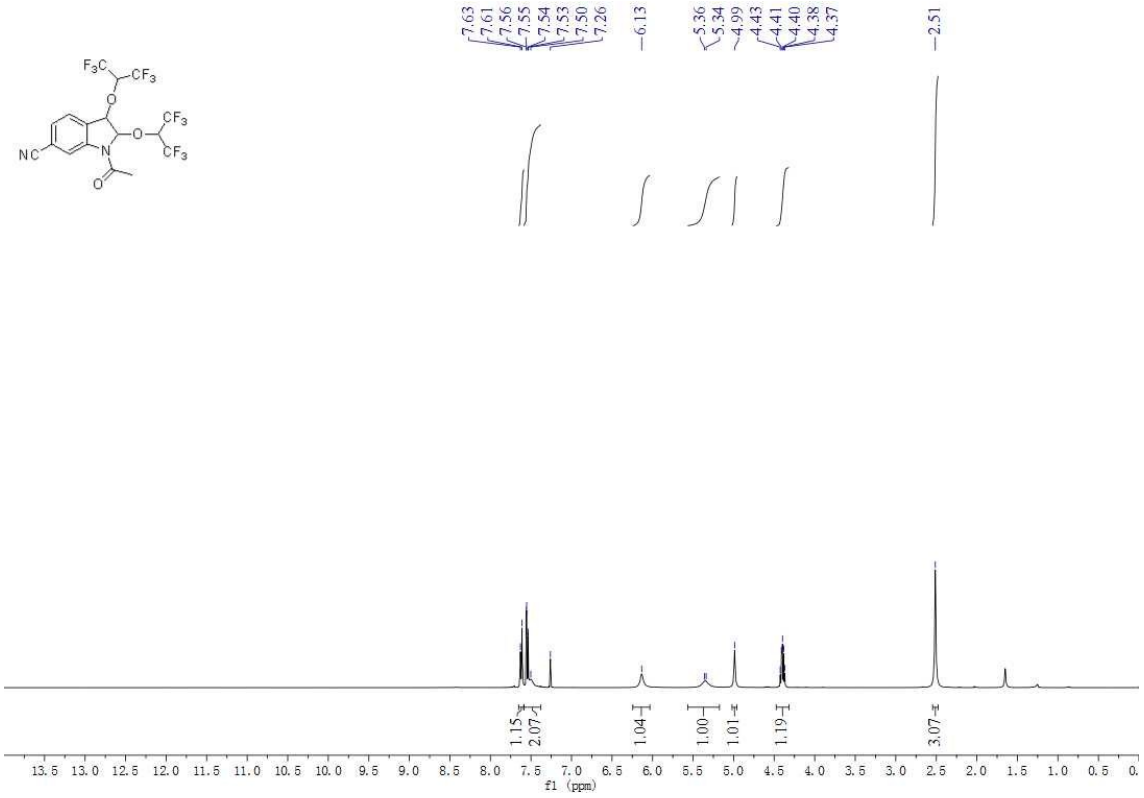
1-(6-bromo-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indolin-1-yl)ethan-1-one (2h)

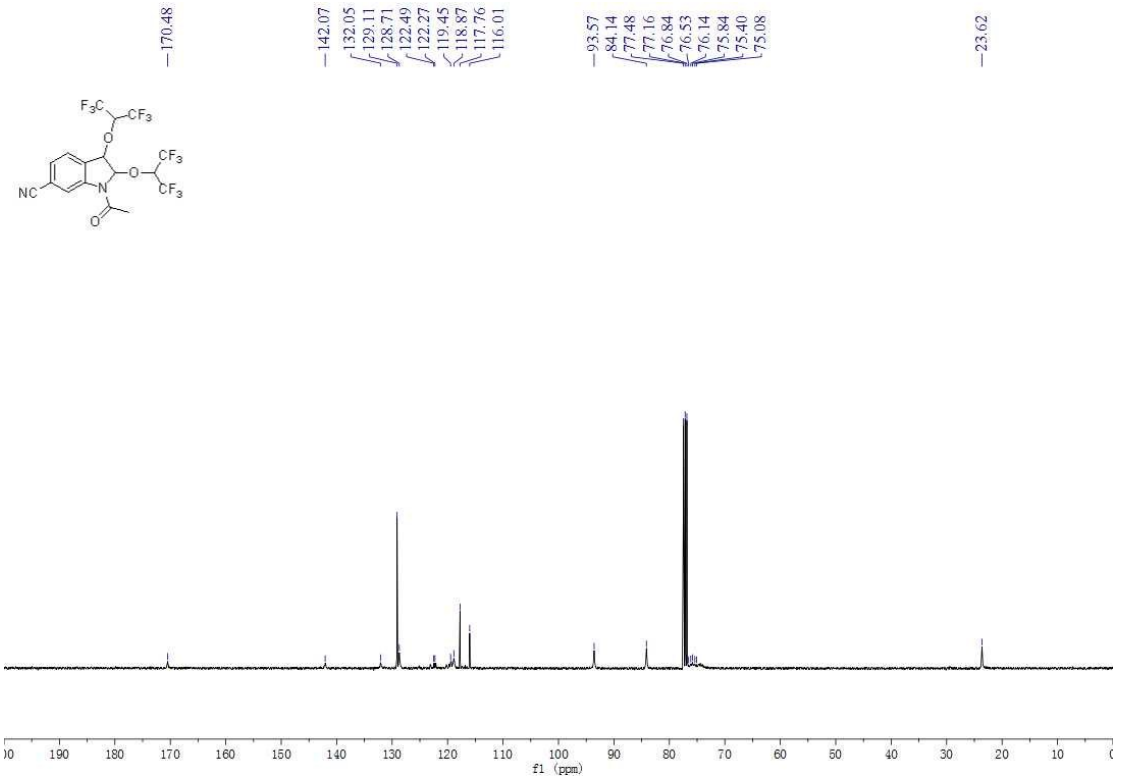


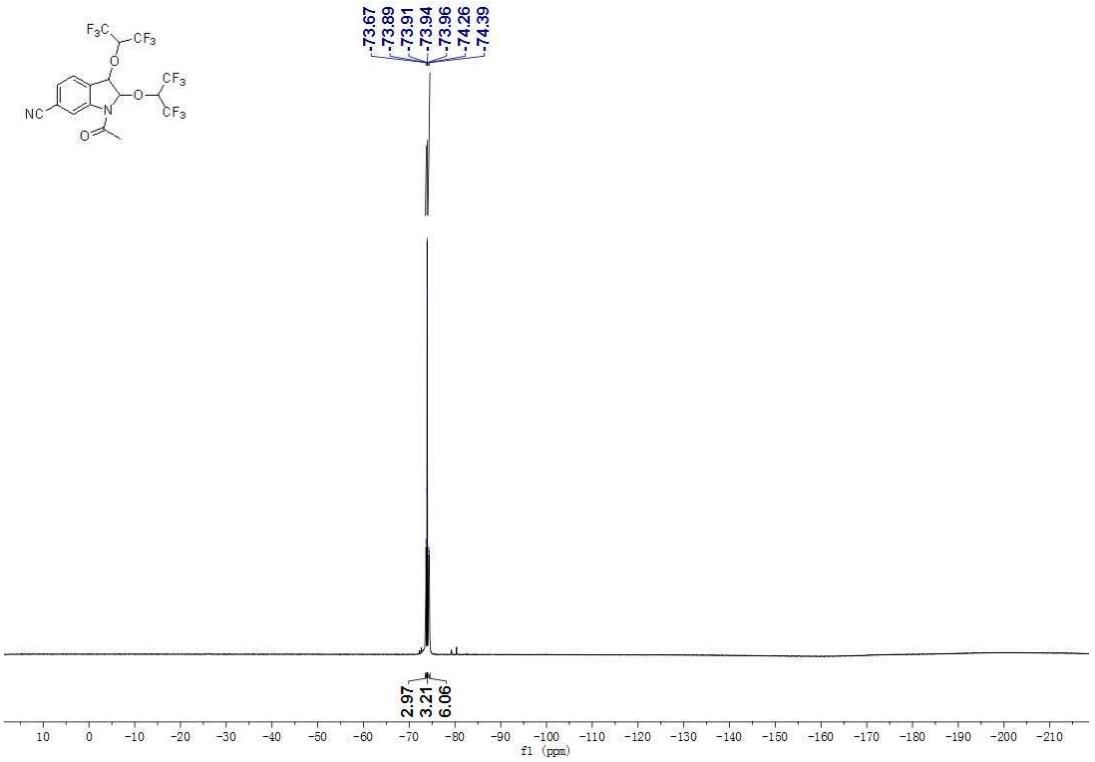

170.63
143.03
128.95
128.39
126.20
122.61
122.21
119.81
119.40
94.22
84.12
77.48
77.16
76.84
74.78
74.47
74.03
73.65
23.54
f1 (ppm)


-73.73
-73.74
-74.06
-74.09
-74.11
-74.14
-74.40
-74.47
3.00
3.22
6.11
f1 (ppm)

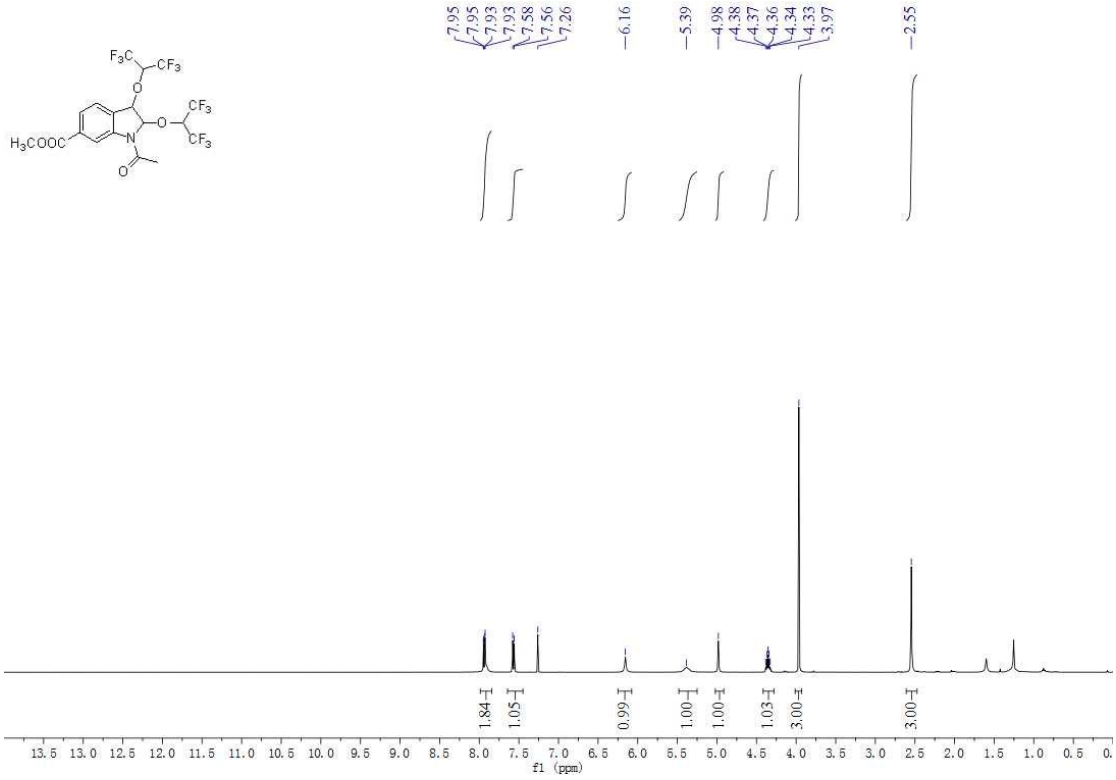
1-acetyl-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indoline-6-carbonitrile (2i)

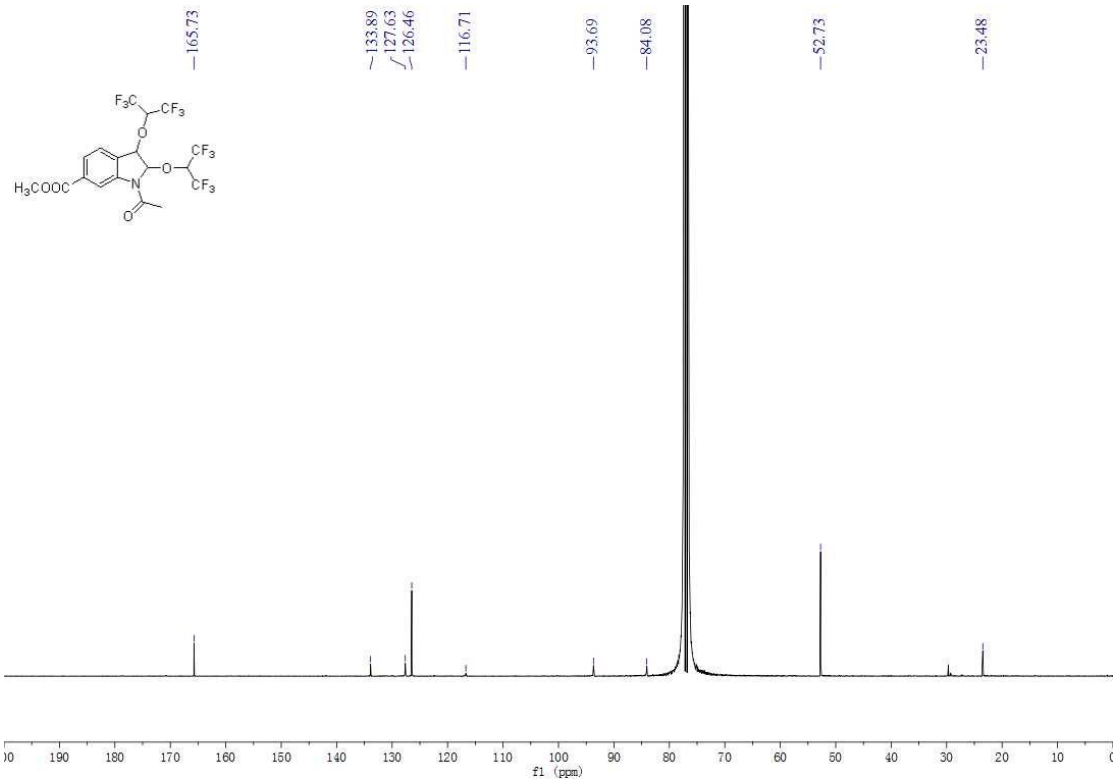


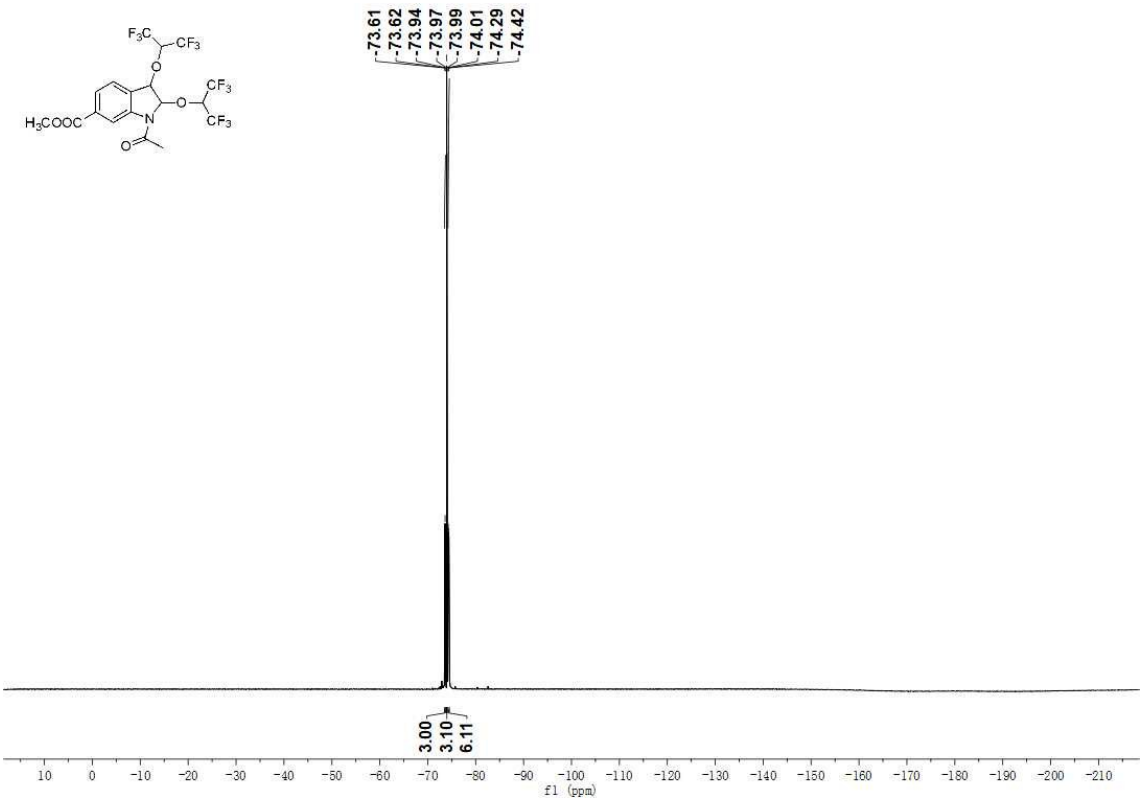




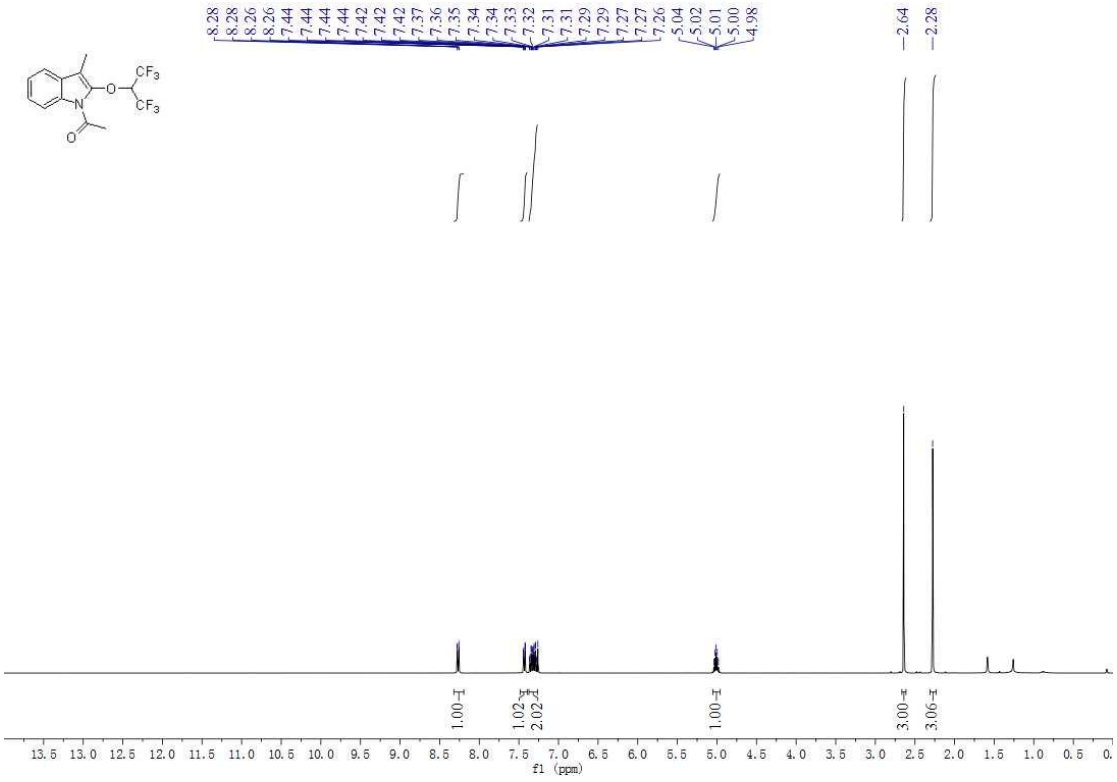
methyl 1-acetyl-2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)indoline-6-carboxylate (2j)

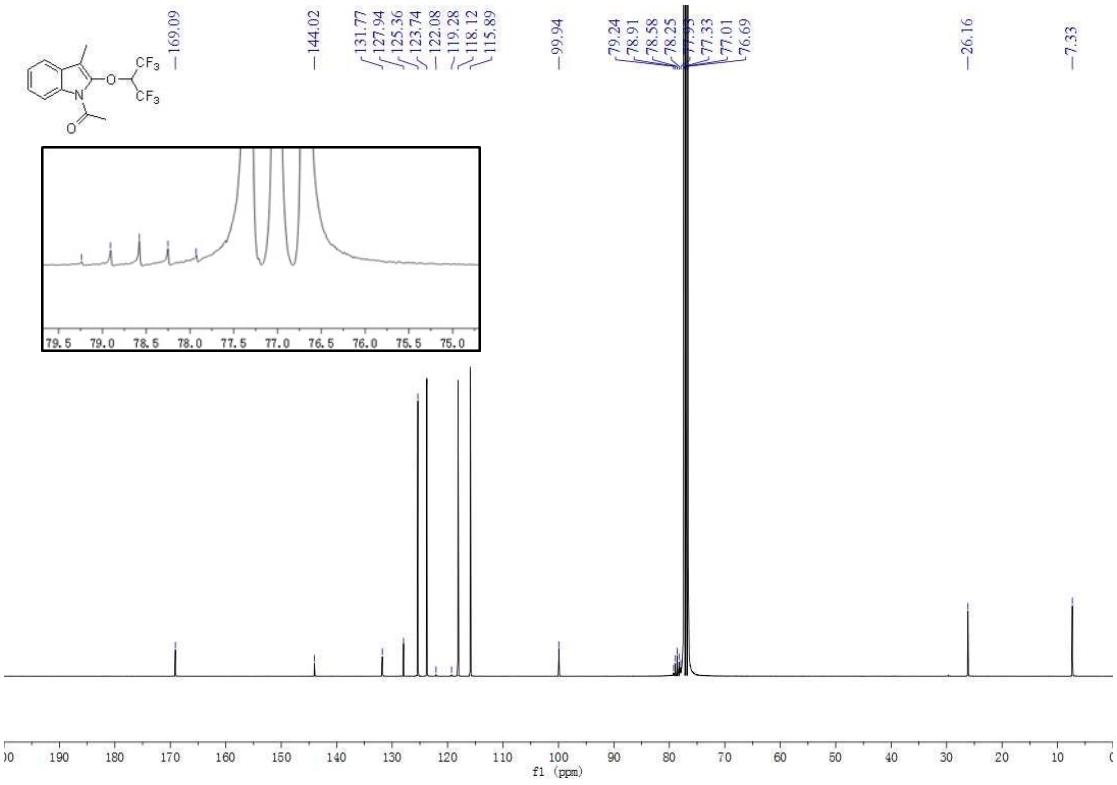


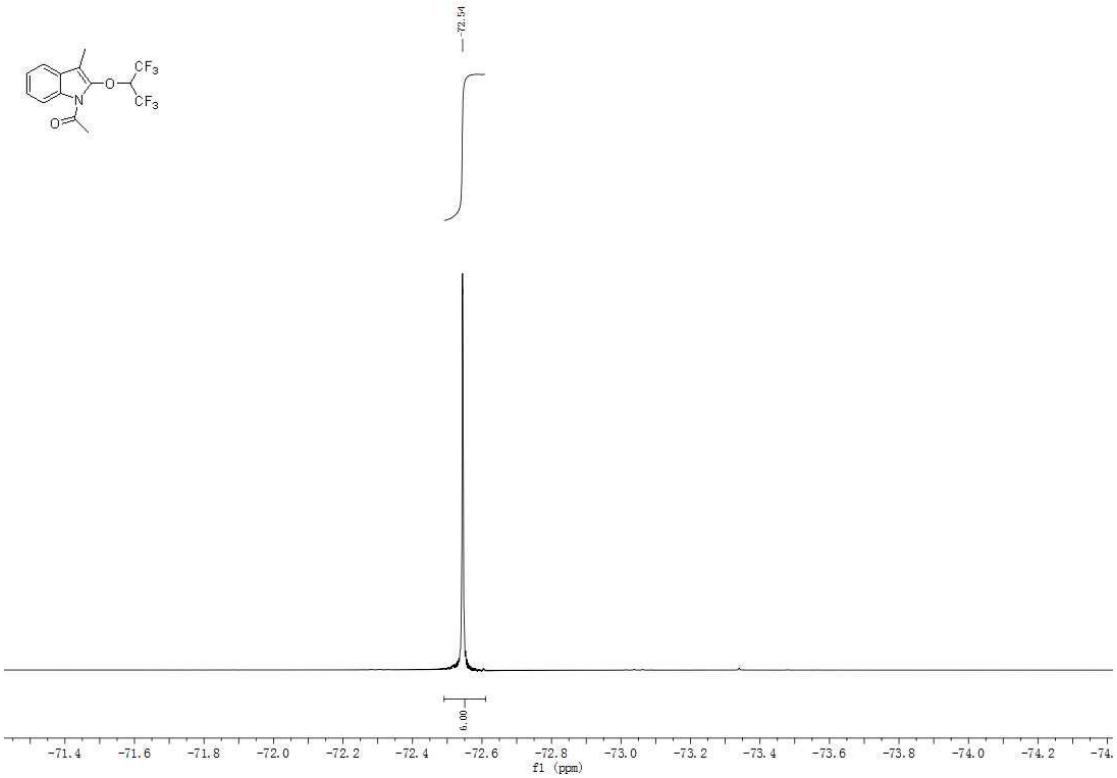

165.73
133.89
127.63
126.46
116.71
93.69
84.08
52.73
23.48
f1 (ppm)


-73.61
-73.62
-73.94
-73.97
-73.99
-74.01
-74.29
-74.42
3.00
3.10
6.11
f1 (ppm)

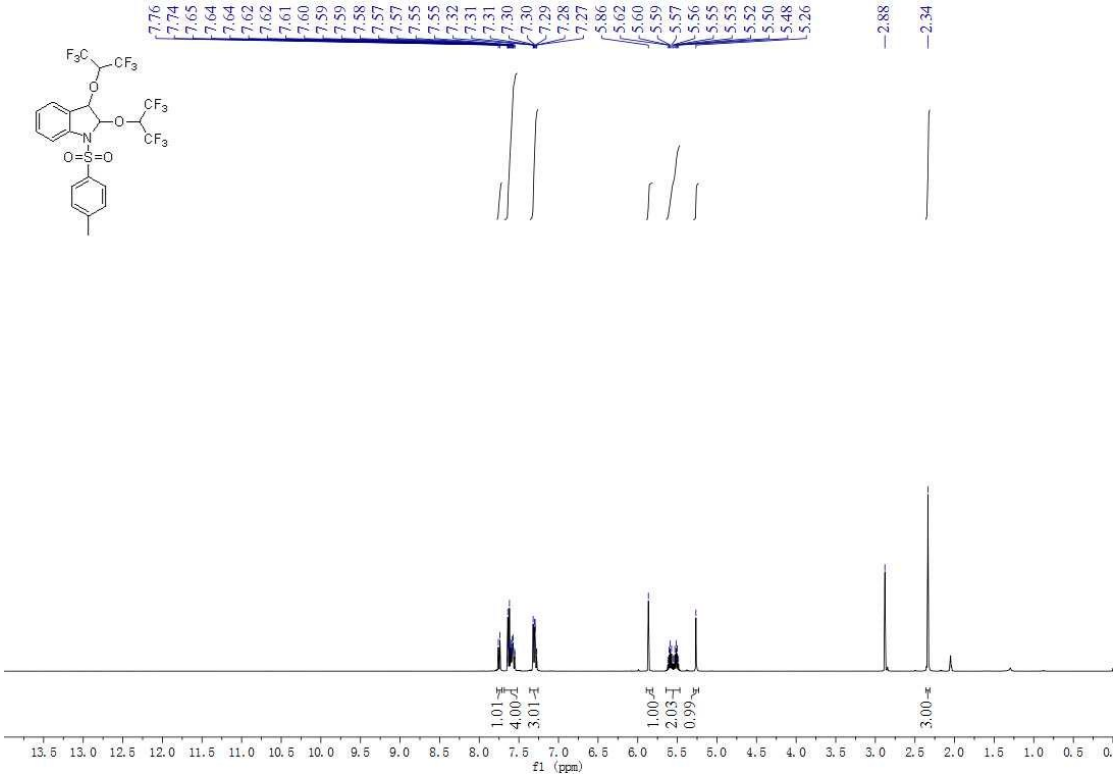
1-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-3-methyl-1H-indol-1-yl)ethan-1-one (2k)

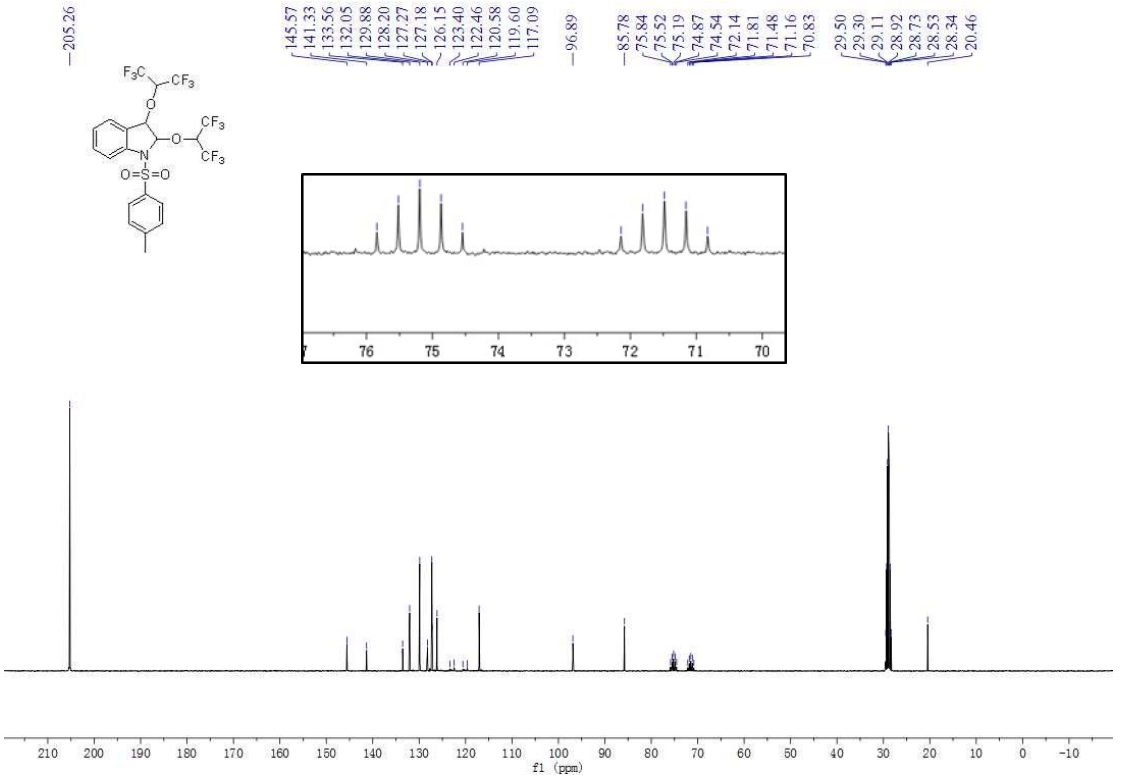


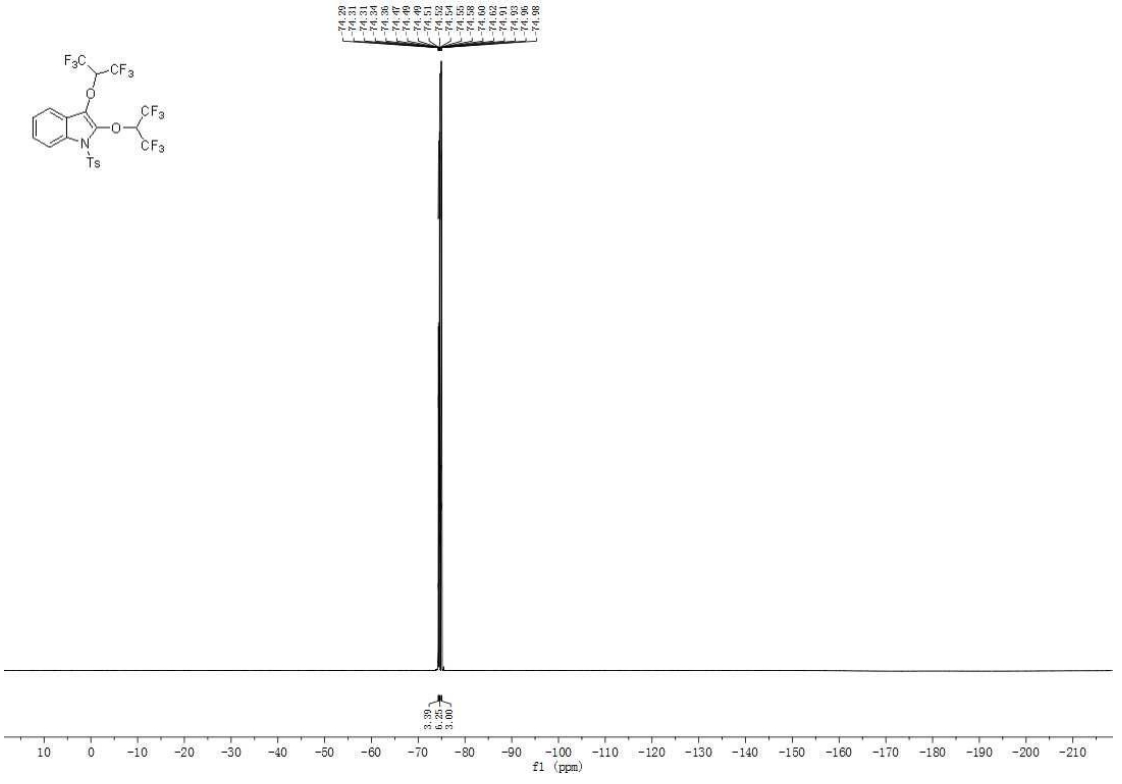




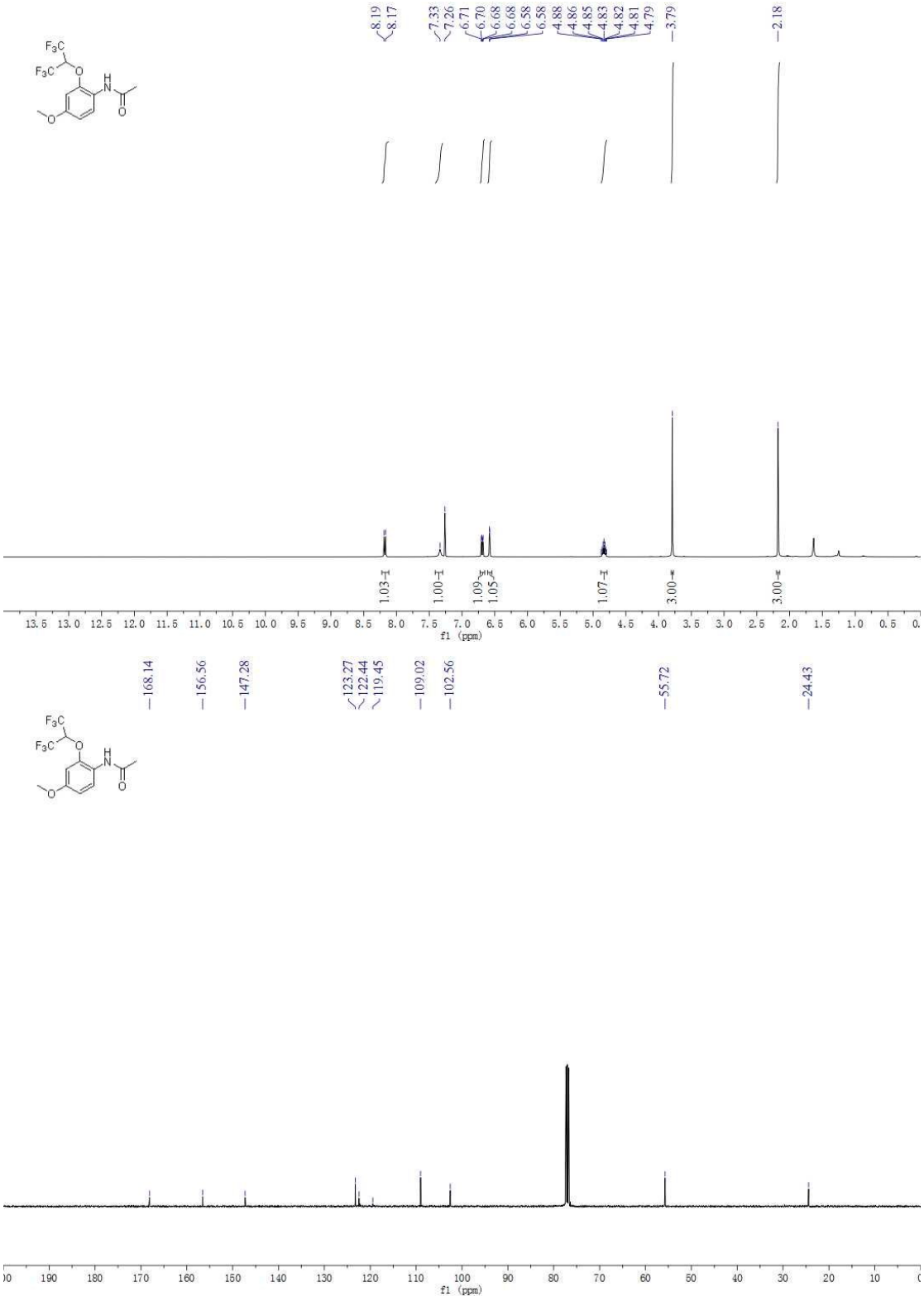
2,3-bis((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-1-tosylindoline (2l)

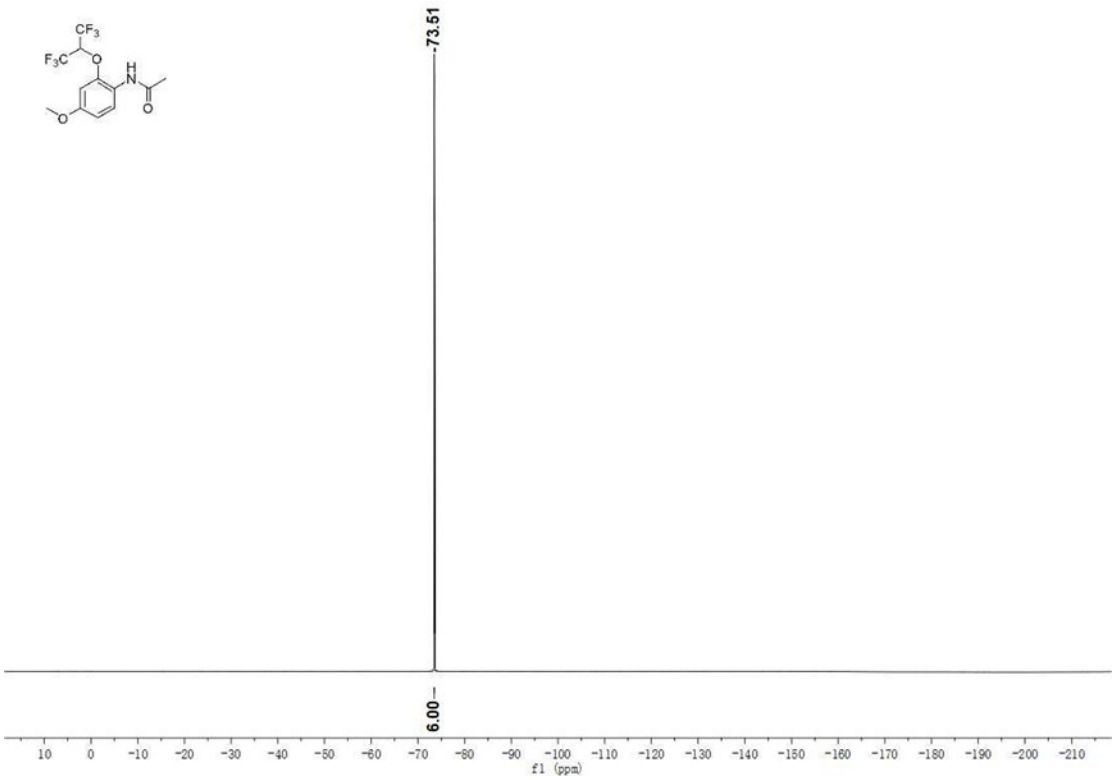



205.26
145.57
141.33
133.56
132.05
129.88
128.20
127.27
127.18
126.15
123.40
122.46
120.58
119.60
117.09
96.89
85.78
75.84
75.52
75.19
74.87
74.54
72.14
71.81
71.48
71.16
70.83
29.50
29.30
29.11
28.92
28.73
28.53
28.34
20.46
F3C
CF3
O
CF3
CF3
N
O=S=O
76
75
74
73
72
71
70
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

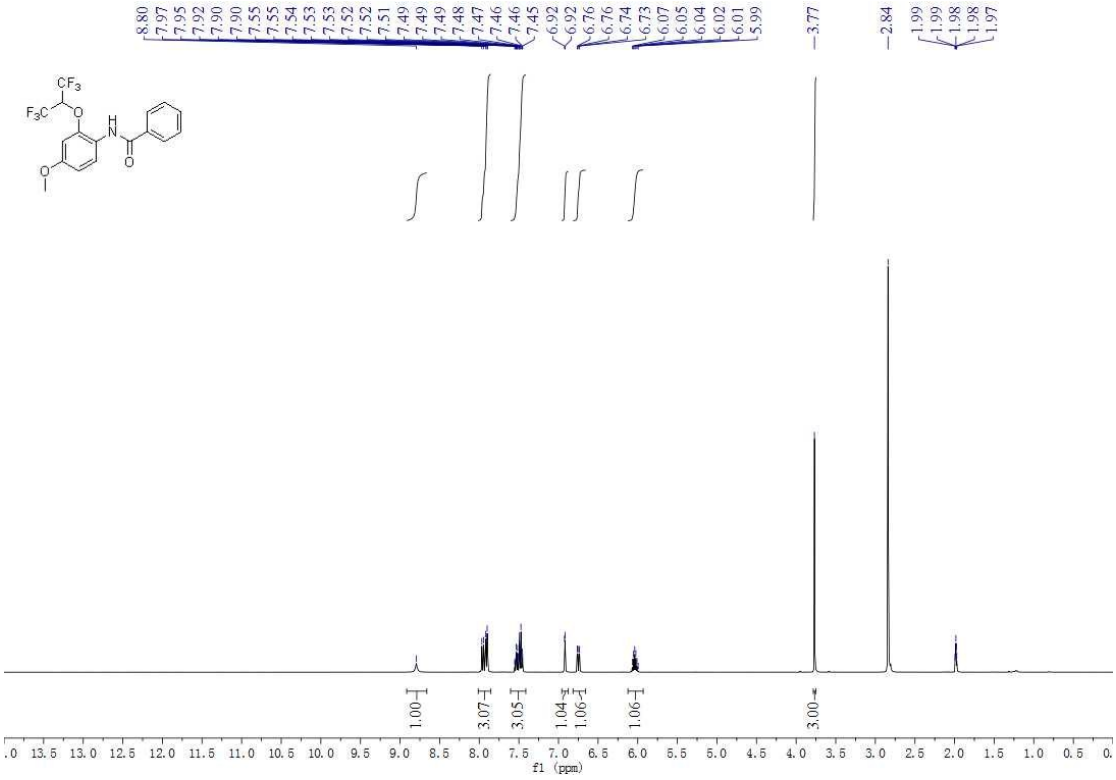

74.29
74.31
74.31
74.34
74.36
74.47
74.49
74.49
74.51
74.52
74.54
74.55
74.58
74.60
74.62
74.91
74.93
74.96
74.98
F3C
CF3
O
CF3
CF3
N
Ts
3.39
6.25
3.00
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

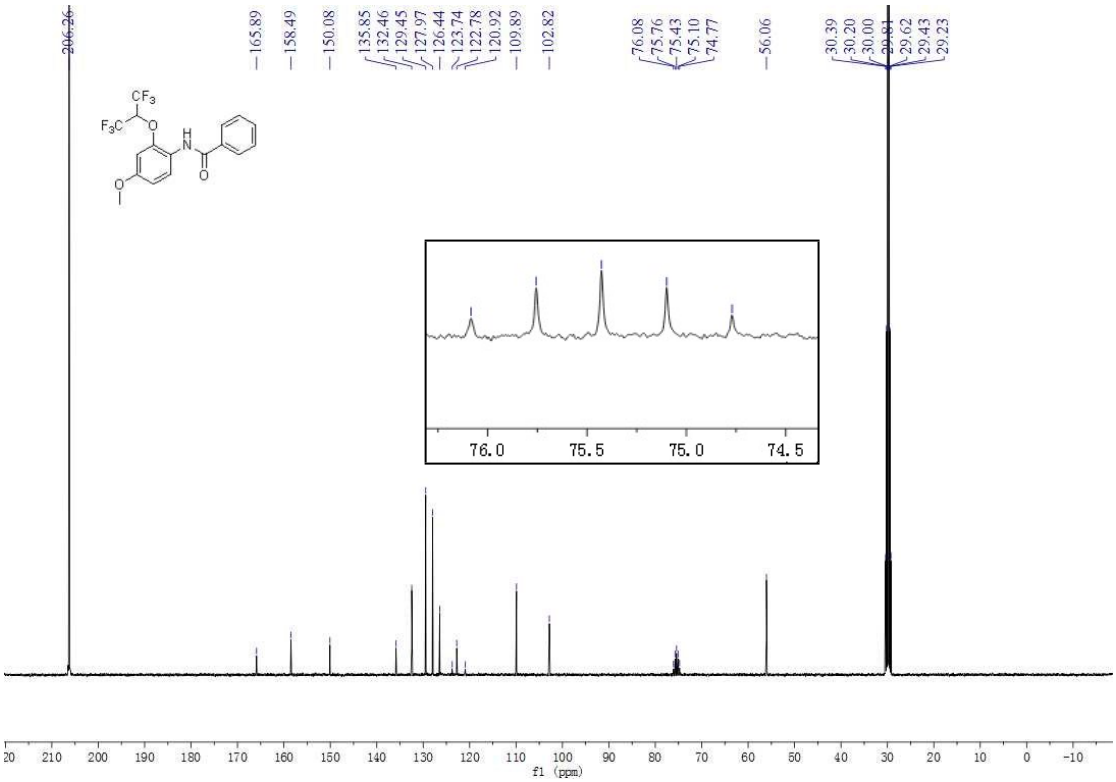
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methoxyphenyl)acetamide (2m)

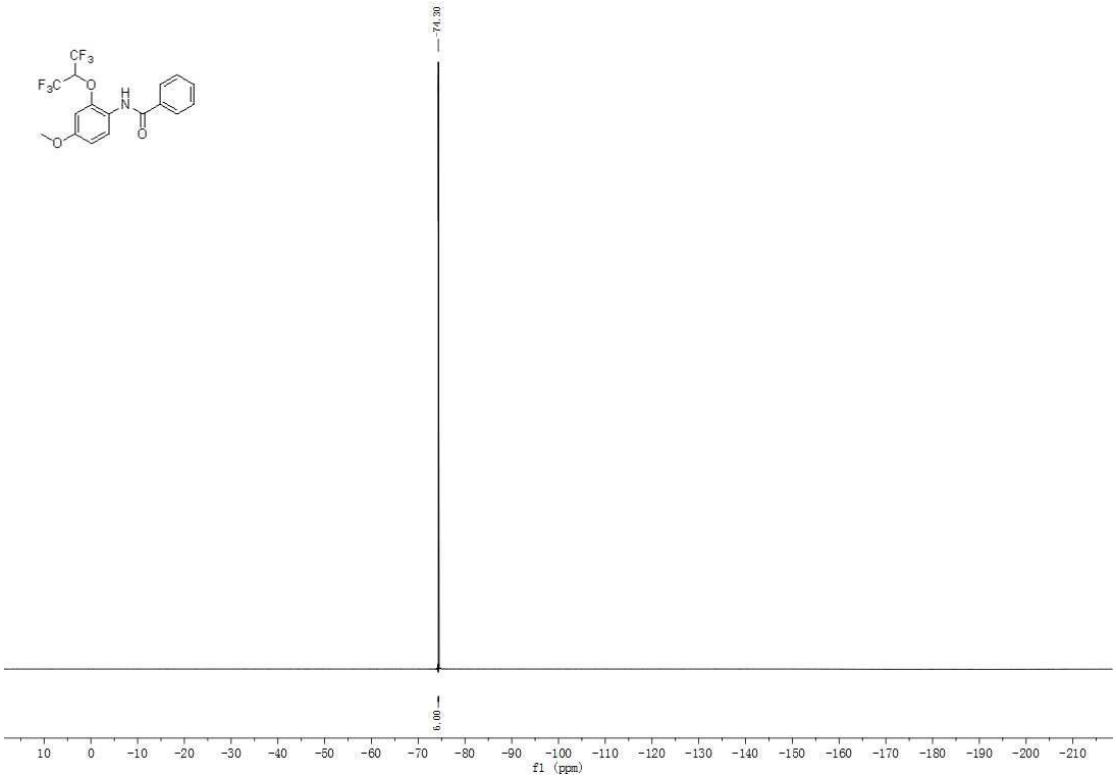




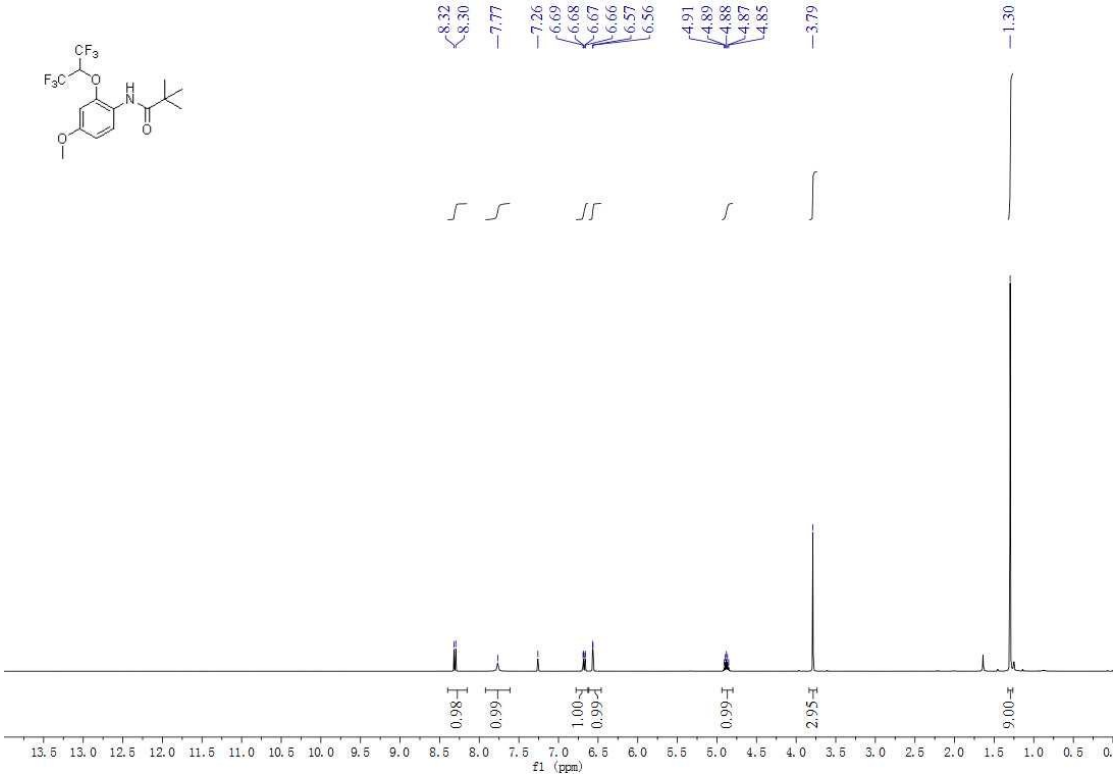
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methoxyphenyl)benzamide (2n)

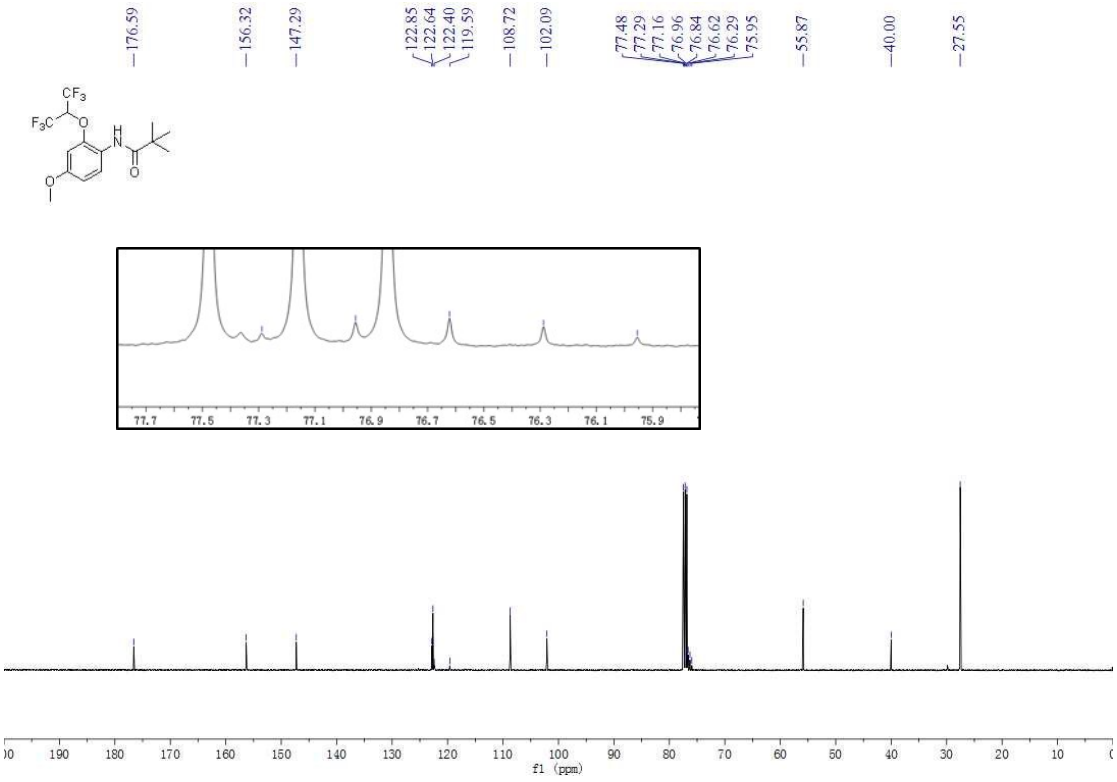


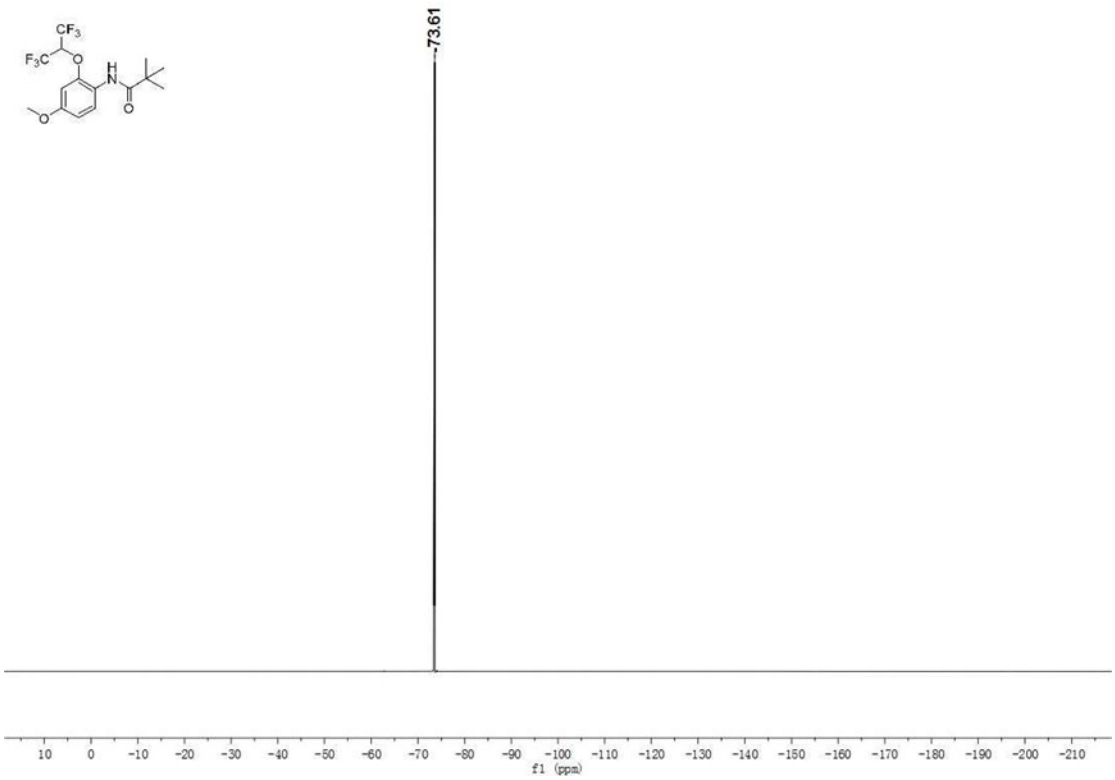

206.26
165.89
158.49
150.08
135.85
132.46
129.45
127.97
126.44
123.74
122.78
120.92
109.89
102.82
76.08
75.76
75.43
75.10
74.77
56.06
30.39
30.20
30.00
29.81
29.62
29.43
29.23
76.0
75.5
75.0
74.5
f1 (ppm)


74.30
6.00
f1 (ppm)

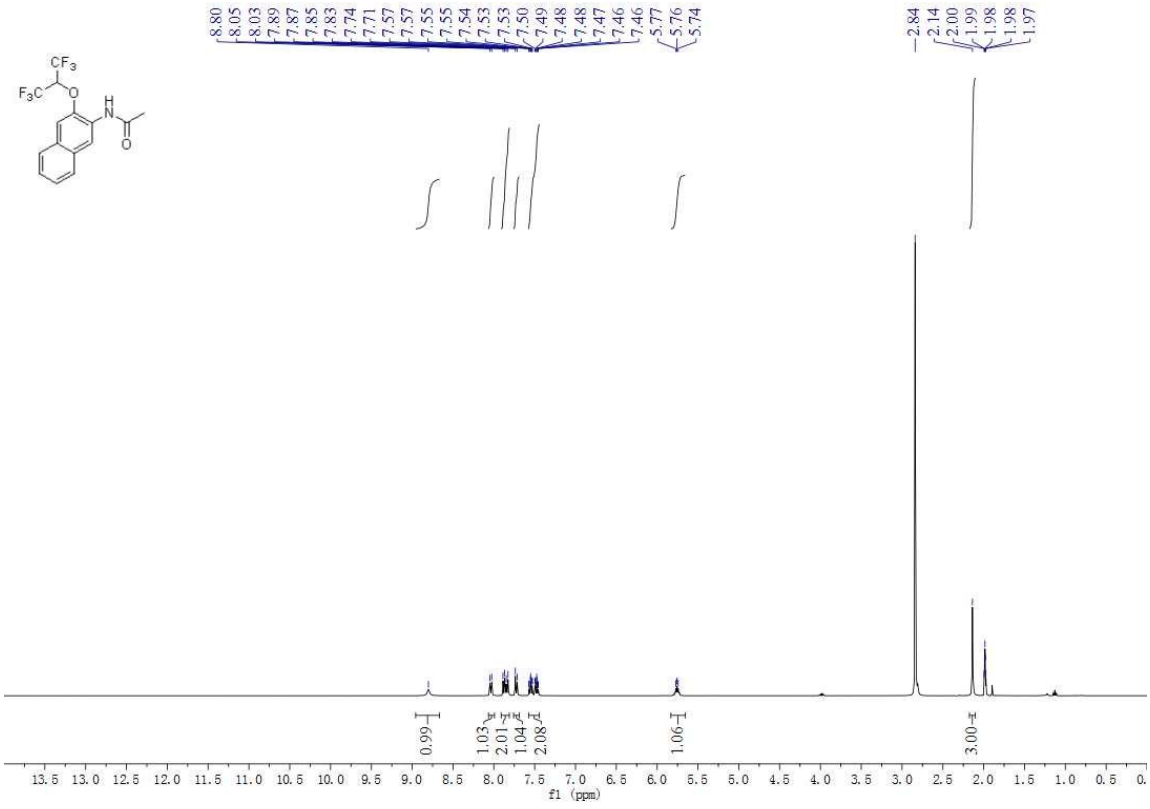
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-methoxyphenyl)pivalamide (2o)

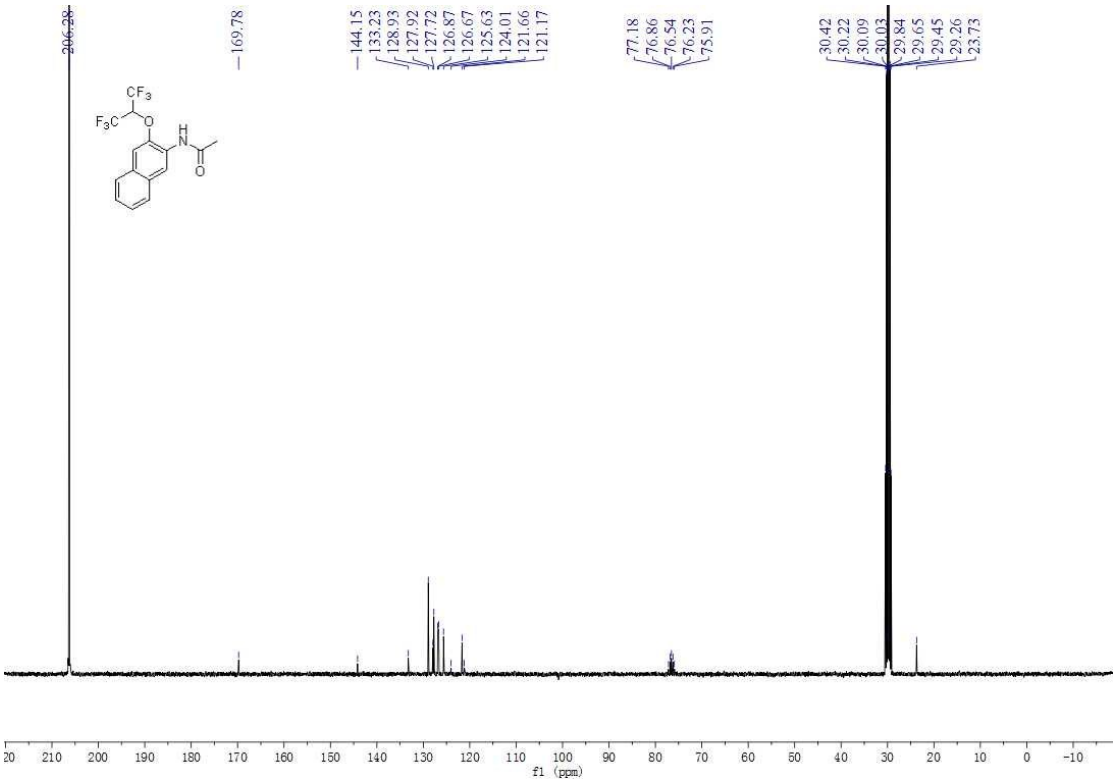


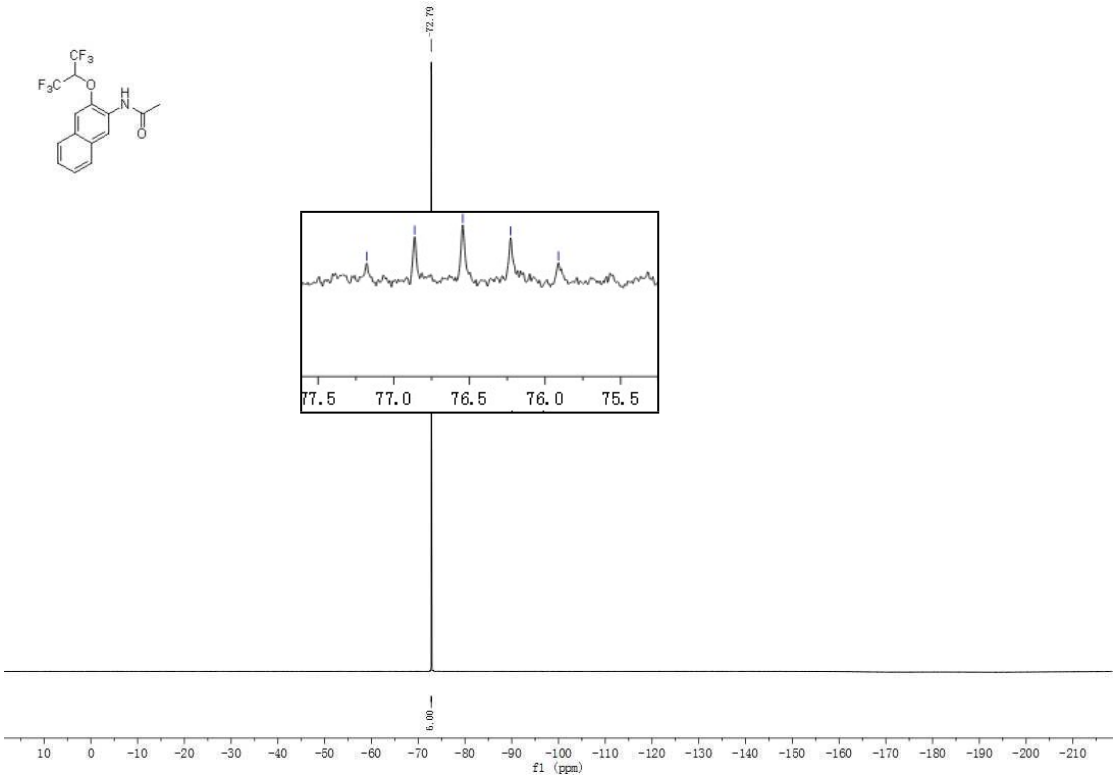




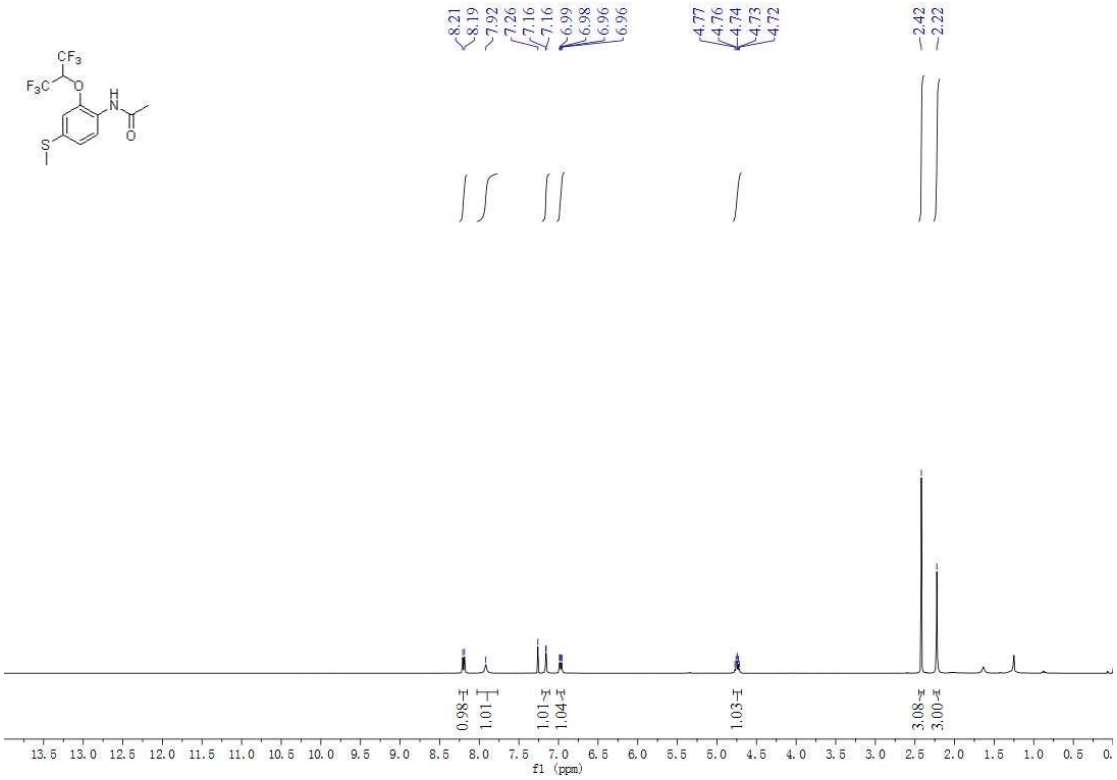
N-(3-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)naphthalen-2-yl)acetamide (2p)

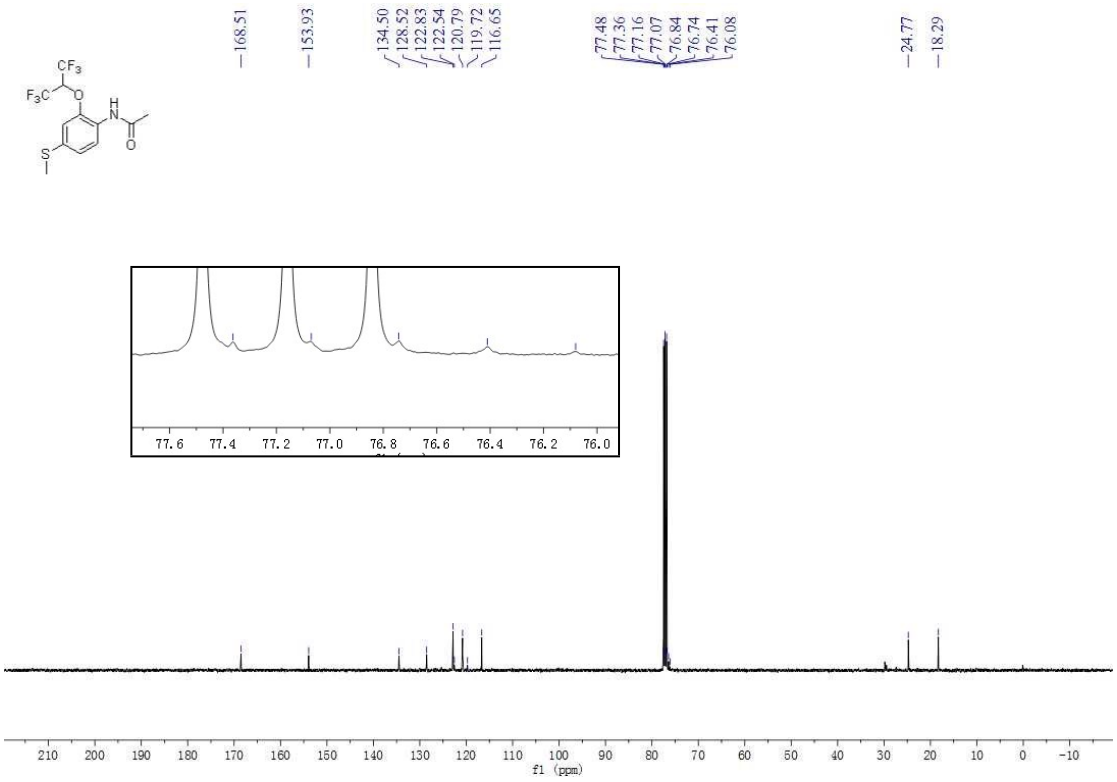


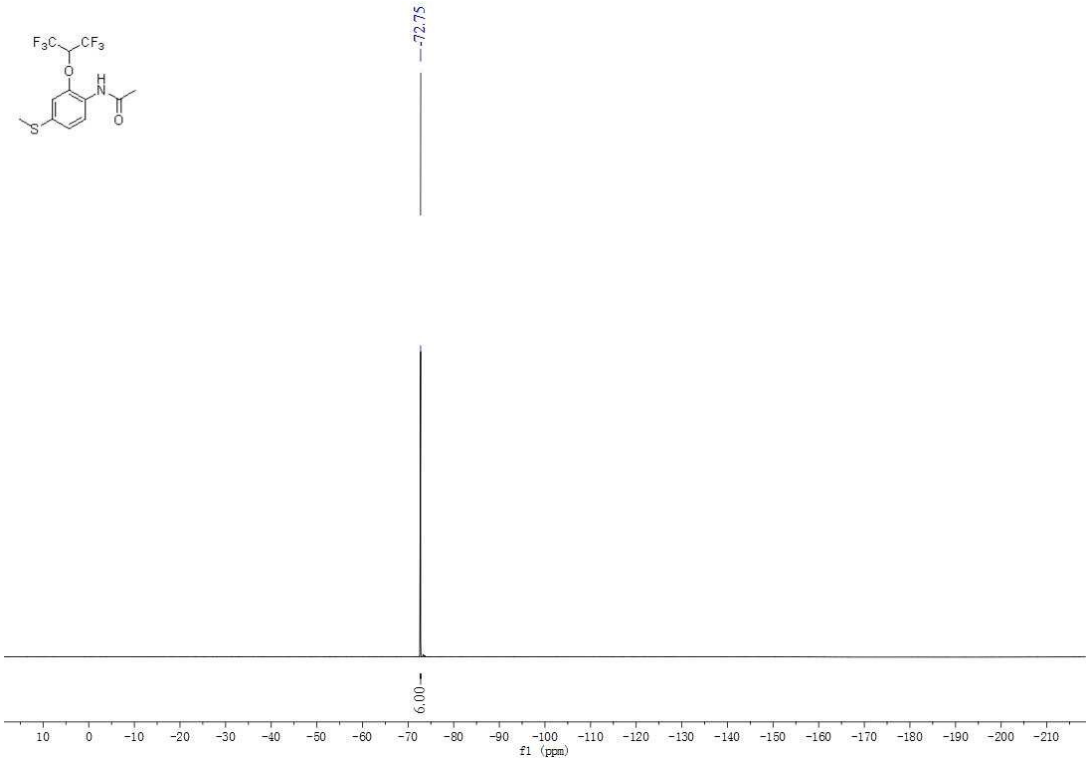

206.28
169.78
144.15
133.23
128.93
127.92
127.72
126.87
126.67
125.63
124.01
121.66
121.17
77.18
76.86
76.54
76.23
75.91
30.42
30.22
30.09
30.03
29.84
29.65
29.45
29.26
23.73
CF3
F3C
O
H
N
O
f1 (ppm)


72.79
CF3
F3C
O
H
N
O
77.5
77.0
76.5
76.0
75.5
6.00
f1 (ppm)

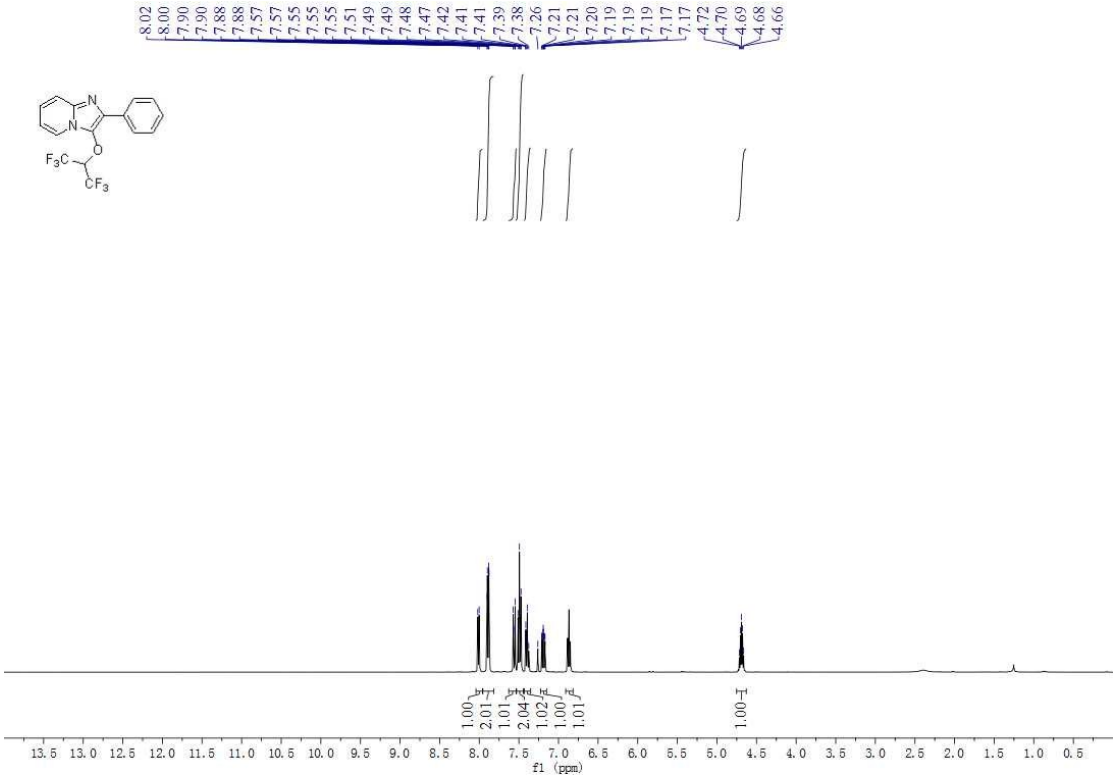
N-(2-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-4-(methylthio)phenyl)acetamide (2q)

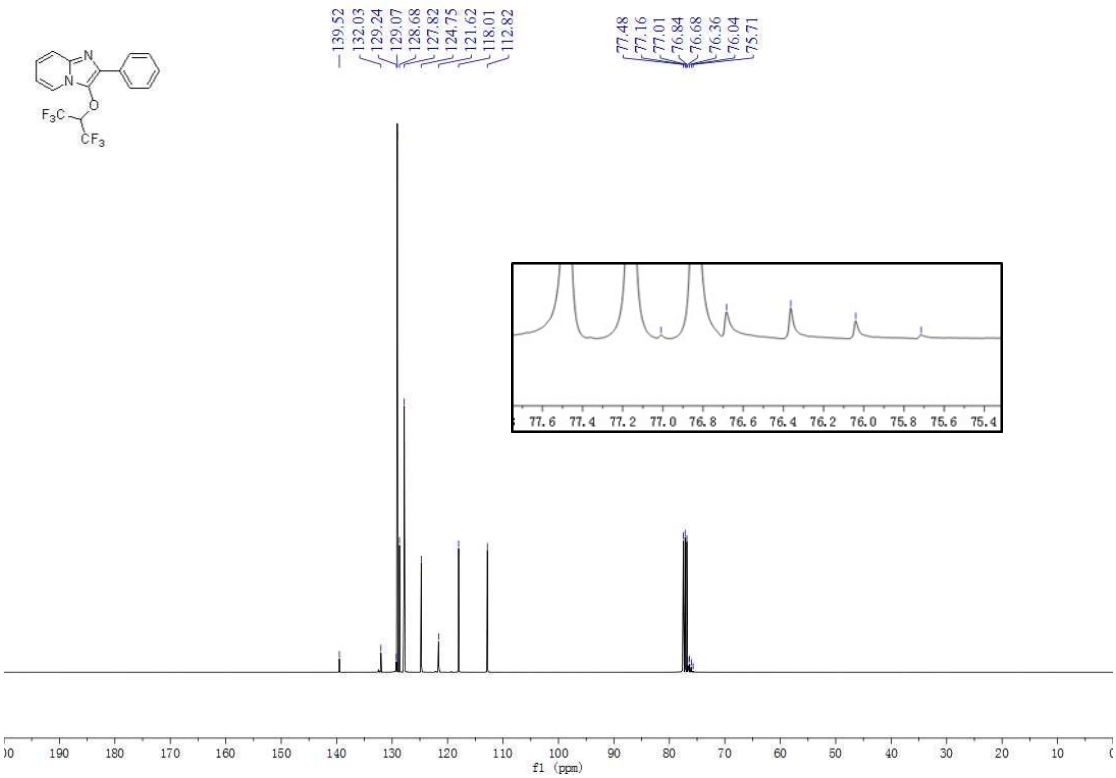


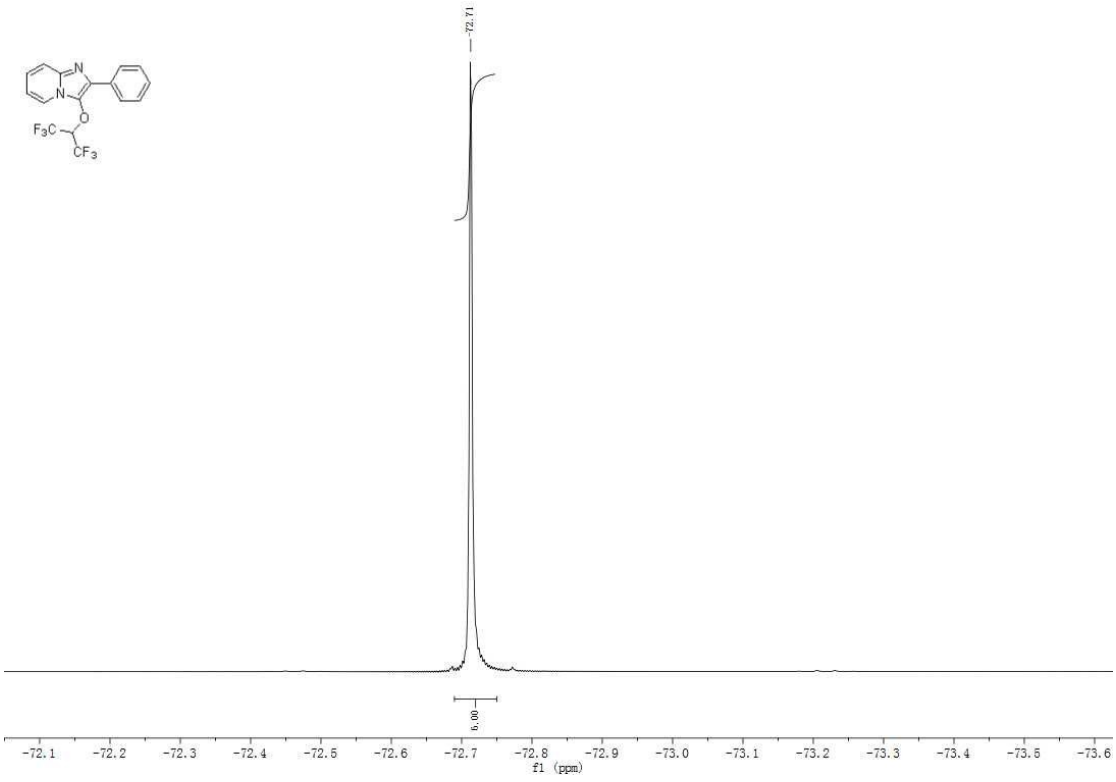




3-((1,1,1,3,3,3-hexafluoropropan-2-yl)oxy)-2-phenylimidazo[1,2-a]pyridine (2r)




139.52
132.03
129.24
129.07
128.68
127.82
124.75
121.62
118.01
112.82
77.48
77.16
77.01
76.84
76.68
76.36
76.04
75.71
F3C
CF3
O
N
77.6 77.4 77.2 77.0 76.8 76.6 76.4 76.2 76.0 75.8 75.6 75.4
f1 (ppm)


-72.71
6.00
F3C
CF3
O
N
-72.1 -72.2 -72.3 -72.4 -72.5 -72.6 -72.7 -72.8 -72.9 -73.0 -73.1 -73.2 -73.3 -73.4 -73.5 -73.6
f1 (ppm)