**Supporting Information**

# $PCl_3$ or $PCl_3/SnCl_4$-Promoted Fluoroalkylthiolation of Arenes with Fluoroalkanesulfinyl Chlorides

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# Experimental Section

## General information

Unless otherwise mentioned, solvents and reagents were purchased from commercial sources and used as received. Solvents were freshly distilled by standard procedure prior to use. Melting points were measured on a RY-I apparatus and uncorrected. $^{1}H$ NMR spectra were recorded in $CDCl_3$ on a Bruker AM 400 spectrometer (400 MHz) with TMS as internal standard. $^{19}F$ NMR spectra were taken on a Bruker AM 400 (376 MHz) spectrometer with $CFCl_3$ as external standard. $^{13}C$ NMR spectra were recorded in $CDCl_3$ on a Varian AM-400 spectrometer (100 MHz) or Agilent AM-400 (100 MHz) spectrometer with TMS as internal standard. For compounds **2k-m**, **2o-q**, the peaks for fluorine-possessing carbon atoms in perfluoroalkyl groups are difficult to find out in $^{13}C$ NMR spectra because of their multiplicity. High Resolution Mass Spectra (HRMS) were recorded on Waters Micromass GCT (EI), Themo Scientific Q Exactive HF Orbitrap-FTMS (ESI), Themo Fisher Scientfic LTQ (DART) or IonSpec FT-ICR mass spectrometer (FI) spectrometers.

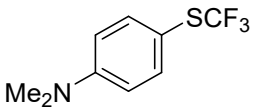
## Typical procedure for the $PCl_3$-promoted reaction

To a sealed tube containing a solution of **1a** (1.0 mmol, 2.0 equiv) in MeCN (0.2 mL) was slowly added $PCl_3$ (0.5 mmol, 1.0 equiv) and $CF_3SOCl$ (0.5 mmol, 1.0 equiv). The mixture was stirred at room temperature for 3 hours. After the completion of reaction, water was added to quench the reaction. The aqueous layer was extracted with ethyl acetate (15 mL ×3) and the combined organic layer was dried over anhydrous $Na_2SO_4$. After removal of solvent under reduced pressure, the residue was purified by column chromatography on silica gel (PE) to give product **2a**.

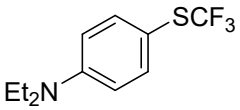
## Typical procedure for the $PCl_3/SnCl_4$-promoted reaction

To a sealed tube containing a solution of **1n** (0.5 mmol, 1.0 equiv) in DCM (0.2 mL) was slowly added $SnCl_4$ (0.5 mmol, 1.0 equiv), $PCl_3$ (1.0 mmol, 2.0 equiv) and $CF_3SOCl$ (1.0 mmol, 2.0 equiv). The mixture was stirred at 100 °C for 3 hours. After the completion of reaction, water was added to quench the reaction. The aqueous layer was extracted with ethyl acetate (15 mL ×3) and the combined organic layer was dried over anhydrous $Na_2SO_4$. After removal of solvent under reduced pressure, the residue was purified by column chromatography on silica gel (PE) to give product **2n**.

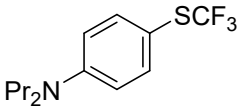
## Compound characterization



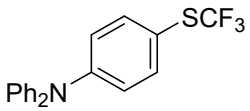

Compound **2a**: Colorless liquid, 85% yield, 93.9 mg. This is a known compound.[1] $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.52 (d, *J* = 8.8 Hz, 2H), 6.70 (d, *J* = 8.8 Hz, 2H), 3.02 (s, 6H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -44.67 (s).



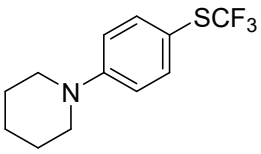

Compound **2b**: Yellow oil, 82% yield, 102.1 mg. $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.45 (d, *J* = 8.8 Hz, 2H), 6.64 (d, *J* = 8.8 Hz, 2H), 3.39 (q, *J* = 7.1 Hz, 4H), 1.20 (t, *J* = 7.1 Hz, 6H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -44.94 (s). $^{13}$C NMR (101 MHz, $CDCl_3$) δ 149.48, 138.24, 129.87 (q, *J* = 310.1 Hz), 111.81, 107.11, 44.44, 12.39. MS (FI) m/z (%): 249 (100) $[M]^+$. HRMS (FI) calcd for $C_{11}H_{14}F_3NS$ $[M]^+$ requires 249.0791, found 249.0794.



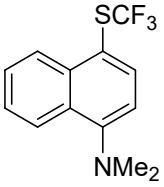

Compound **2c**: Colorless oil, 87% yield, 120.5 mg (*ortho*/*para* = 1:41). This is a known compound.[2] *para*-isomer: $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.44 (d, *J* = 8.9 Hz, 2H), 6.60 (d, *J* = 8.9 Hz, 2H), 3.27 (t, *J* = 8.0 Hz, 2H), 1.68-1.59 (m, 2H), 0.95 (t, *J* = 7.4 Hz, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -44.87 (s).



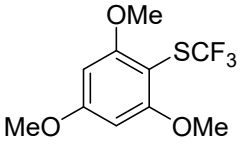

Compound **2d**: Colorless liquid, 57% yield, 98.3 mg. This is a known compound.[3] $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.45 (d, *J* = 8.6 Hz, 2H), 7.32 (t, *J* = 7.8 Hz, 4H), 7.17-7.11 (m, 6H), 7.02 (d, *J* = 8.6 Hz, 2H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -43.74 (s).



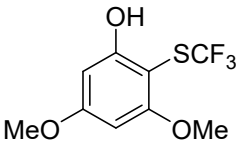

Compound **2e**: Colorless oil, 62% yield, 80.9 mg. $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.48 (d, *J* = 8.7 Hz, 2H), 6.88 (d, *J* = 8.7 Hz, 2H), 3.27 (t, *J* = 5.3 Hz, 4H), 1.72-1.59 (m, 6H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -44.35 (s). $^{13}$C NMR (101 MHz, $CDCl_3$) δ 153.32, 137.89, 129.79 (q, *J* = 308.4 Hz), 115.53, 110.61, 49.07, 25.46, 24.26. MS (EI) m/z (%): 261 (75) $[M]^+$, 260 (32), 192 (100), 136 (30). HRMS (EI) calcd for $C_{12}H_{14}F_3NS$ $[M]^+$ requires 261.0794, found 261.0790.




Compound **2f**: Brown oil, 57% yield, 77.3 mg. $^{1}$H NMR (400 MHz, $CDCl_3$) δ 8.53 (d, *J* = 8.4 Hz, 1H), 8.25 (d, *J* = 8.4 Hz, 1H), 7.87 (d, *J* = 7.9 Hz, 1H), 7.62 (t, *J* = 6.9 Hz, 1H), 7.55 (t, *J* = 7.0 Hz, 1H), 7.03 (d, *J* = 7.9 Hz, 1H), 2.96 (s, 6H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -43.05 (s). $^{13}$C NMR (101 MHz, $CDCl_3$) δ 154.76, 138.45, 136.62, 129.77 (q, *J* = 311.1 Hz), 129.20, 127.29, 126.41, 125.54, 124.98, 114.01, 113.39, 44.85. MS (FI) m/z (%): 271 (100) $[M]^+$. HRMS (FI) calcd for $C_{13}H_{12}F_3NS$ $[M]^+$ requires 271.0637, found 271.0632.

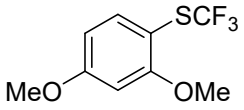



Compound **2g**: Colorless oil, 67% yield, 89.8 mg. This is a known compound.[4] $^{1}$H NMR (400 MHz, $CDCl_3$) δ 6.15 (s, 2H), 3.86 (s, 6H), 3.84 (s, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -43.56 (s).

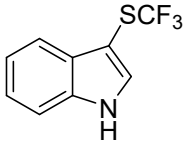



Compound **2h**: Yellow solid, 64% yield, 81.3 mg. This is a known compound.[5] $^{1}$H

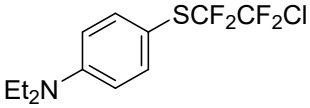
NMR (400 MHz, $CDCl_3$) δ 6.62 (s, 1H), 6.24 (s, 1H), 6.09 (s, 1H), 3.85 (s, 3H), 3.81 (s, 3H). $^{19}F$ NMR (376 MHz, $CDCl_3$) δ -43.75 (s).



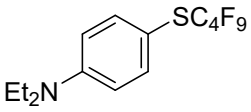

Compound **2i**: Colorless oil, 72% yield, 85.7 mg. This is a known compound.[4] $^1H$ NMR (400 MHz, $CDCl_3$) δ 7.53 (d, *J* = 8.4 Hz, 1H), 6.53-6.51 (m, 2H), 3.88 (s, 3H), 3.84 (s, 3H). $^{19}F$ NMR (376 MHz, $CDCl_3$) δ -43.71 (s).




Compound **2j**: Colorless oil, 54% yield, 58.6 mg. This is a known compound.[6] $^1H$ NMR (400 MHz, $CDCl_3$) δ 8.46 (s, 1H), 7.86-7.84 (m, 1H), 7.52-7.51 (m, 1H), 7.43-7.41 (m, 1H), 7.35-7.30 (m, 2H). $^{19}F$ NMR (376 MHz, $CDCl_3$) δ -44.56 (s, 3F).

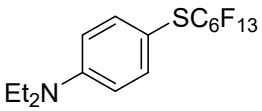



Compound **2k**: Yellow oil, 55% yield, 86.6 mg. $^1H$ NMR (400 MHz, $CDCl_3$) δ 7.42 (d, *J* = 8.9 Hz, 2H), 6.62 (d, *J* = 8.9 Hz, 2H), 3.37 (q, *J* = 7.1 Hz, 4H), 1.18 (t, *J* = 7.1 Hz, 6H). $^{19}F$ NMR (376 MHz, $CDCl_3$) δ -67.53 (t, *J* = 6.8 Hz, 2F), -88.99 (t, *J* = 6.8 Hz, 2F). $^{13}C$ NMR (101 MHz, $CDCl_3$) δ 149.55, 138.93, 111.70, 105.63, 44.40, 12.41. MS (FI) m/z (%): 315 (100) $[M]^+$. HRMS (FI) calcd for $C_{12}H_{14}ClF_4NS$ $[M]^+$ requires 315.0466, found 315.0465.

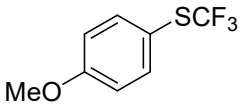



Compound **2l**: Brown oil, 71% yield, 141.7 mg. $^1H$ NMR (400 MHz, $CDCl_3$) δ 7.46 (d, *J* = 8.9 Hz, 2H), 6.66 (d, *J* = 8.9 Hz, 2H), 3.40 (q, *J* = 7.1 Hz, 4H), 1.21 (t, *J* = 7.1 Hz, 6H). $^{19}F$ NMR (376 MHz, $CDCl_3$) δ -81.16 (t, *J* = 9.8 Hz, 3F), -88.92 (t, *J* = 13.3 Hz, 2F), -120.33~-120.45 (m, 2F), -125.61~-125.72 (m, 2F). $^{13}C$ NMR (101 MHz, $CDCl_3$)

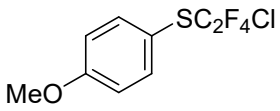
δ 149.66, 139.07, 111.72, 104.62, 44.38, 12.29. MS (FI) m/z (%): 399 (100) $[M]^+$. HRMS (FI) calcd for $C_{14}H_{14}F_9NS$ $[M]^+$ requires 399.0698, found 399.0695.



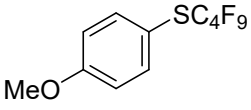

Compound **2m**: Brown oil, 79% yield, 197.1 mg. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.45 (d, *J* = 8.9 Hz, 2H), 6.65 (d, *J* = 8.9 Hz, 2H), 3.39 (q, *J* = 7.1 Hz, 4H), 1.20 (t, *J* = 7.1 Hz, 6H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -81.05 (t, *J* = 10.0 Hz, 3F), -88.72 (t, *J* = 13.8 Hz, 2F), -119.48~-119.60 (m, 2F), -121.54 (s, 2F), -122.92 (s, 2F), -126.22~-126.39 (m, 2F). $^{13}$C NMR (101 MHz, $CDCl_3$) δ 149.64, 138.12, 111.70, 104.94, 42.86, 11.39. MS (FI) m/z (%): 499 (100) $[M]^+$. HRMS (FI) calcd for $C_{16}H_{14}F_{13}NS$ $[M]^+$ requires 499.0634, found 499.0629.



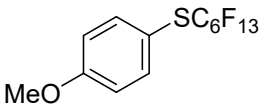

Compound **2n**: Colorless oil, 95% yield, 98.8 mg. This is a known compound.[4] $^1$H NMR (400 MHz, $CDCl_3$) δ 7.59 (d, *J* = 8.4 Hz, 2H), 6.94 (d, *J* = 8.4 Hz, 2H), 3.84 (s, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -44.01 (s).



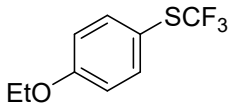

Compound **2o**: Yellow liquid, 66% yield, 90.4 mg. $^1$H NMR (400 MHz, $CDCl_3$) δ 7.58 (d, *J* = 8.9 Hz, 2H), 6.93 (d, *J* = 8.9 Hz, 2H), 3.84 (s, 3H).$^{19}$F NMR (376 MHz, $CDCl_3$) δ -67.66 (t, *J* = 6.6 Hz, 2F), -88.26 (t, *J* = 6.6 Hz, 2F). $^{13}$C NMR (101 MHz, $CDCl_3$) δ 161.98, 139.00, 114.94, 113.65 (t, *J* = 2.9 Hz), 55.36. MS (EI) m/z (%):276 (21), 274 (71) $[M]^+$, 139 (100), 124 (18), 96 (17). HRMS (EI) calcd for $C_9H_7ClF_4OS$ $[M]^+$ requires 273.9839, found 273.9836.



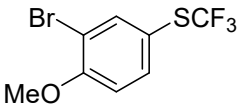
Compound **2p**: Colorless liquid, 81% yield, 145.0 mg (*ortho*/*para* = 1:18). *para*-isomer: $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.55 (d, *J* = 8.8 Hz, 2H), 6.92 (d, *J* = 8.8 Hz, 2H), 3.82 (s, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -81.02 (t, *J* = 9.6 Hz, 3F), -88.13 (t, *J* = 15.0 Hz, 2F), -120.18~-120.30 (m, 2F), -125.56~-125.72 (m, 2F). $^{13}$C NMR (101 MHz, $CDCl_3$) δ 162.04, 139.13, 114.98, 112.98, 55.41. MS (EI) m/z (%):358 (49) $[M]^+$, 139 (100), 124 (15), 96 (12). HRMS (EI) calcd for $C_{11}H_7F_9OS$ $[M]^+$ requires 358.0068, found 358.0071.



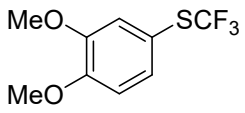

Compound **2q**: Colorless oil, 92% yield, 210.7 mg (*ortho*/*para* = 1:36). *para*-isomer: $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.57 (d, *J* = 8.7 Hz, 2H), 6.93 (d, *J* = 8.7 Hz, 2H), 3.84 (s, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -80.89 (t, *J* = 10.1 Hz, 3F), -87.93 (t, *J* = 13.6 Hz, 2F), -119.34~-119.46 (m, 2F), -121.56 (s, 2F), -122.91 (s, 2F), -126.18~-126.36 (m, 2F). $^{13}$C NMR (101 MHz, $CDCl_3$) δ 162.04, 139.13, 114.97, 113.03, 55.38. MS (EI) m/z (%): 458 (95) $[M]^+$, 439 (30), 139 (100), 124 (34), 96 (32). HRMS (EI) calcd for $C_{13}H_7F_{13}OS$ $[M]^+$ requires 458.0005, found 458.0009.




Compound **2r**: Colorless liquid, 95% yield, 105.5 mg (*ortho*/*para* = 1:27). This is a known compound. [7] *para*-isomer: $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.55 (d, *J* = 8.8 Hz, 2H), 6.90 (d, *J* = 8.8 Hz, 2H), 4.04 (q, *J* = 7.0 Hz, 2H), 1.42 (t, *J* = 7.0 Hz, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -44.03 (s).




Compound **2s**: Yellow liquid, 43% yield, 51.2 mg (*ortho*/*para* = 1:33). This is a known compound. [4] *para*-isomer: $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.23 (d, *J* = 8.4 Hz, 1H), 7.10 (s, 1H), 6.86 (d, *J* = 8.4 Hz, 1H), 3.89 (s, 3H), 3.88 (s, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -43.76 (s).




Compound **2t**: Colorless oil, 64% yield, 91.5 mg. This is a known compound. [4] $^{1}$H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, $J$ = 2.2 Hz, 1H), 7.58 (dd, $J$ = 8.6, 2.3 Hz, 1H), 6.92 (d, $J$ = 8.6 Hz, 1H), 3.94 (s, 3H). $^{19}$F NMR (376 MHz, $CDCl_3$) δ -43.98 (s).

## References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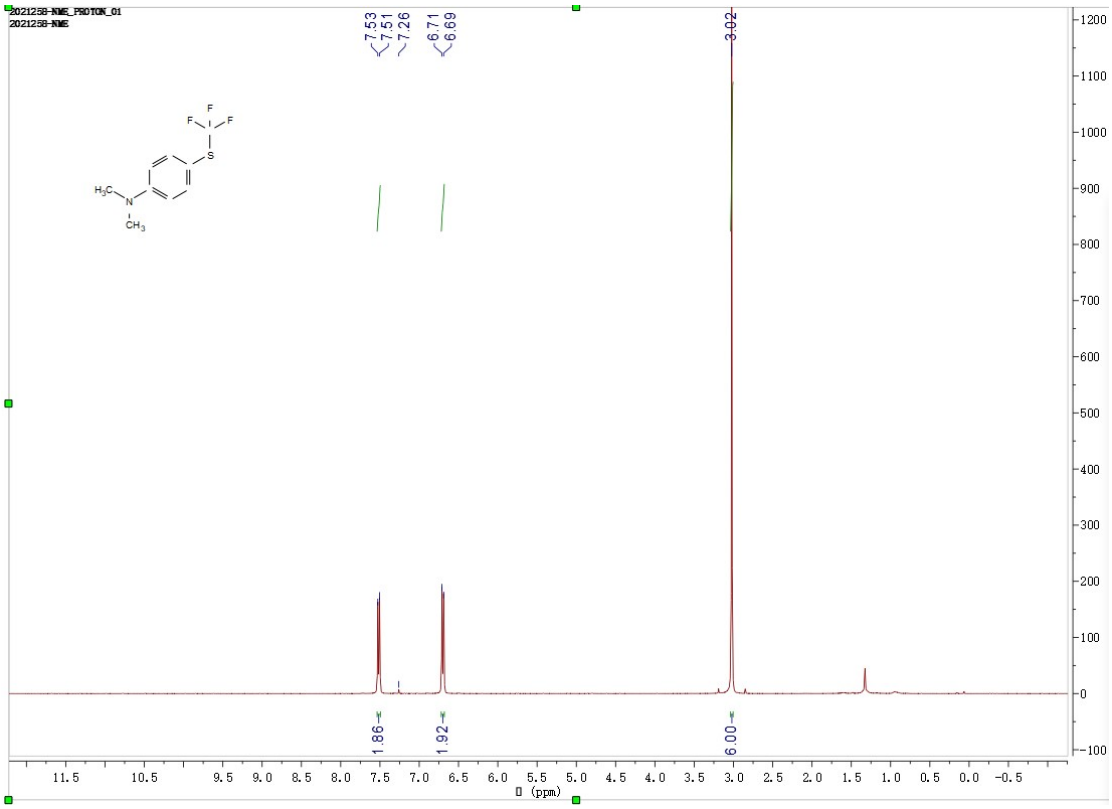
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7.26
6.71
6.69
3.02
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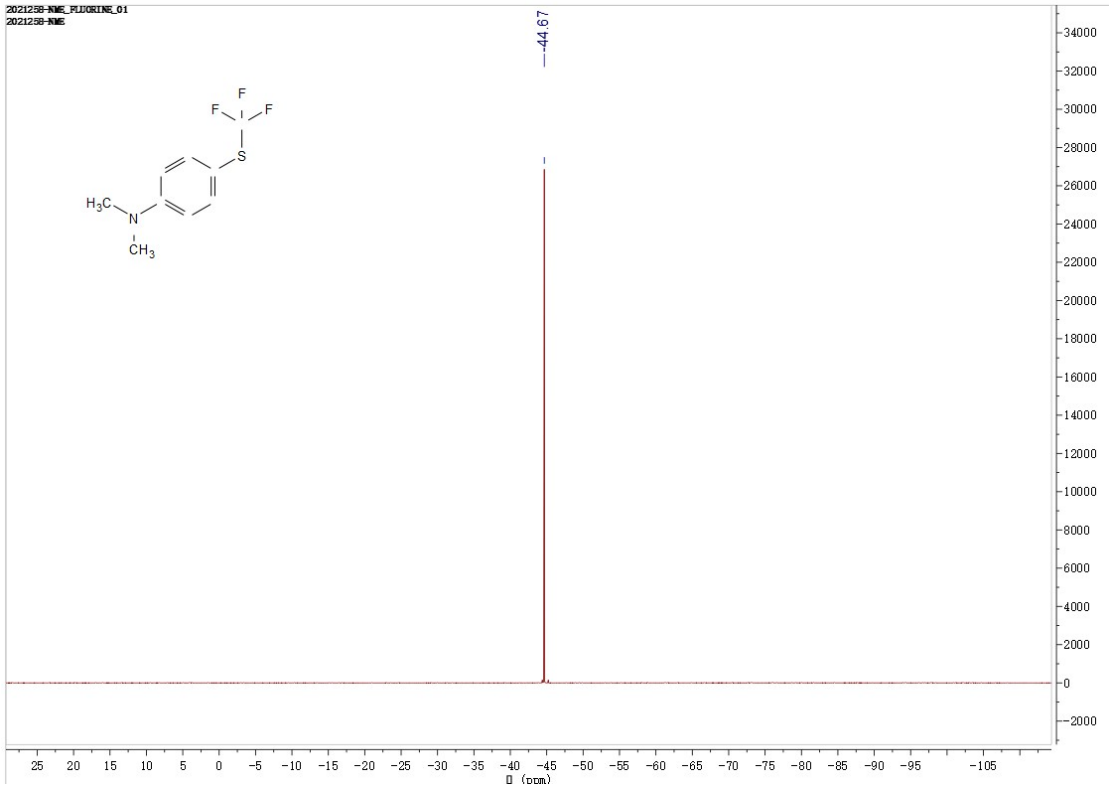
1.92
6.00
(ppm)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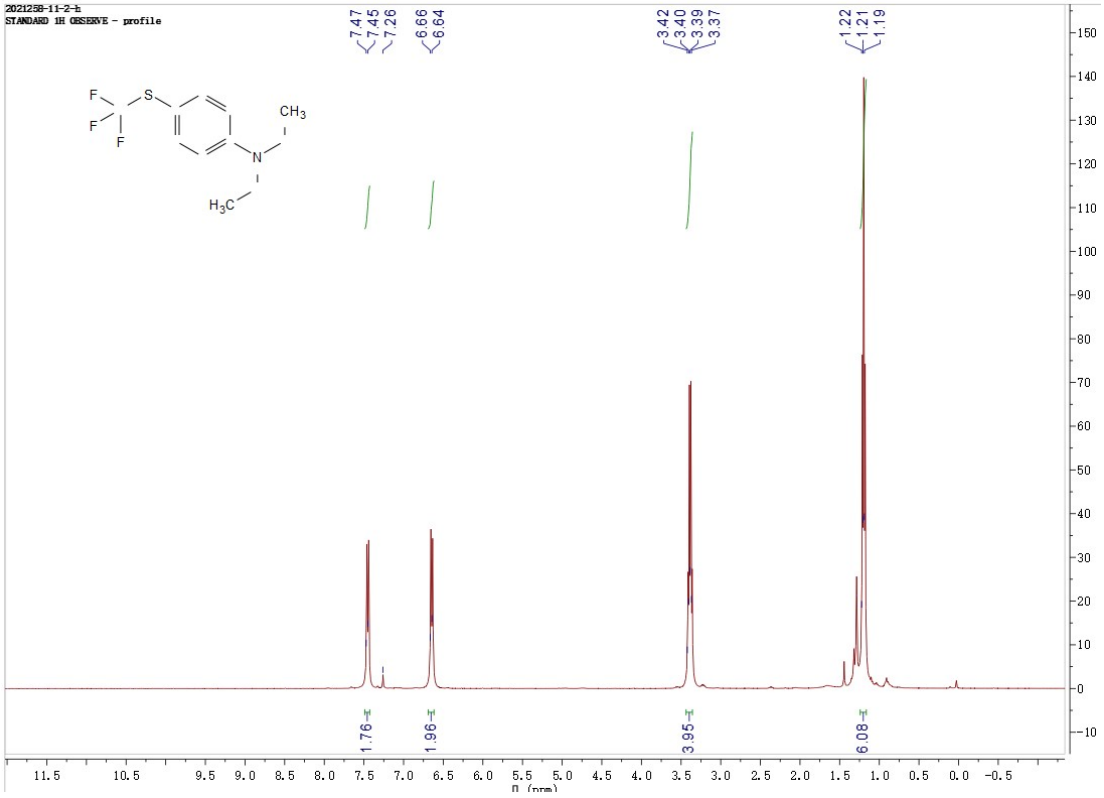
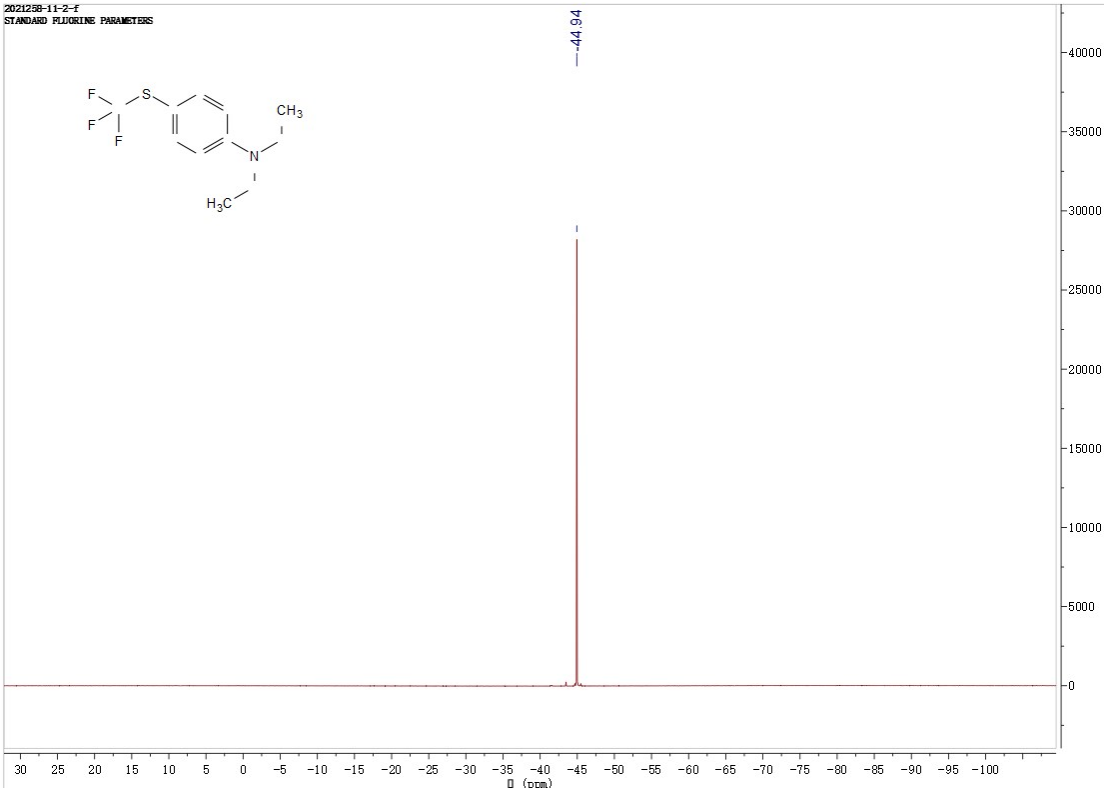
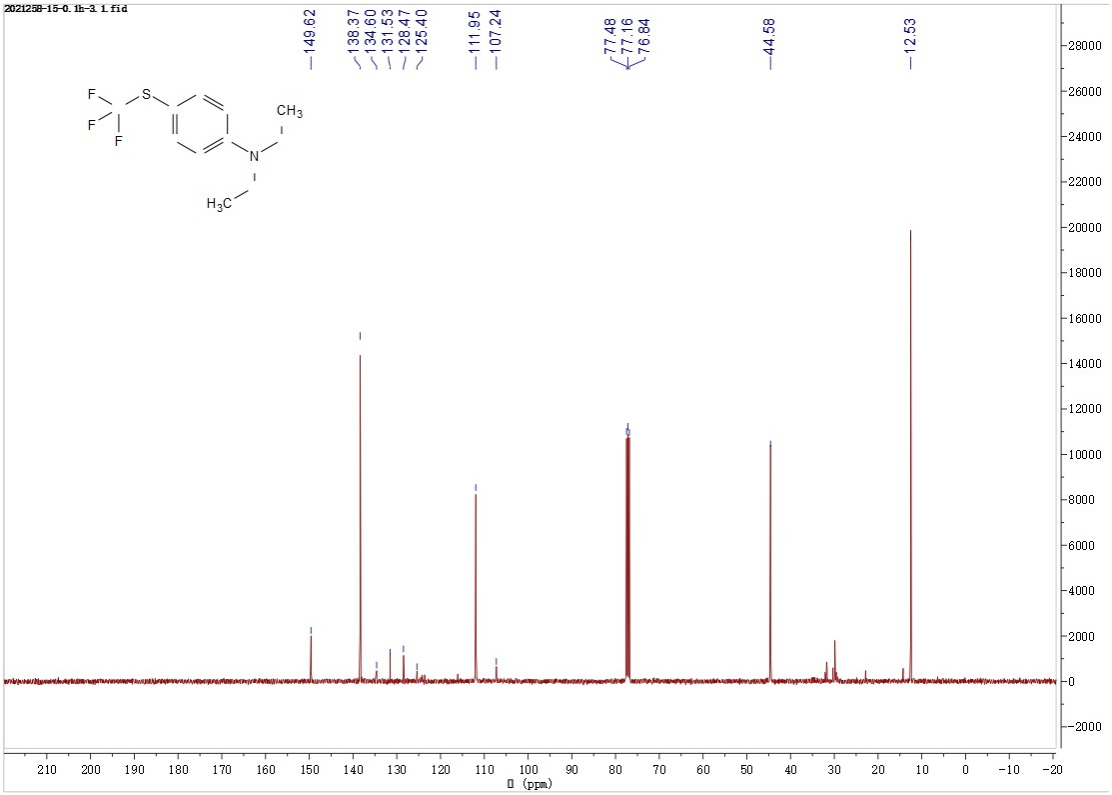
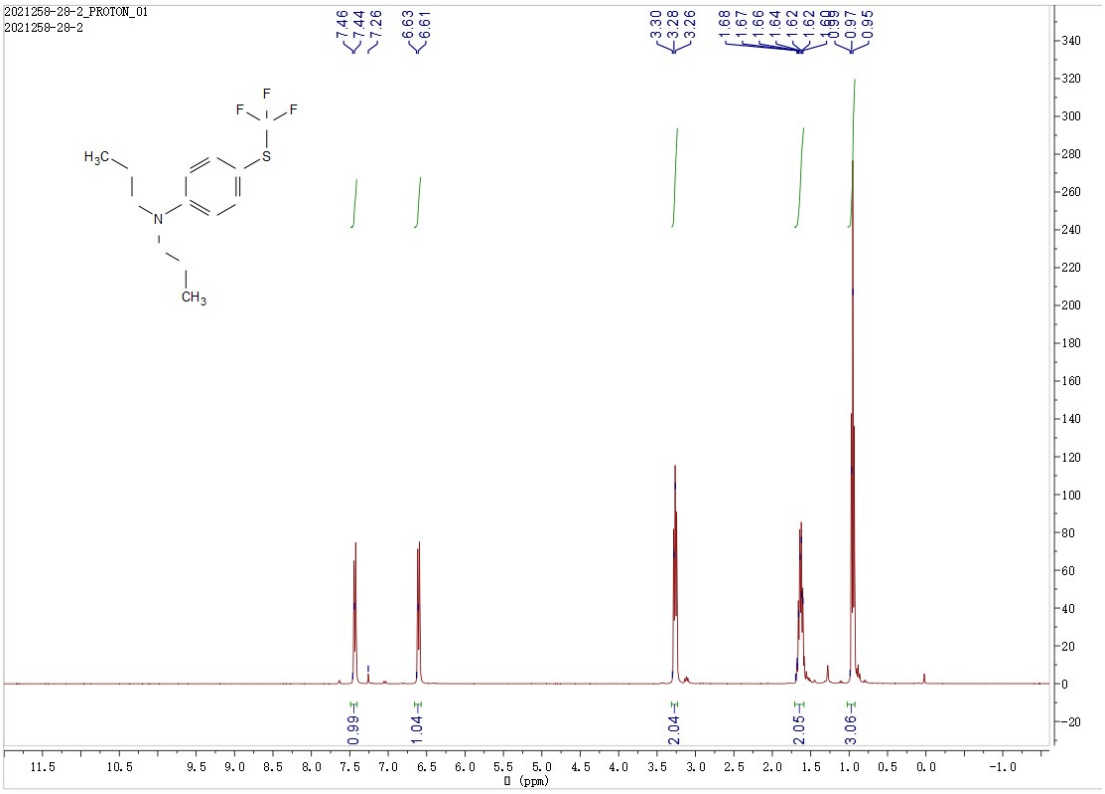
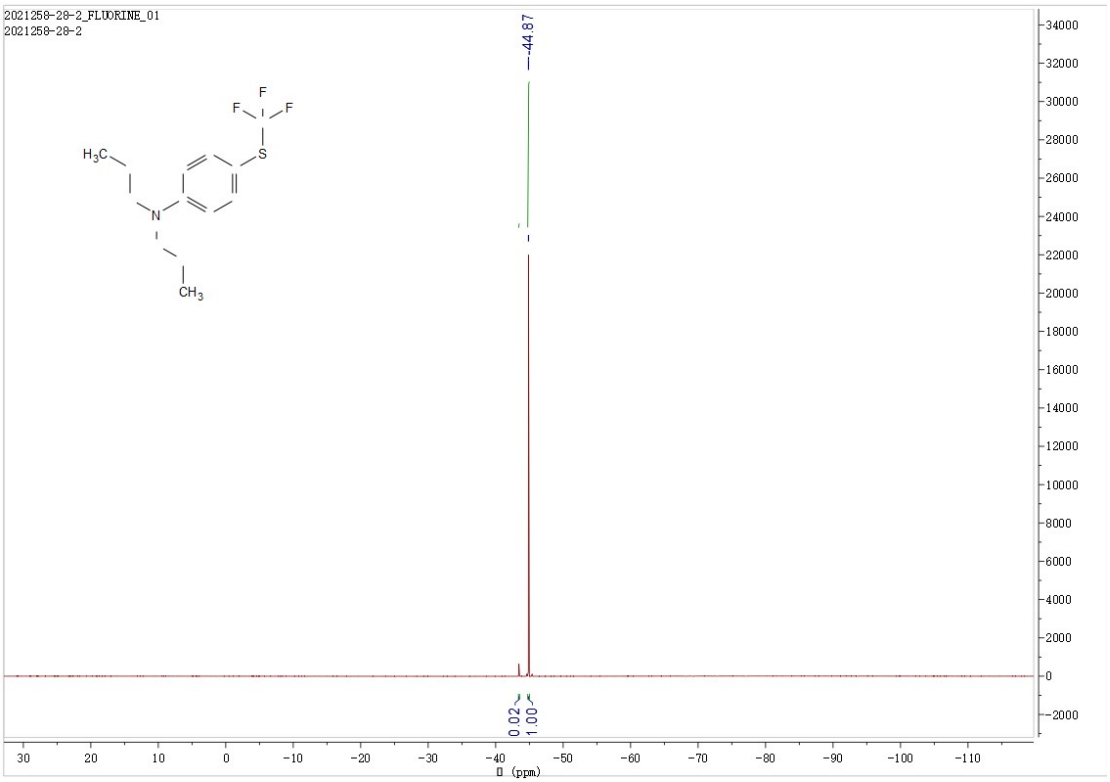
-44.67
(ppm)

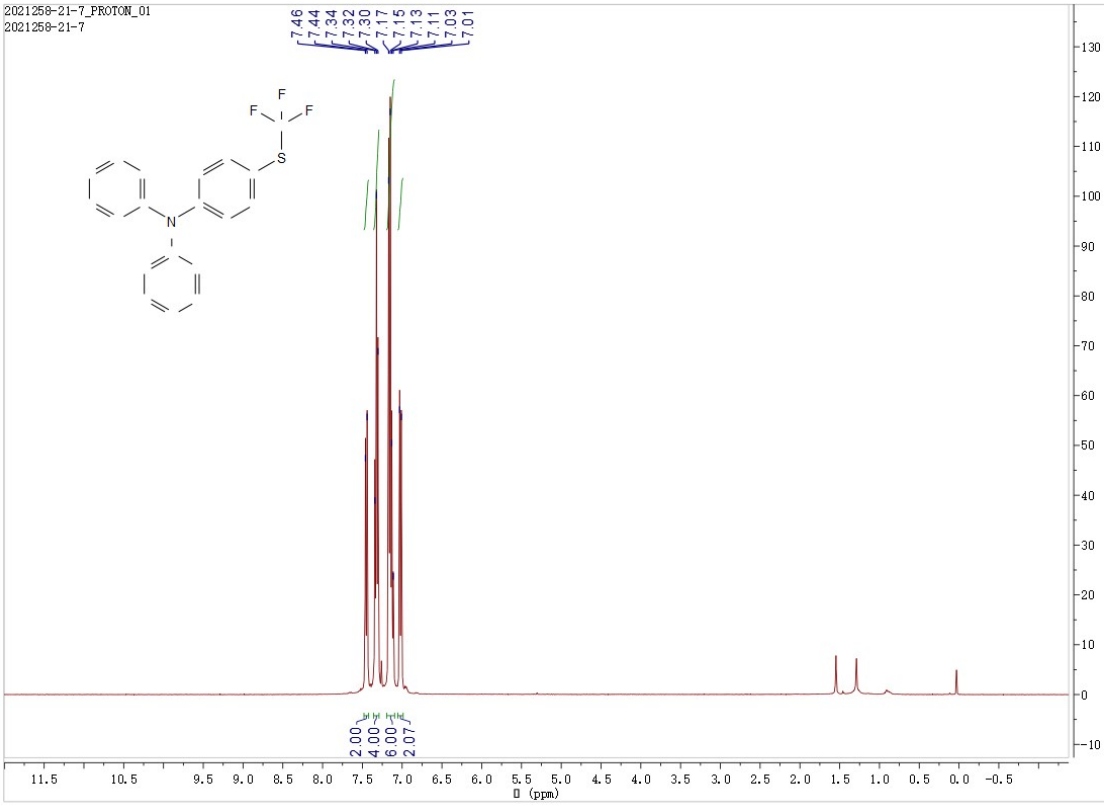

2021258-11-2-h
STANDARD 1H OBSERVE - profile
7.47
7.45
7.26
6.66
6.64
3.42
3.40
3.39
3.37
1.22
1.21
1.19
1.76
1.96
3.95
6.08
F
F
F
S
CH3
N
H3C

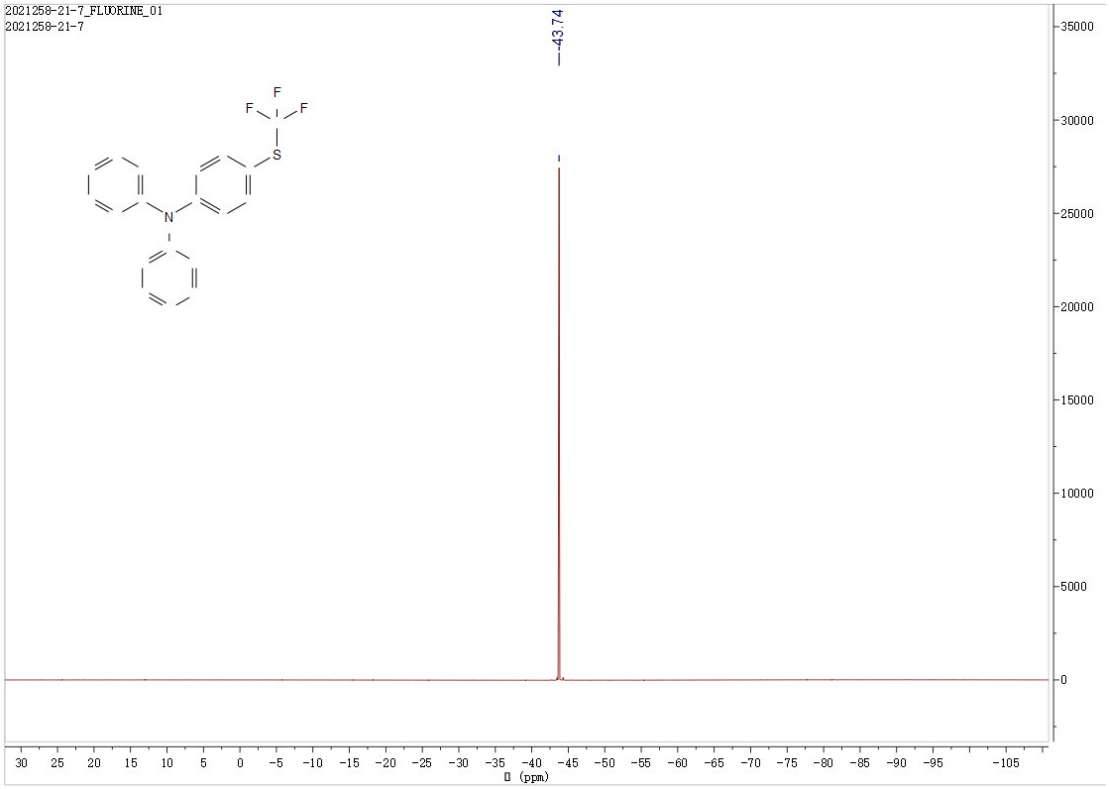

2021258-11-2-f
STANDARD FLUORINE PARAMETERS
-44.94
F
F
F
S
CH3
N
H3C

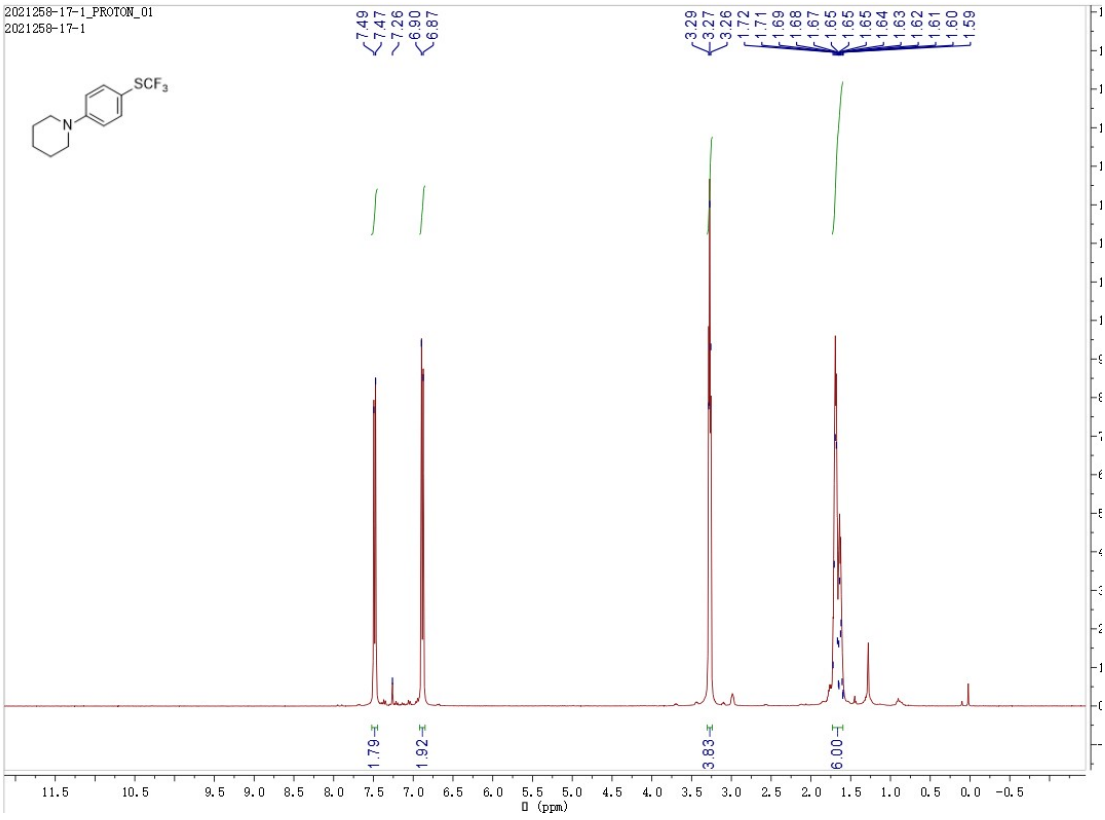

2021258-15-0.1h-3.1.fid
149.62
138.37
134.60
131.53
128.47
125.40
111.95
107.24
77.48
77.16
76.84
44.58
12.53
F
S
F
F
CH3
N
H3C
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)

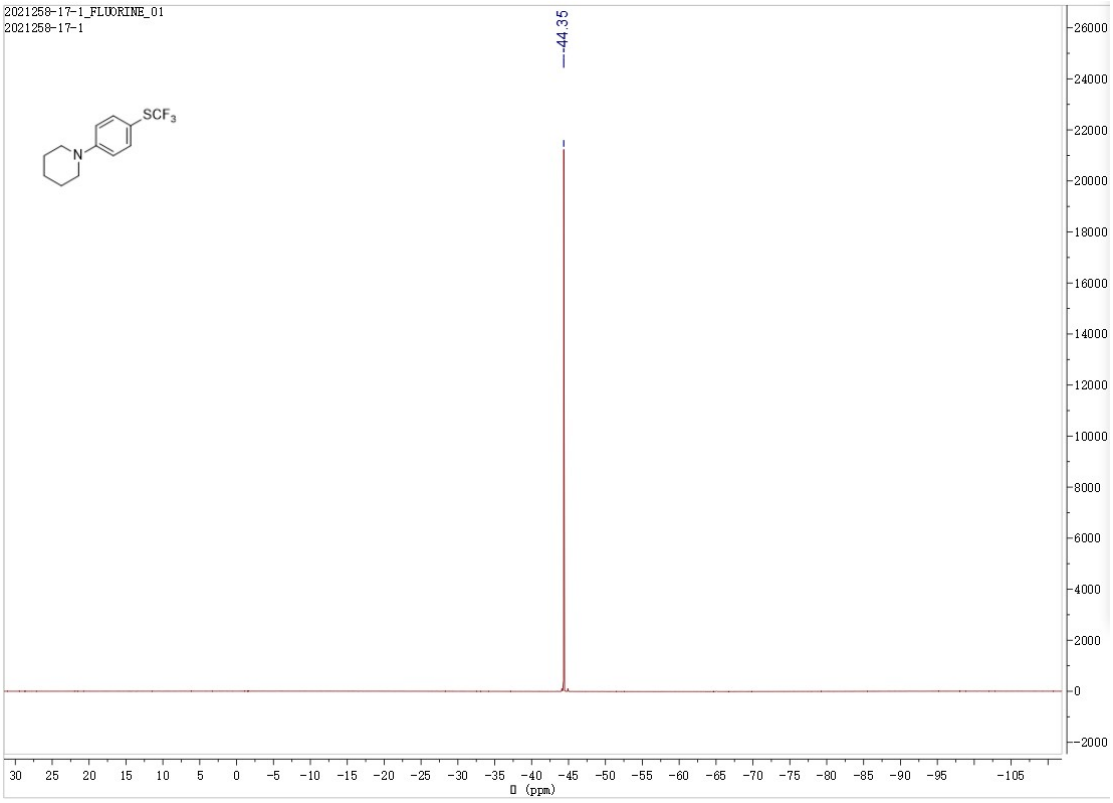

2021258-28-2_PROTON_01
2021258-28-2
7.46
7.44
7.26
6.63
6.61
3.30
3.28
3.26
1.68
1.67
1.66
1.64
1.62
1.62
0.99
0.97
0.95
F
F
F
S
H3C
N
CH3
0.99
1.04
2.04
2.05
3.06
11.5 10.5 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -1.0
f1 (ppm)

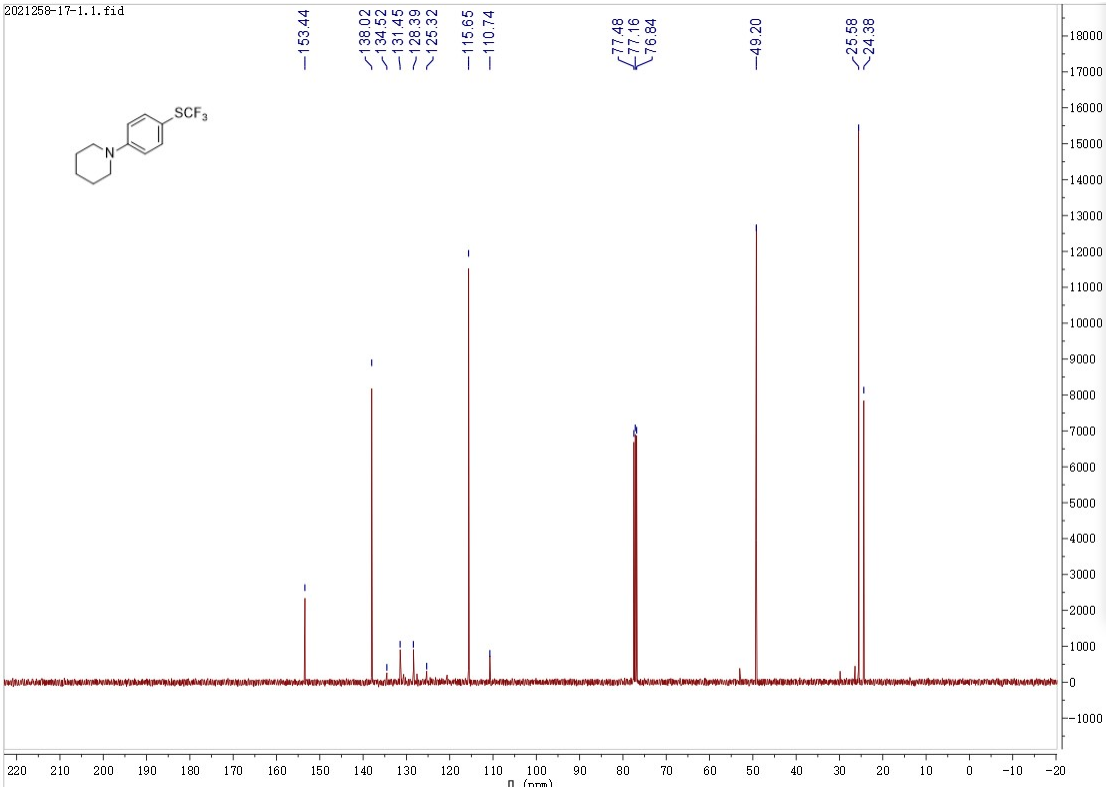

2021258-28-2_FLUORINE_01
2021258-28-2
-44.87
F
F
F
S
H3C
N
CH3
0.02
1.00
(ppm)

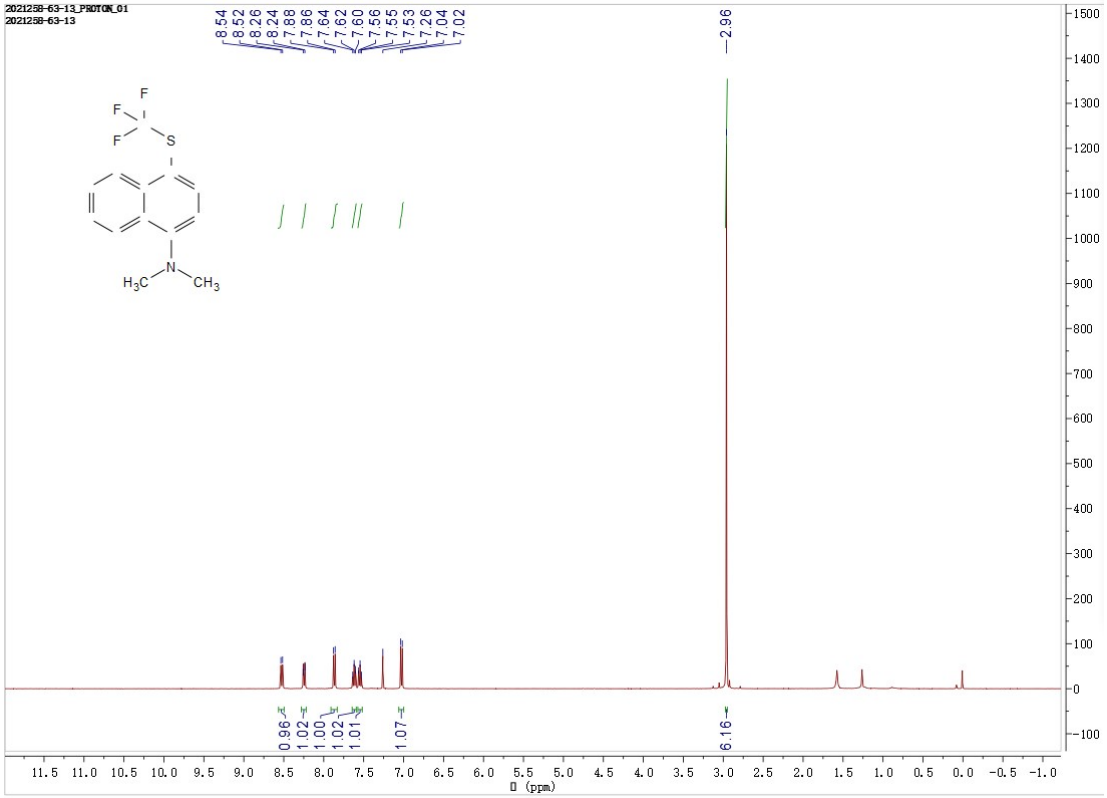

2021258-21-7_PROTON_01
2021258-21-7
7.46
7.44
7.34
7.32
7.30
7.17
7.15
7.13
7.11
7.03
7.01
F
F
F
S
N
2.00
4.00
6.00
2.07
(ppm)

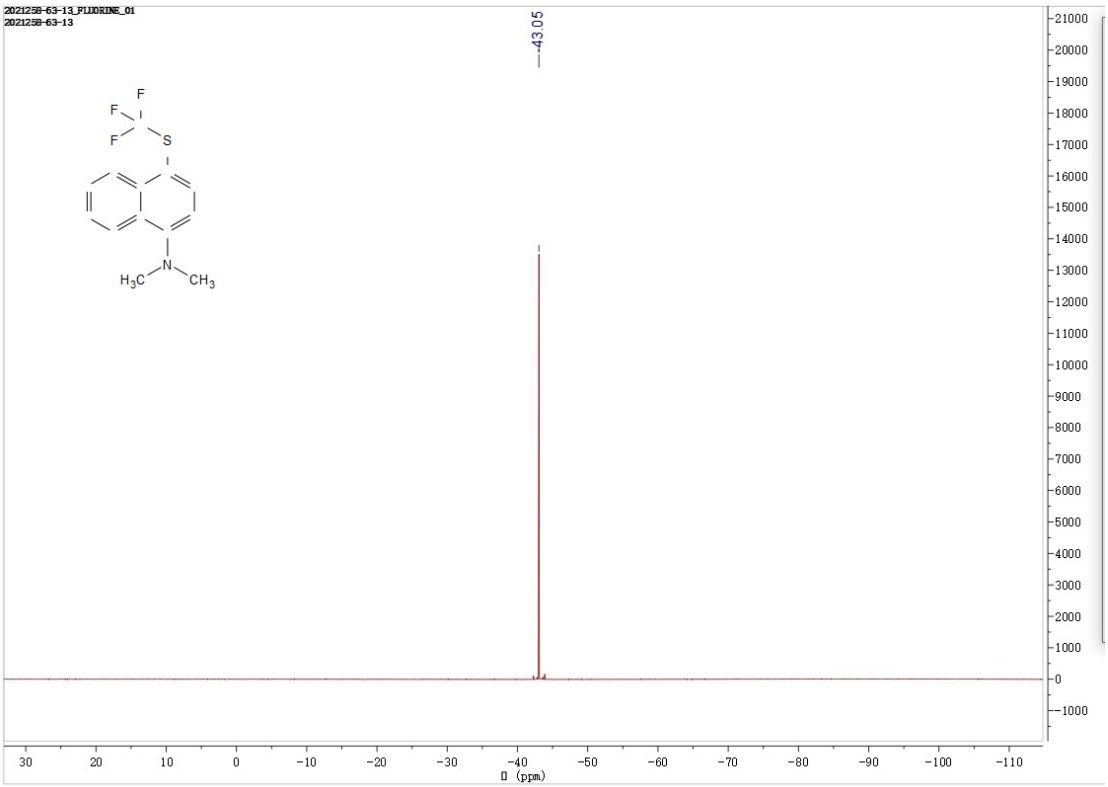

2021258-21-7_FLUORINE_01
2021258-21-7
-43.74
F
F
F
I
S
N
35000
30000
25000
20000
15000
10000
5000
0
30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85 -90 -95 -105
f1 (ppm)

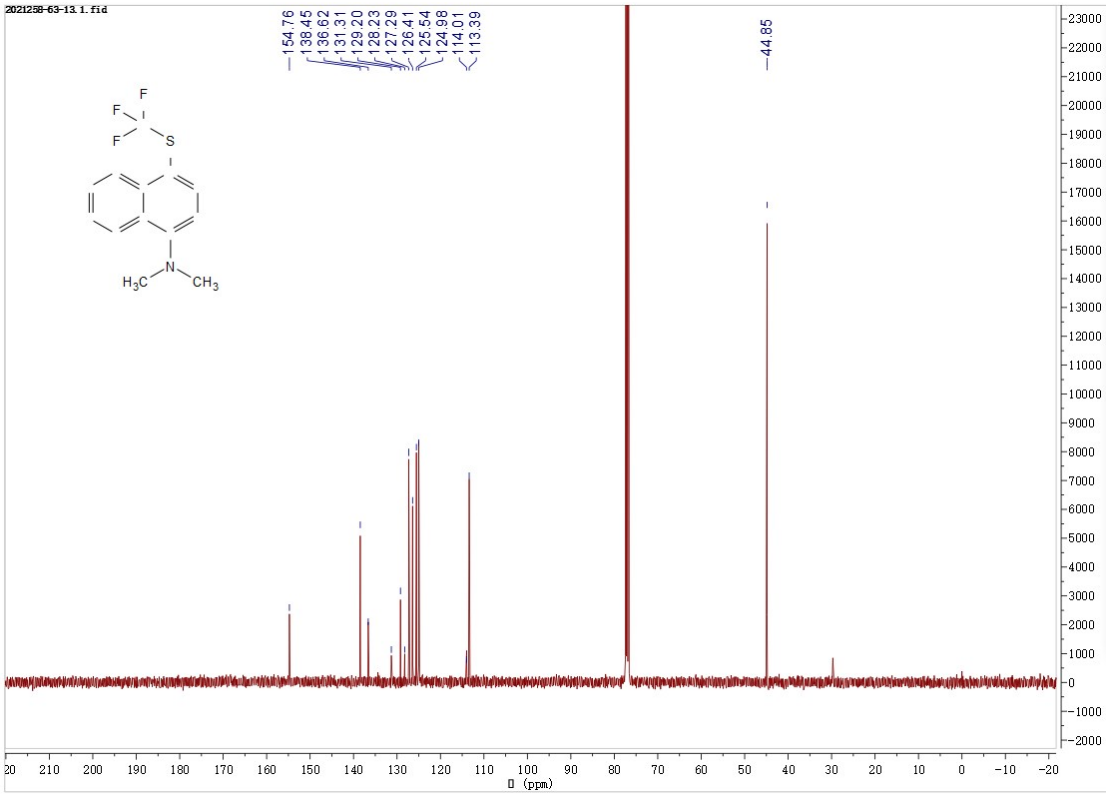

2021258-17-1_PROTON_01
2021258-17-1
7.49
7.47
7.26
6.90
6.87
3.29
3.27
3.26
1.72
1.71
1.69
1.68
1.67
1.65
1.65
1.65
1.64
1.63
1.62
1.61
1.60
1.59
SCF3
N
1.79
1.92
3.83
6.00
11.5 10.5 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

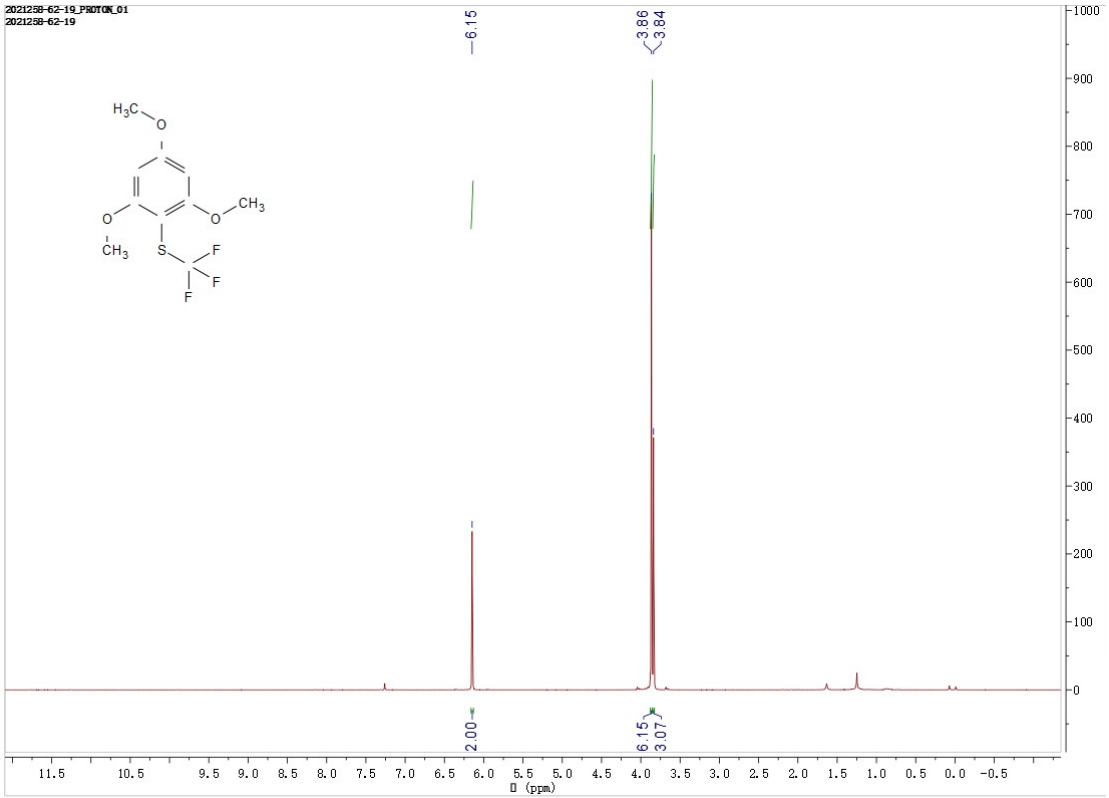

2021258-17-1_FLUORINE_01
2021258-17-1
-44.35
SCF3
N
f1 (ppm)

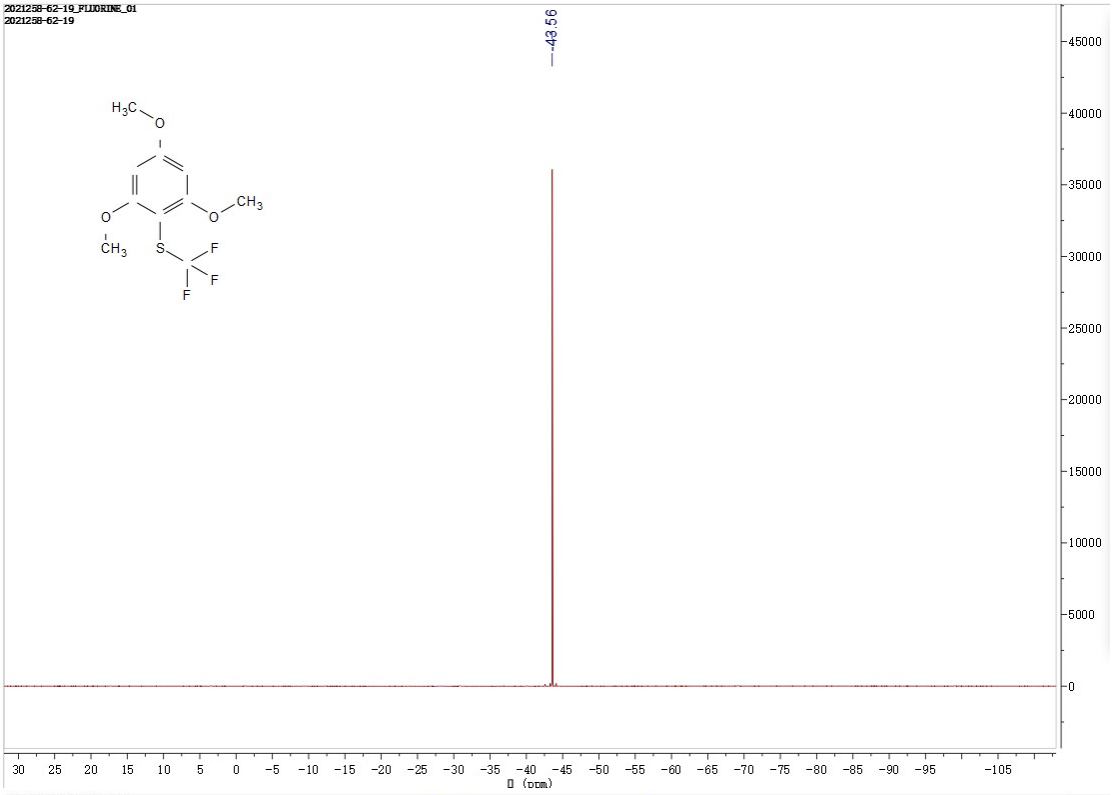

2021258-17-1.1.fid
153.44
138.02
134.52
131.45
128.39
125.32
115.65
110.74
77.48
77.16
76.84
49.20
25.58
24.38
SCF3
N
f1 (ppm)

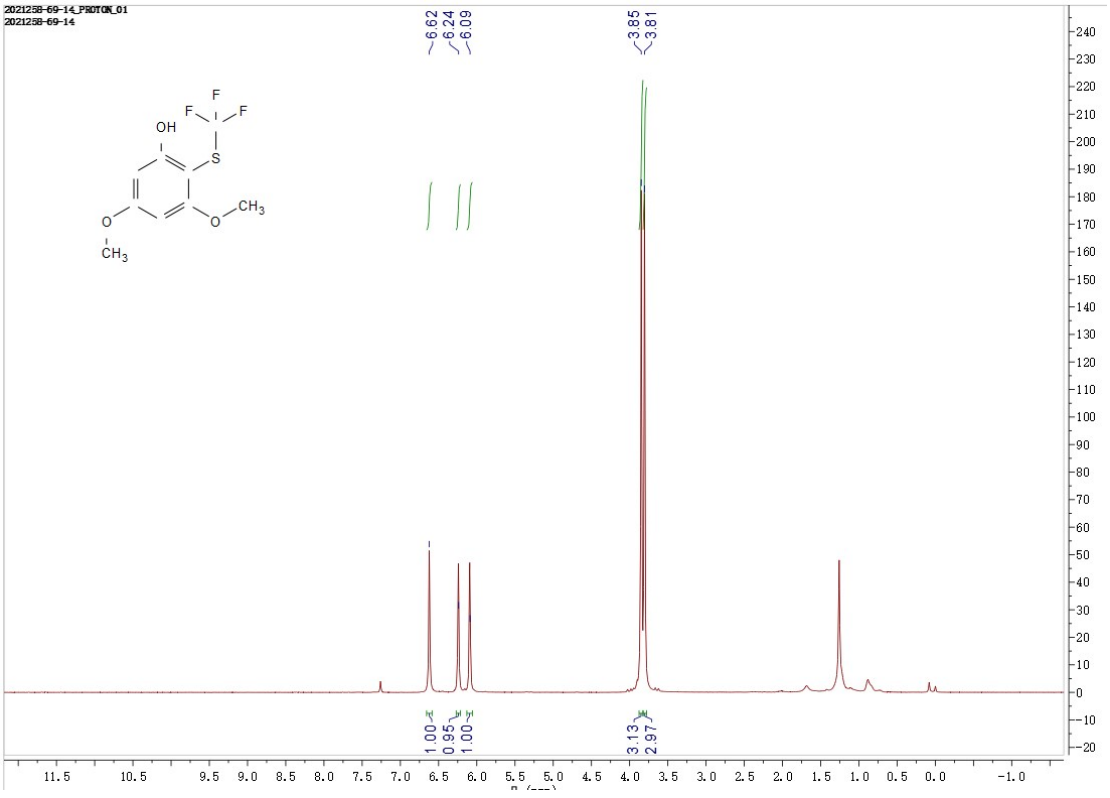

2021258-63-13_PROTON_01
2021258-63-13
8.54
8.52
8.26
8.24
7.88
7.86
7.64
7.62
7.60
7.56
7.55
7.53
7.26
7.04
7.02
2.96
F
F
F
S
N
H3C
CH3
0.96
1.02
1.00
1.02
1.01
1.07
6.16
(ppm)

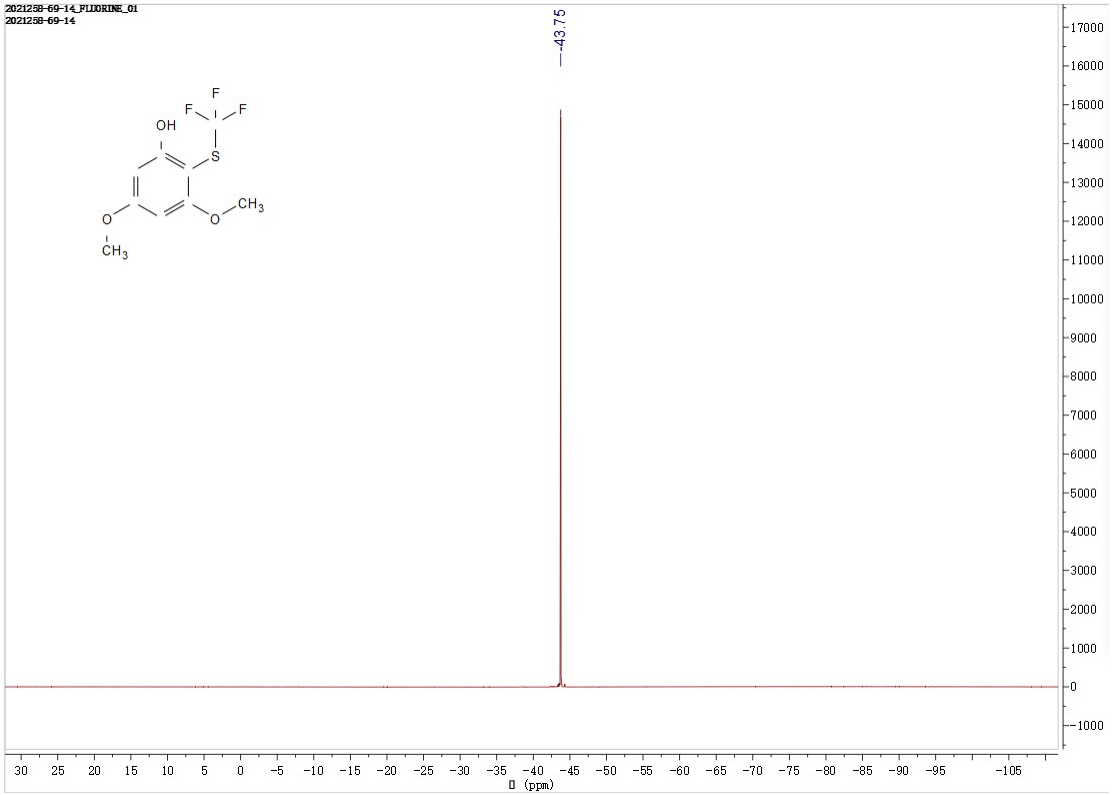

2021258-63-13_FLUORINE_01
2021258-63-13
-43.05
F
F
F
S
N
H3C
CH3
(ppm)

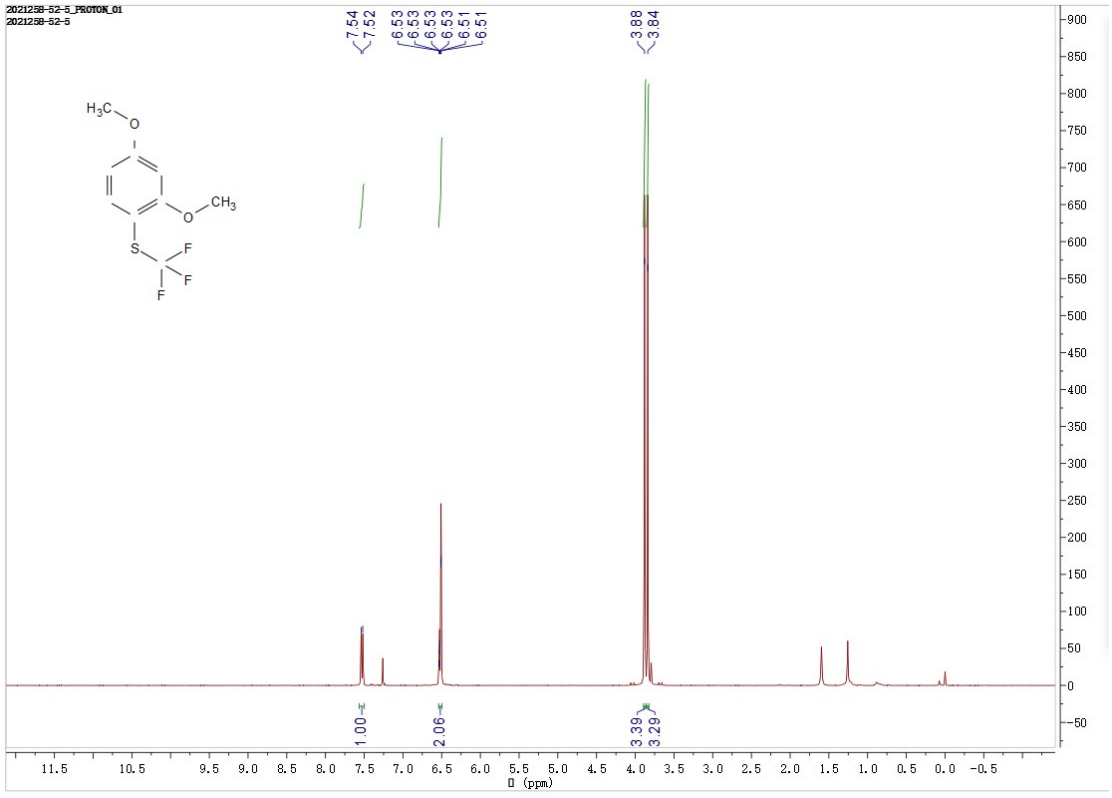

2021258-63-13.1.fid
154.76
138.45
136.62
131.31
129.20
128.23
127.29
126.41
125.54
124.98
114.01
113.39
44.85
F
F
F
S
N
H3C
CH3
(ppm)

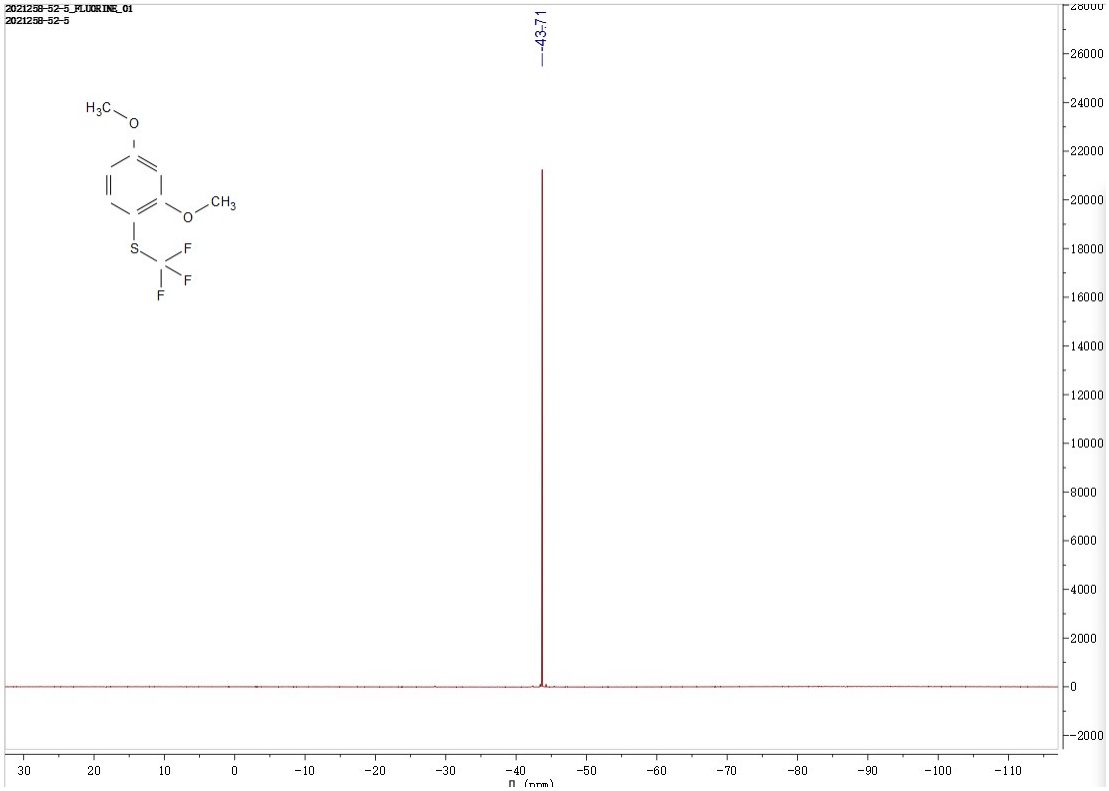

2021258-62-19_PROTON_01
2021258-62-19
6.15
3.86
3.84
H3C
O
O
CH3
O
CH3
S
F
F
F
2.00
6.15
3.07
(ppm)

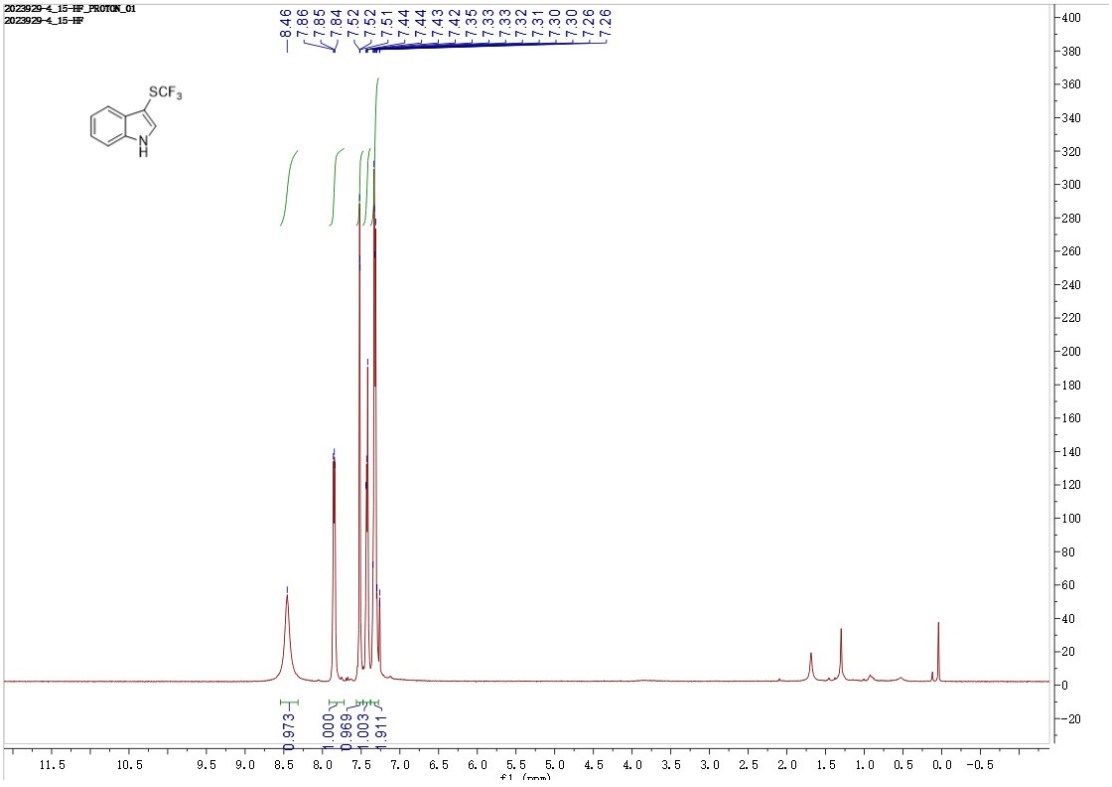

2021258-62-19_FLUORINE_01
2021258-62-19
-43.56
H3C
O
O
CH3
O
CH3
S
F
F
F
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85 -90 -95 -105
f1 (ppm)

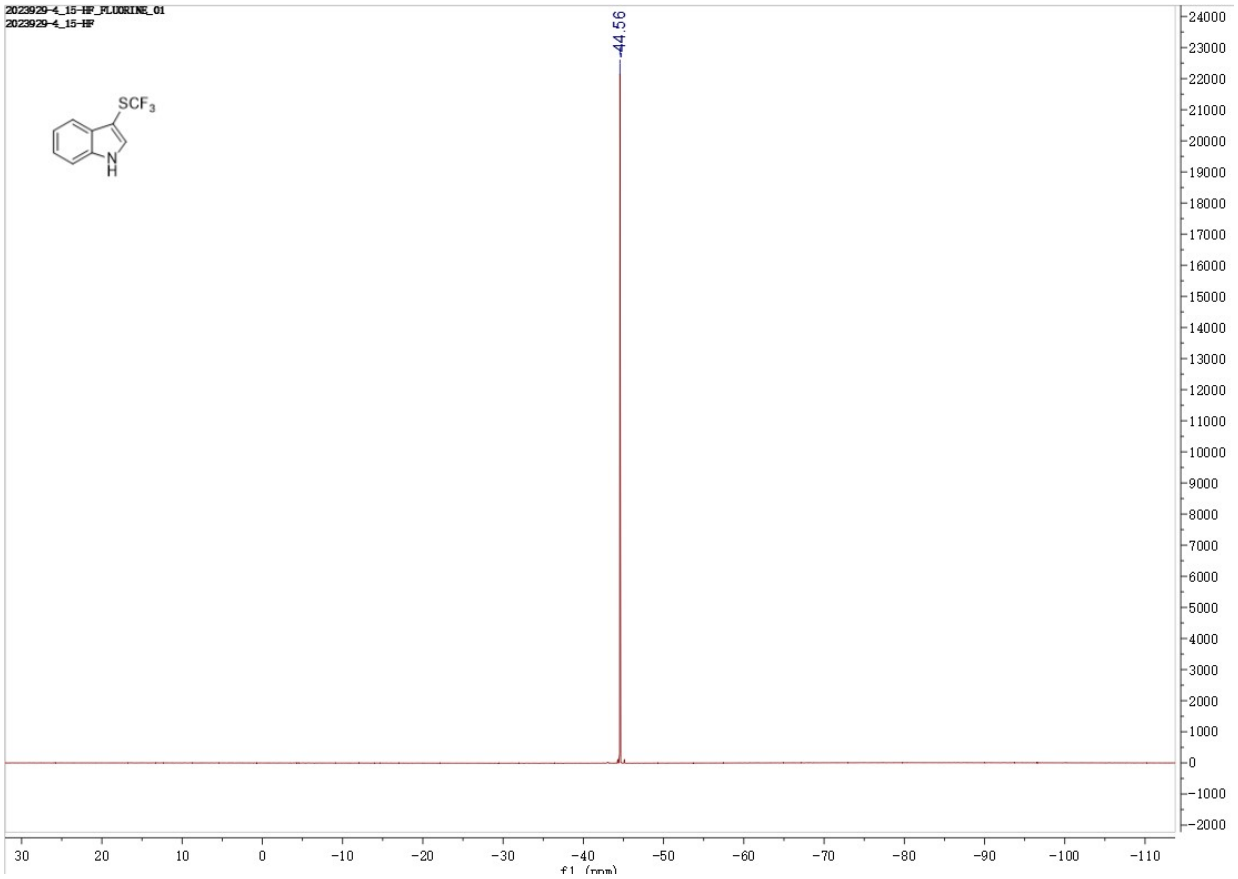

2021258-69-14_PROTON_01
2021258-69-14
6.62
6.24
6.09
3.85
3.81
F
F
F
OH
S
O
CH3
O
CH3
1.00
0.95
1.00
3.13
2.97
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
11.5 10.5 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -1.0

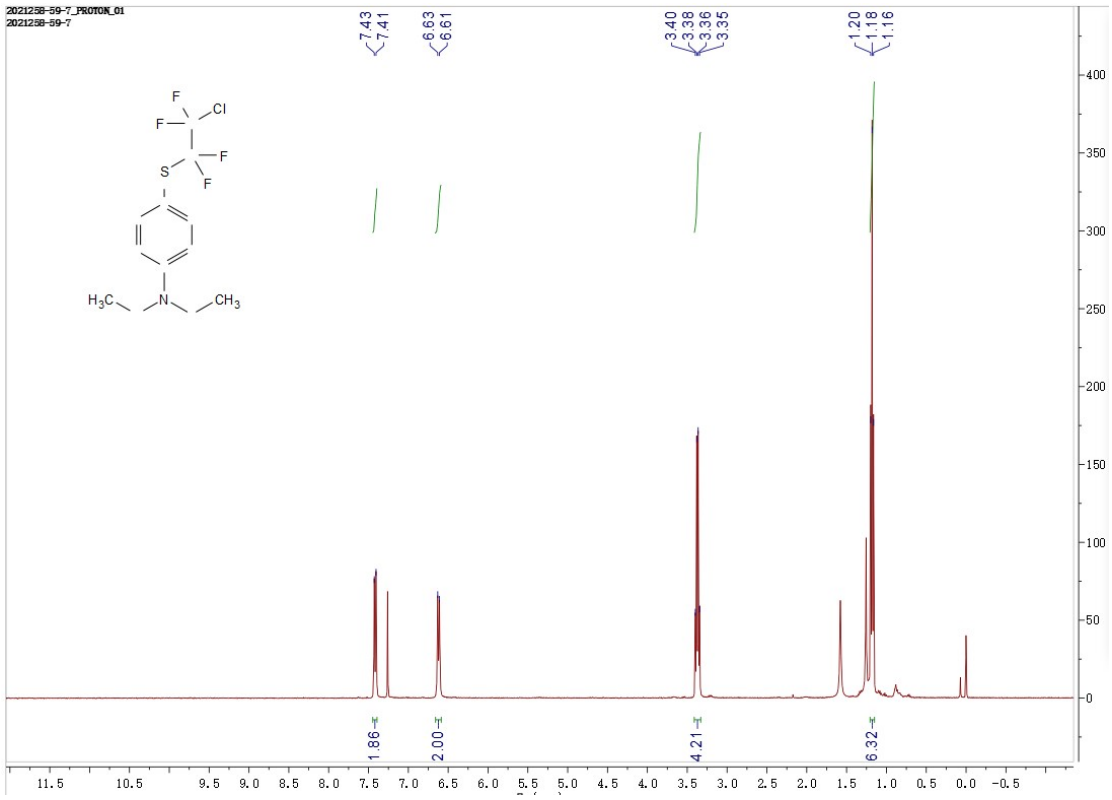

2021258-69-14_FLUORINE_01
2021258-69-14
-43.75
F
F
F
OH
S
O
CH3
O
CH3
f1 (ppm)

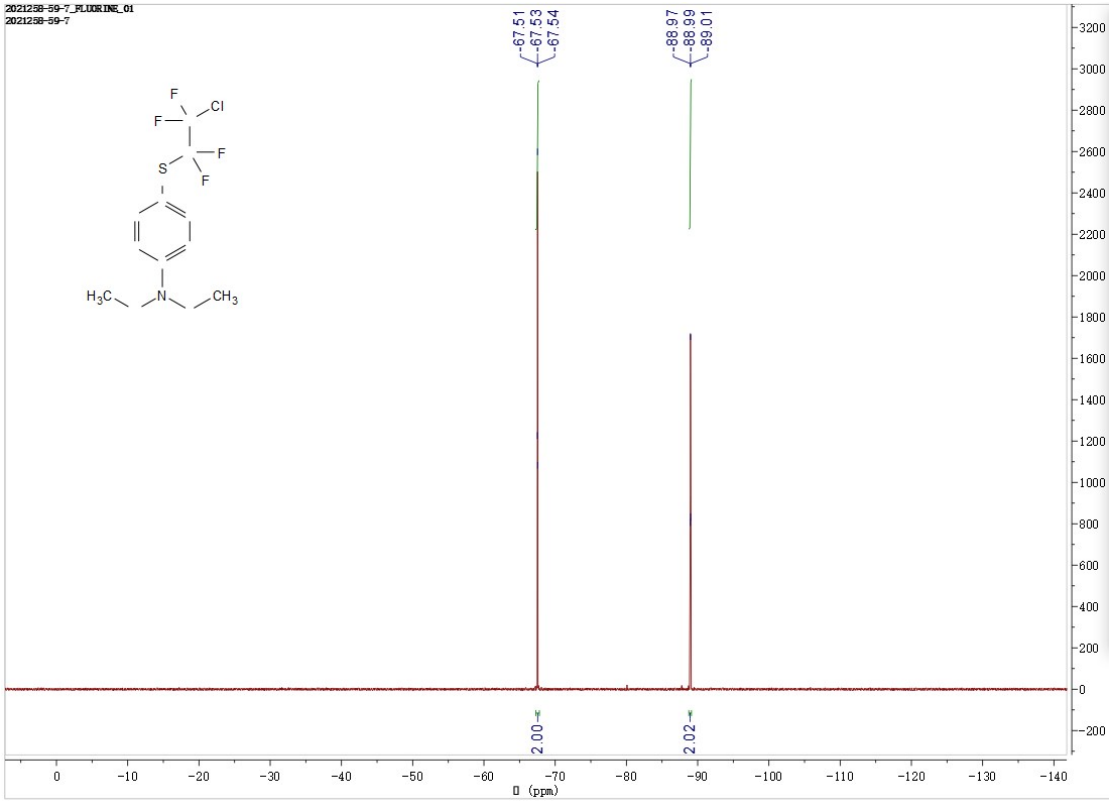

2021258-52-5_PROTON_01
2021258-52-5
7.54
7.52
6.53
6.53
6.53
6.51
6.51
3.88
3.84
H3C
O
O
CH3
S
F
F
F
1.00
2.06
3.39
3.29
f1 (ppm)

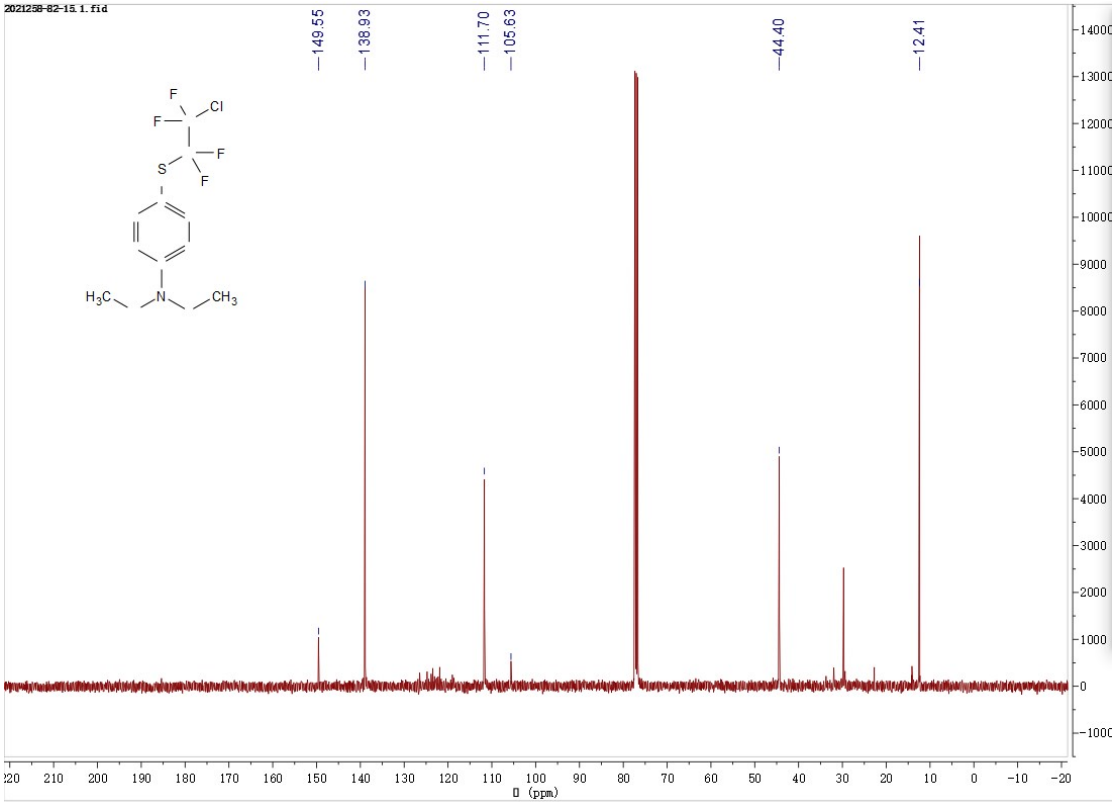

2021258-52-5_FLUORINE_01
2021258-52-5
-43.71
H3C
O
O
CH3
S
F
F
F

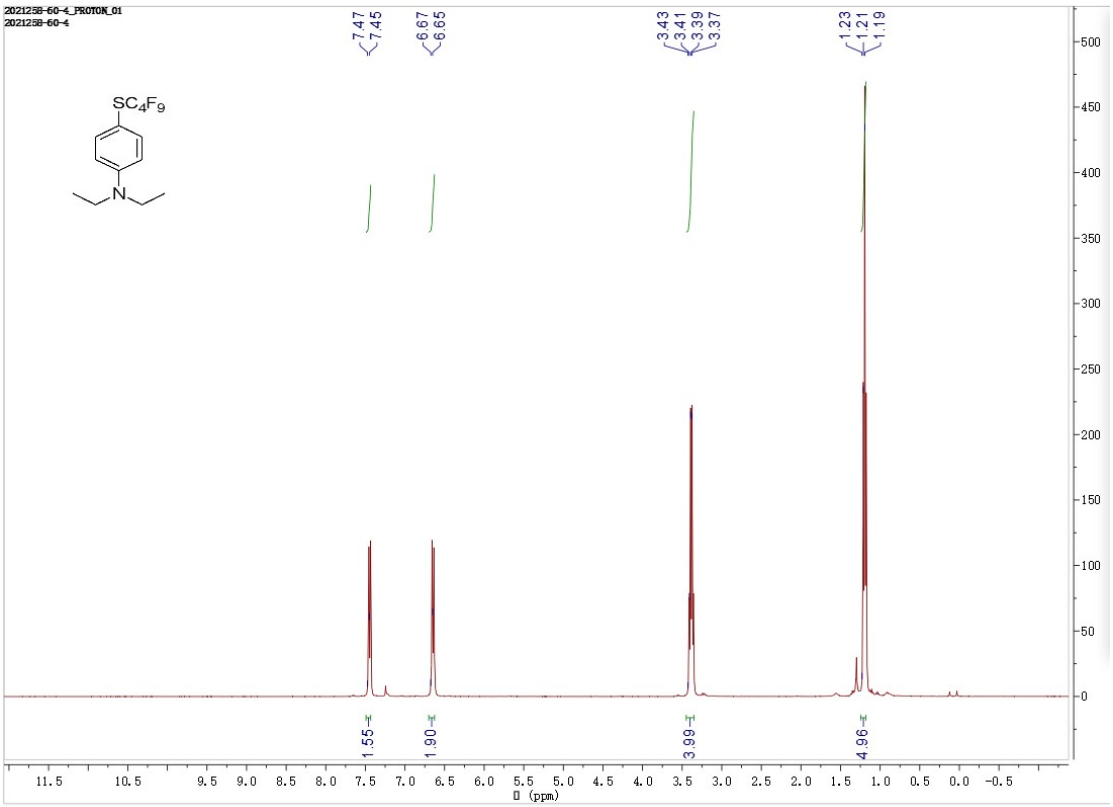

2023929-4_15-HF_PROTON_01
2023929-4_15-HF
8.46
7.86
7.85
7.84
7.52
7.52
7.51
7.44
7.44
7.43
7.42
7.35
7.33
7.33
7.32
7.31
7.30
7.30
7.26
7.26
SCF3
N
H
0.973
1.000
0.969
1.003
1.911
f1 (ppm)

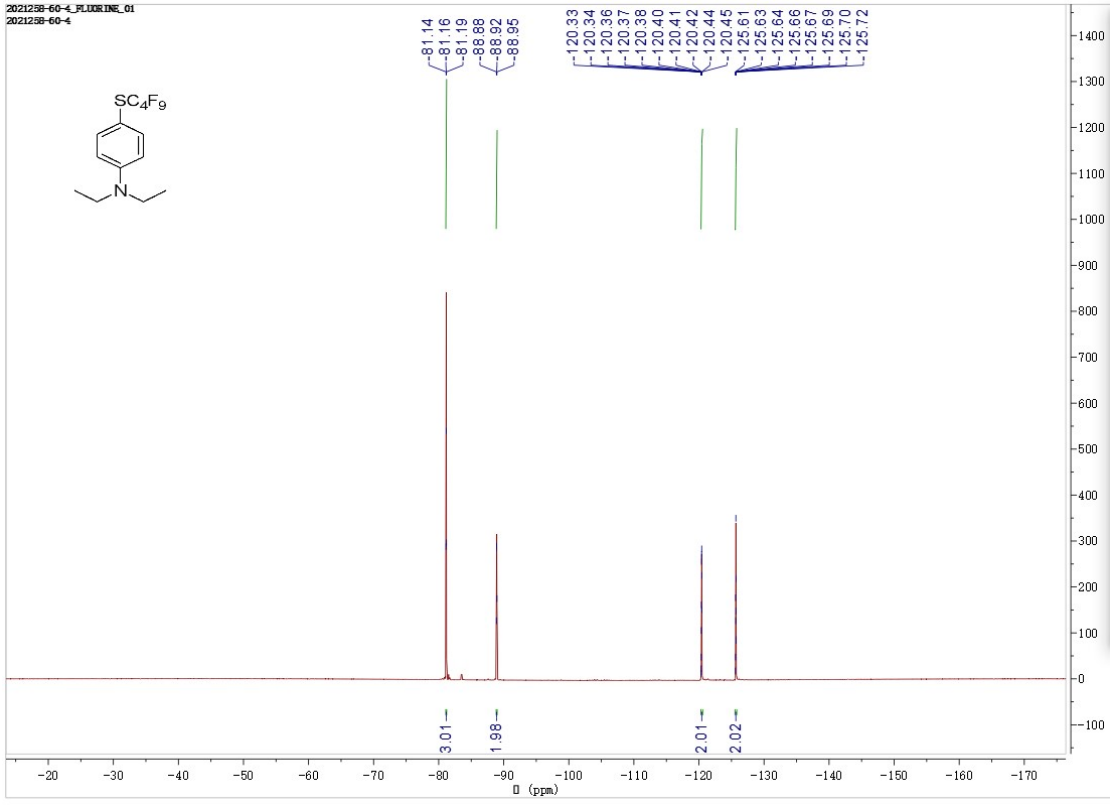

2023929-4_15-HF_FLUORINE_01
2023929-4_15-HF
SCF3
N
H
-44.56
f1 (ppm)

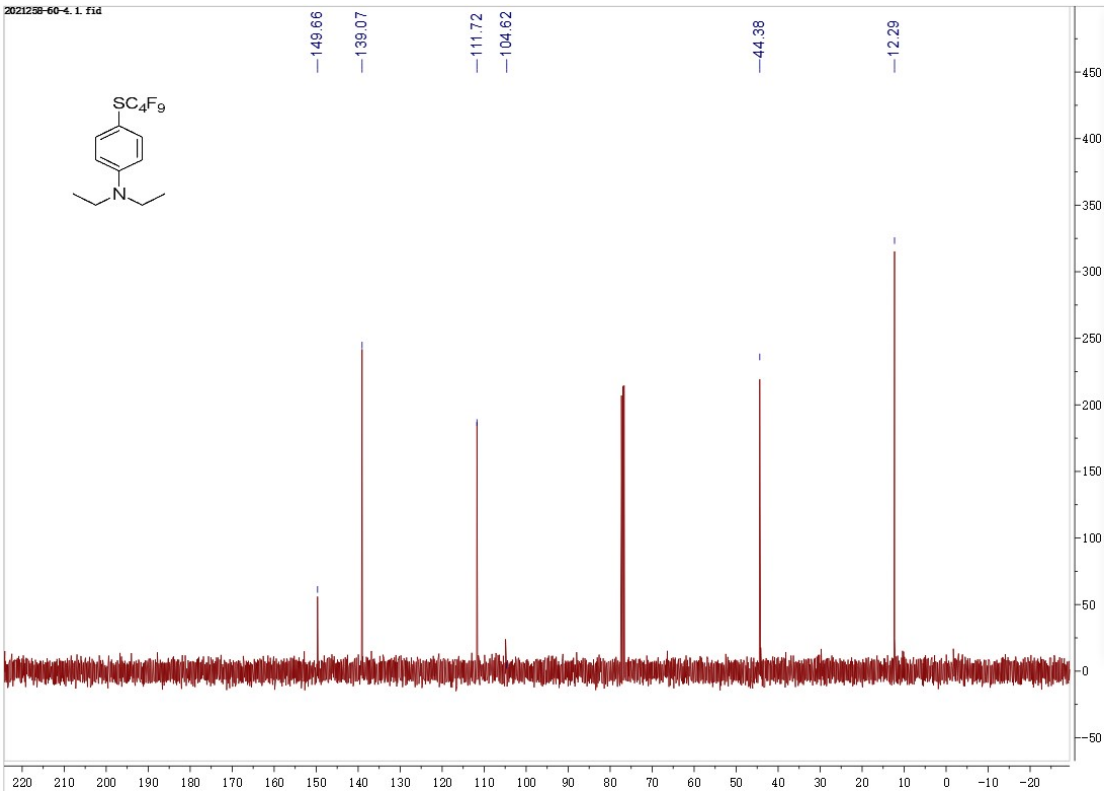

2021258-59-7_PROTON_01
2021258-59-7
7.43
7.41
6.63
6.61
3.40
3.38
3.36
3.35
1.20
1.18
1.16
F
Cl
F
S
F
F
H3C
N
CH3
1.86
2.00
4.21
6.32

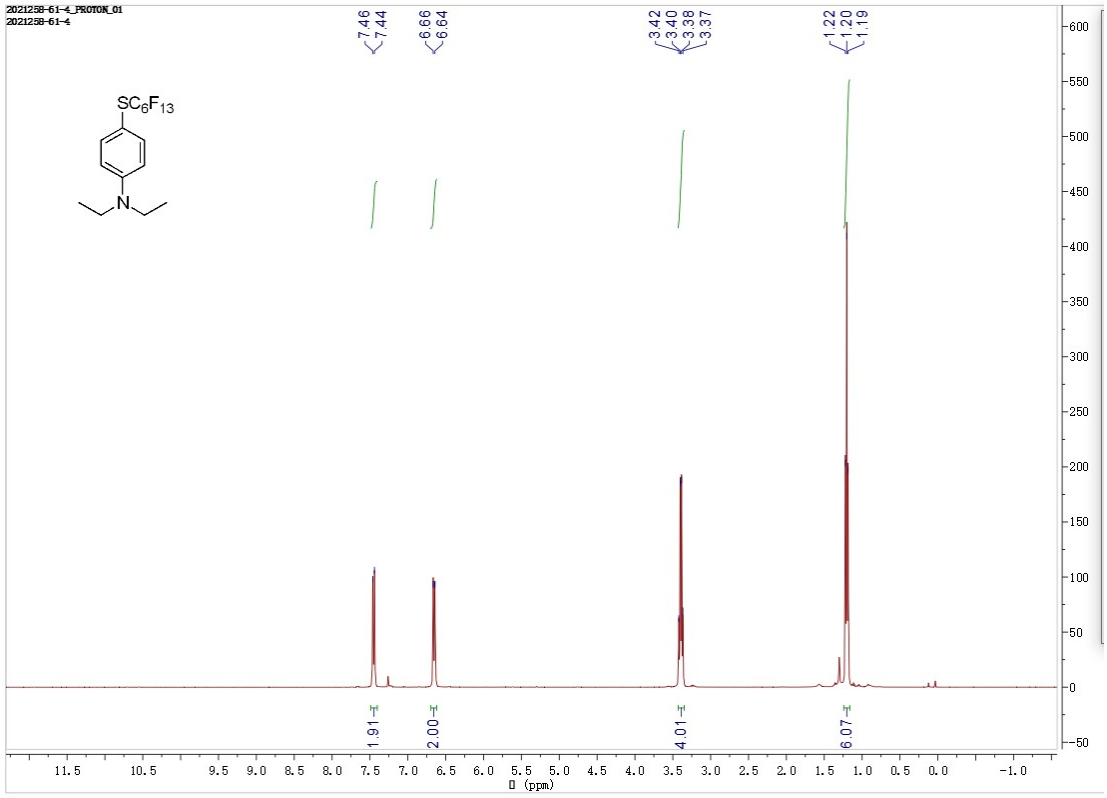

-67.51
-67.53
-67.54
-88.97
-88.99
-89.01
2.00
2.02
F
Cl
F
F
S
F
F
H3C
N
CH3
f1 (ppm)

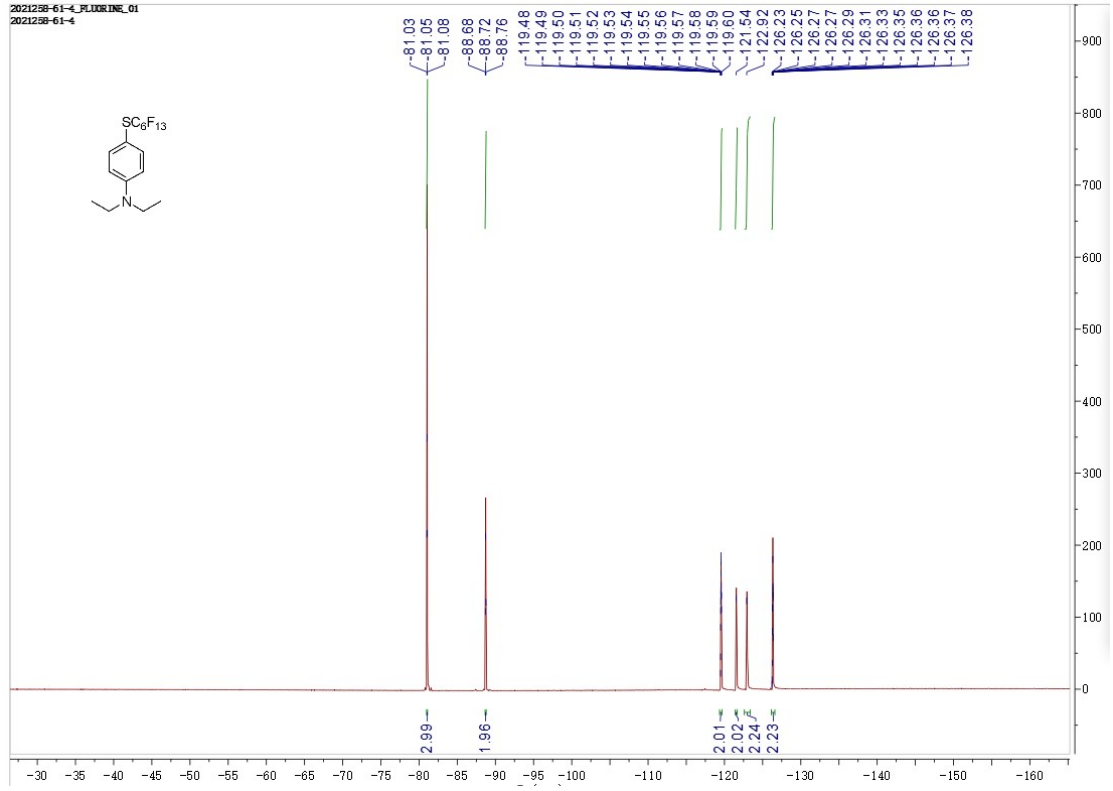

149.55
138.93
111.70
105.63
44.40
12.41
F
Cl
F
F
S
F
F
H3C
N
CH3
f1 (ppm)

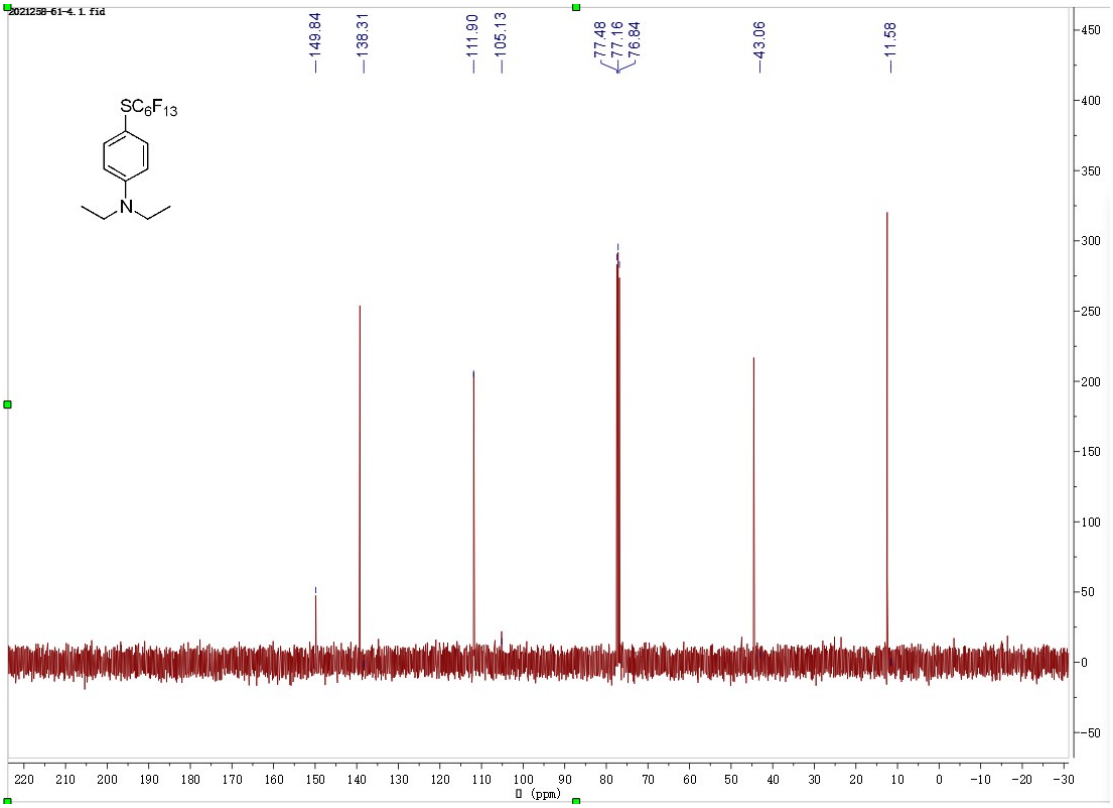

2021258-60-4_PROTON_01
2021258-60-4
7.47
7.45
6.67
6.65
3.43
3.41
3.39
3.37
1.23
1.21
1.19
SC4F9
N
1.55
1.90
3.99
4.96
δ (ppm)

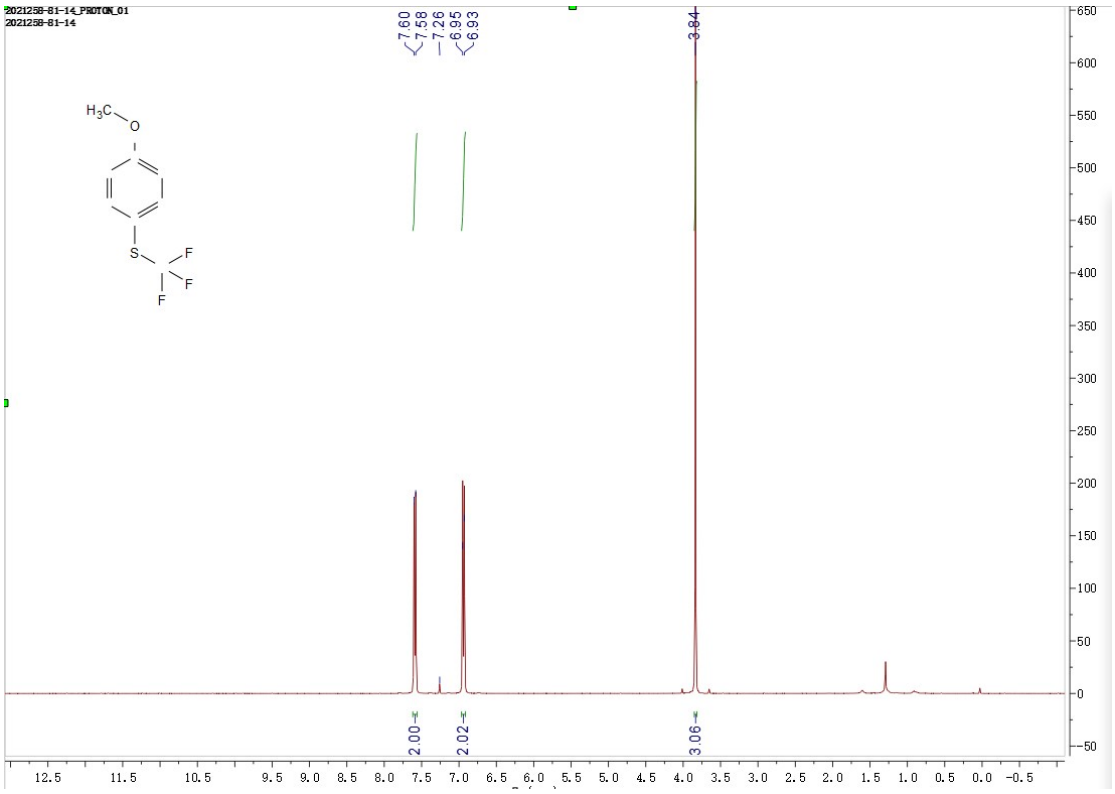

2021258-60-4_FLUORINE_01
2021258-60-4
-81.14
-81.16
-81.19
-88.88
-88.92
-88.95
-120.33
-120.34
-120.36
-120.37
-120.38
-120.40
-120.41
-120.42
-120.44
-120.45
-125.61
-125.63
-125.64
-125.66
-125.67
-125.69
-125.70
-125.72
SC4F9
N
3.01
1.98
2.01
2.02
δ (ppm)

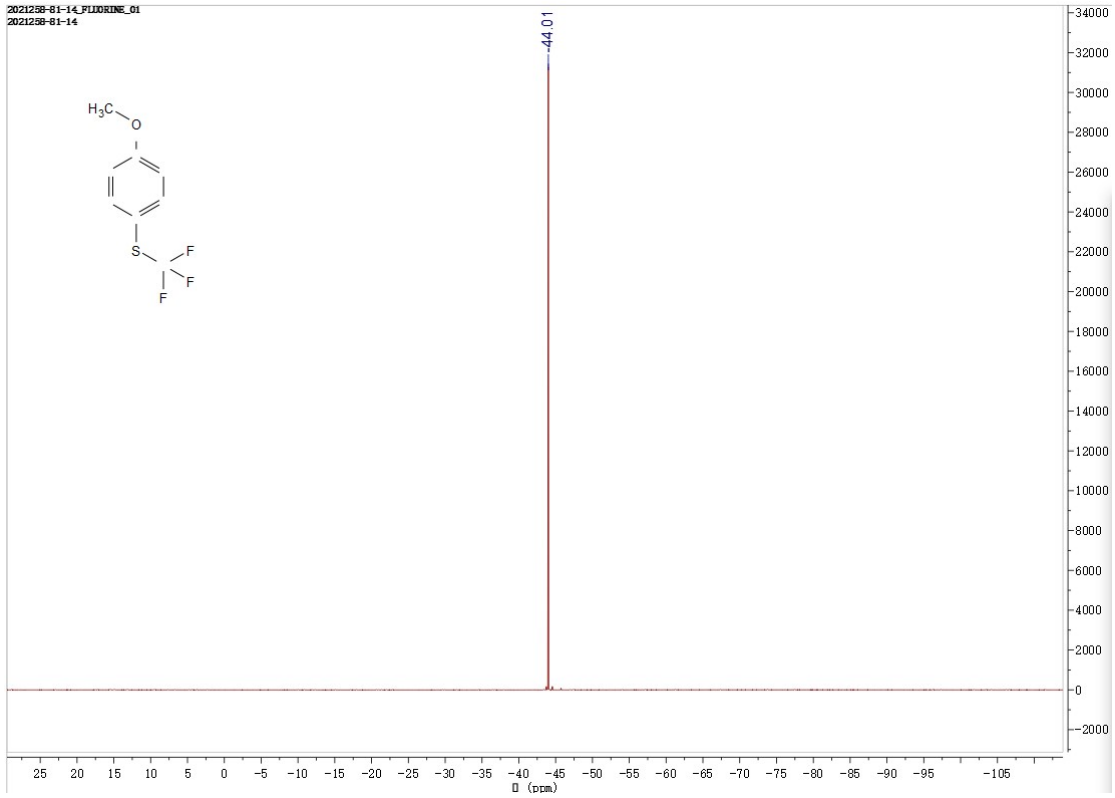

2021258-60-4.1.fid
149.66
139.07
111.72
104.62
44.38
12.29
SC4F9
N

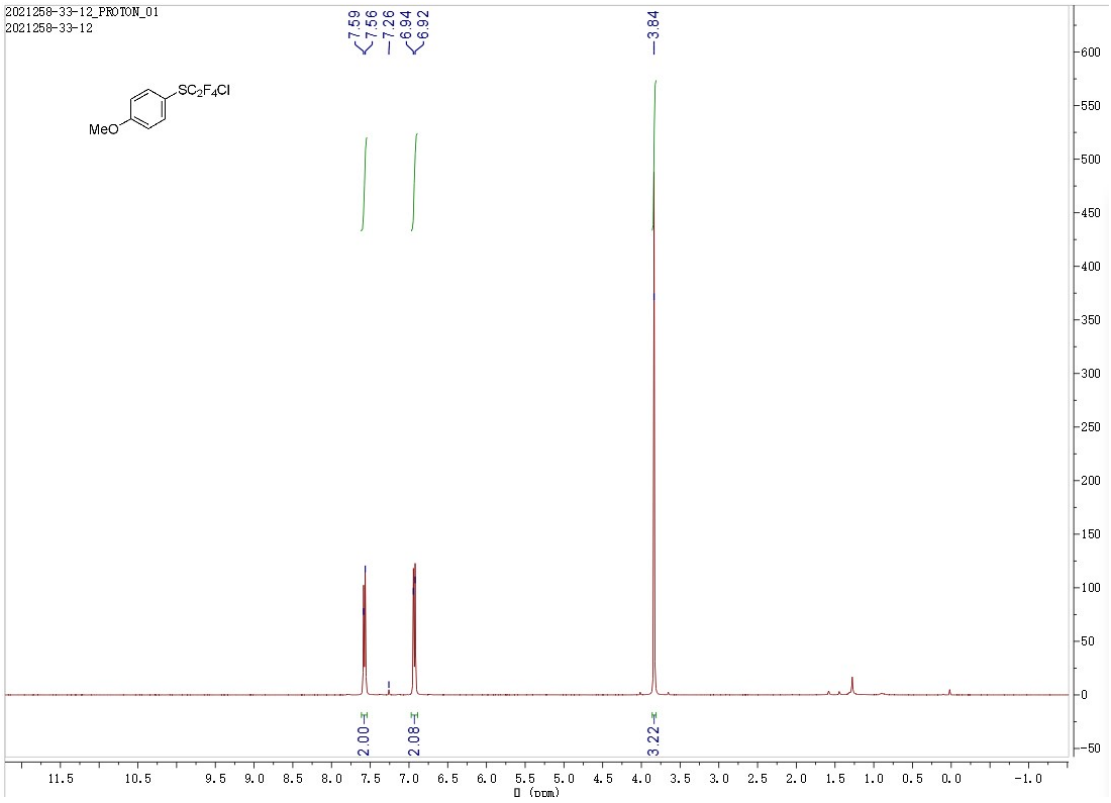

2021258-61-4_PROTON_01
2021258-61-4
7.46
7.44
6.66
6.64
3.42
3.40
3.38
3.37
1.22
1.20
1.19
SC6F13
N
1.91
2.00
4.01
6.07
f1 (ppm)

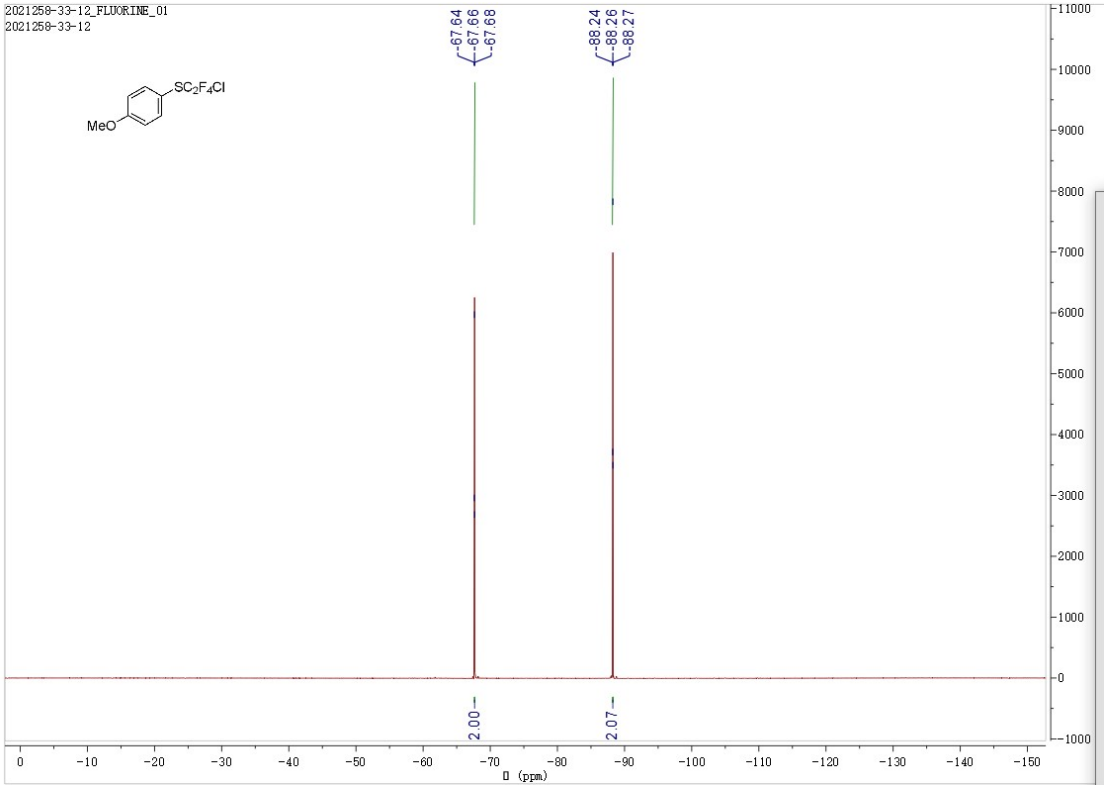

2021258-61-4_FLUORINE_01
2021258-61-4
SC6F13
N
-81.03
-81.05
-81.08
-88.68
-88.72
-88.76
-119.48
-119.49
-119.50
-119.51
-119.52
-119.53
-119.54
-119.55
-119.56
-119.57
-119.58
-119.59
-119.60
-121.54
-122.92
-126.23
-126.25
-126.27
-126.27
-126.29
-126.31
-126.33
-126.35
-126.36
-126.36
-126.37
-126.38
2.99
1.96
2.01
2.02
2.24
2.23

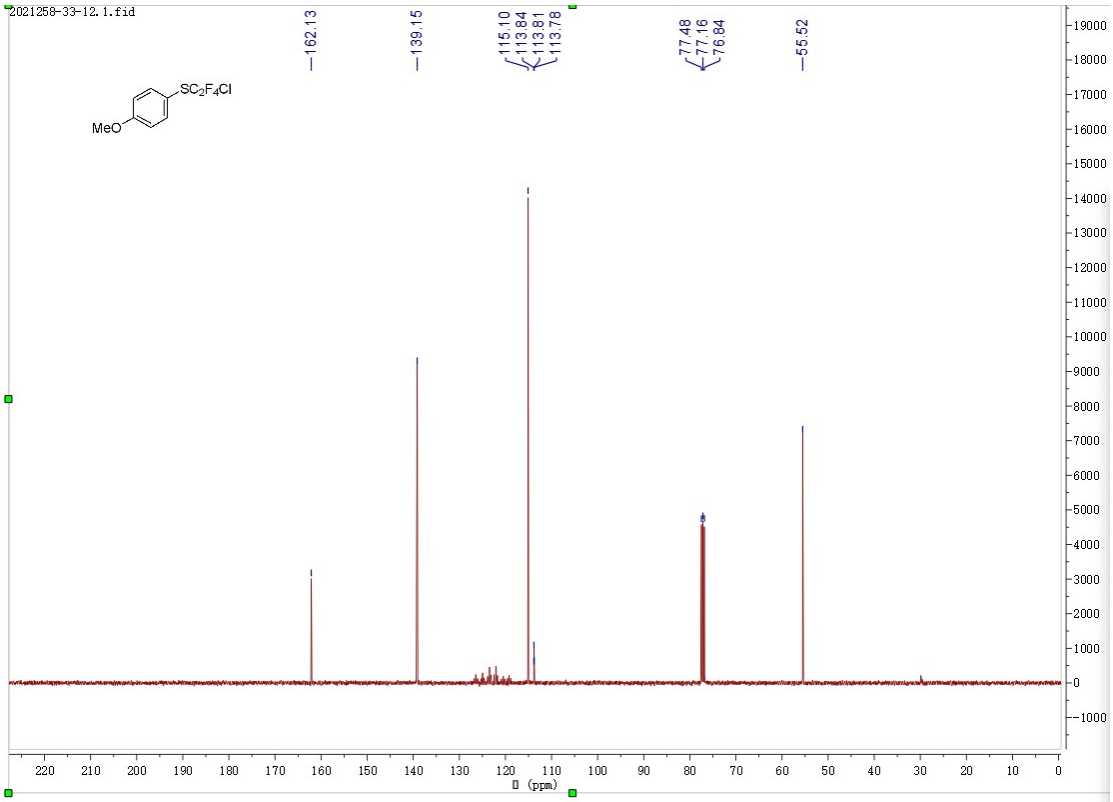

2021258-61-4_1.fid
SC6F13
N
-149.84
-138.31
-111.90
-105.13
-77.48
-77.16
-76.84
-43.06
-11.58
δ (ppm)

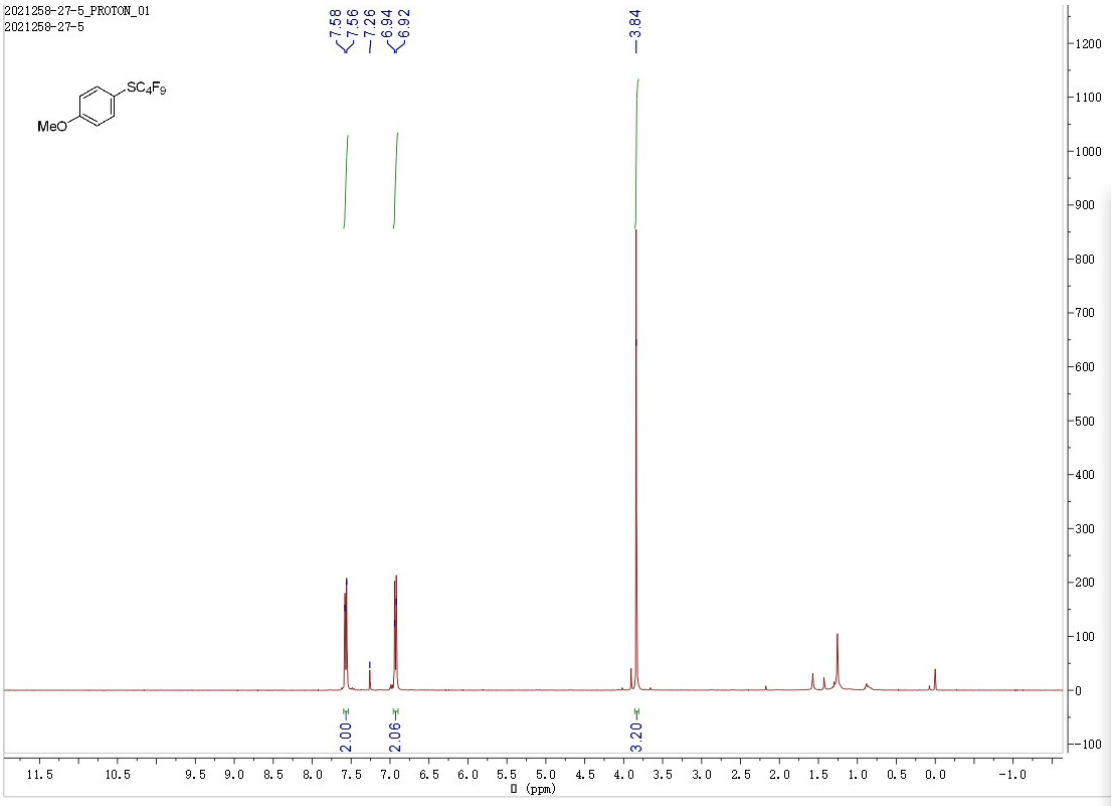

2021258-81-14_PROTON_01
2021258-81-14
7.60
7.58
7.26
6.95
6.93
3.84
2.00
2.02
3.06

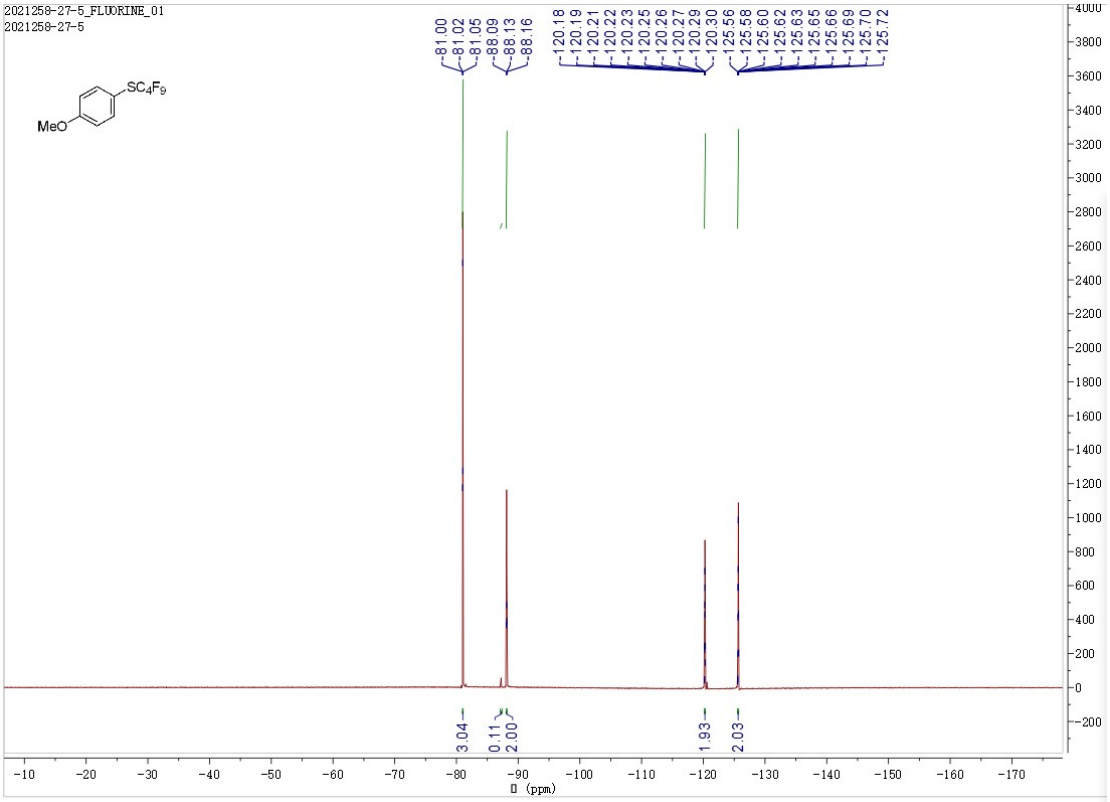

2021258-81-14_FLUORINE_01
2021258-81-14
-44.01
f1 (ppm)

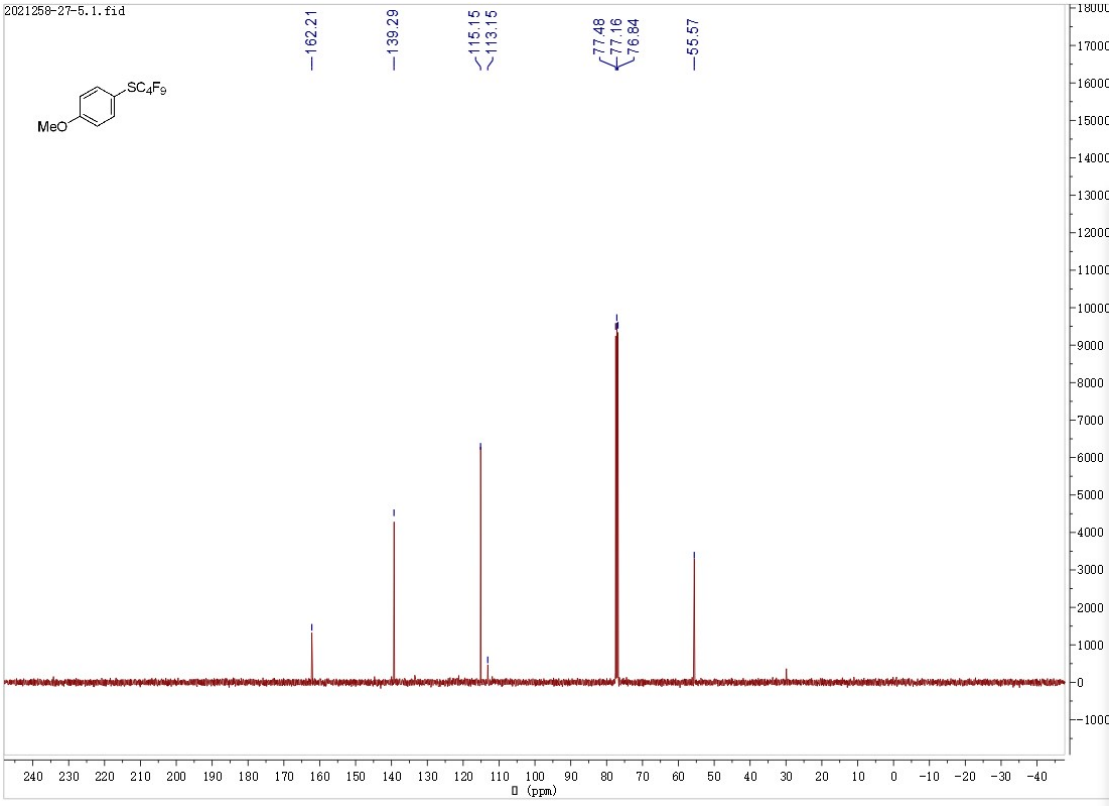

2021258-33-12_PROTON_01
2021258-33-12
SC2F4Cl
MeO
7.59
7.56
7.26
6.94
6.92
3.84
2.00
2.08
3.22
11.5
10.5
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-1.0
(ppm)

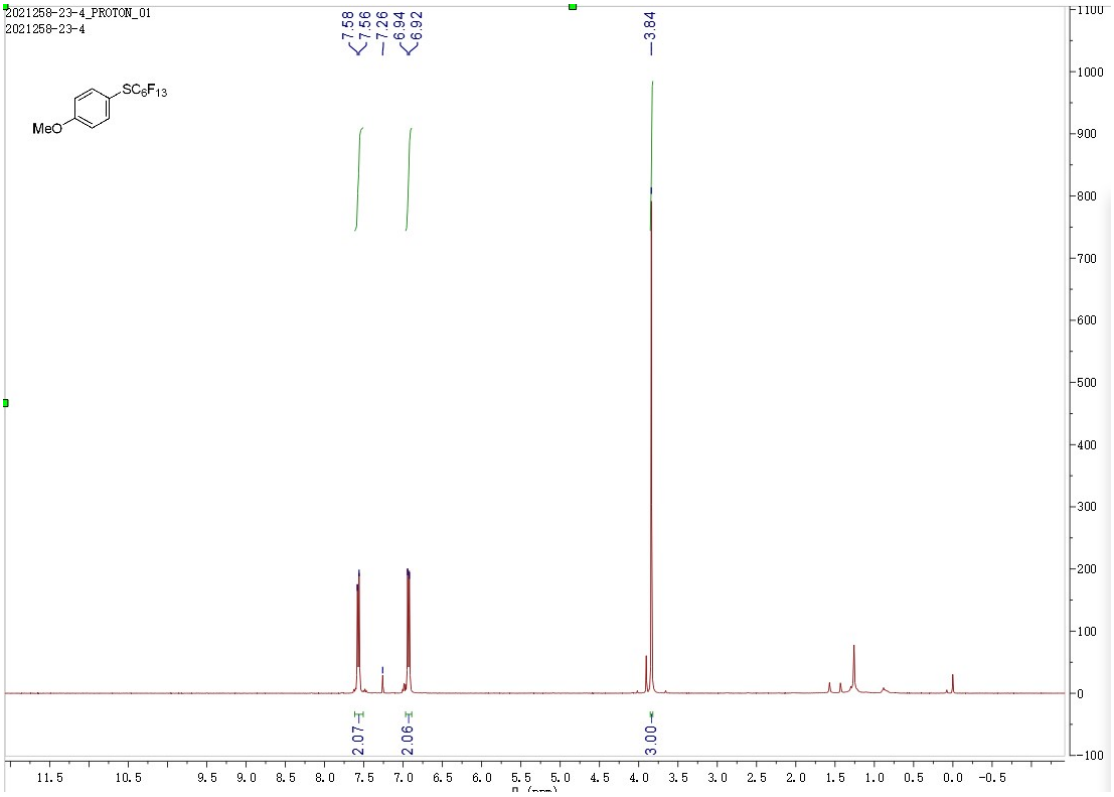

2021258-33-12_FLUORINE_01
2021258-33-12
SC2F4Cl
MeO
-67.64
-67.66
-67.68
-88.24
-88.26
-88.27
2.00
2.07
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
(ppm)

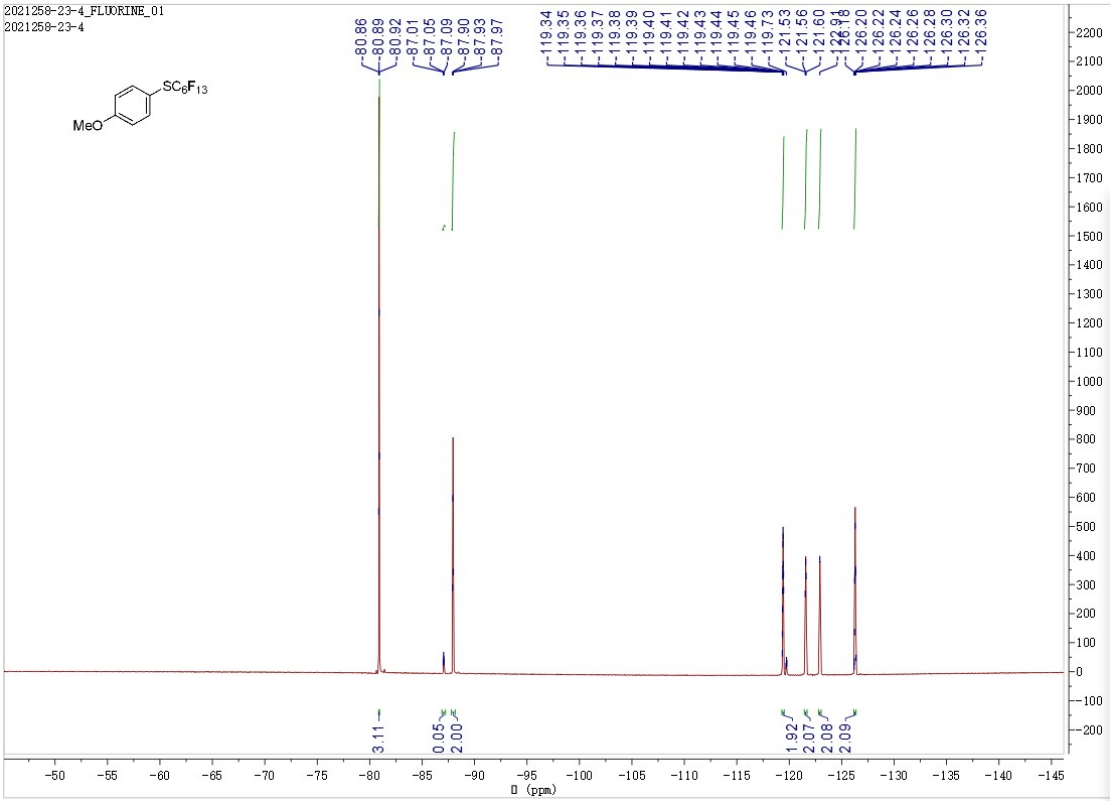

2021258-33-12.1.fid
162.13
139.15
115.10
113.84
113.81
113.78
77.48
77.16
76.84
55.52
SC2F4Cl
MeO
f1 (ppm)

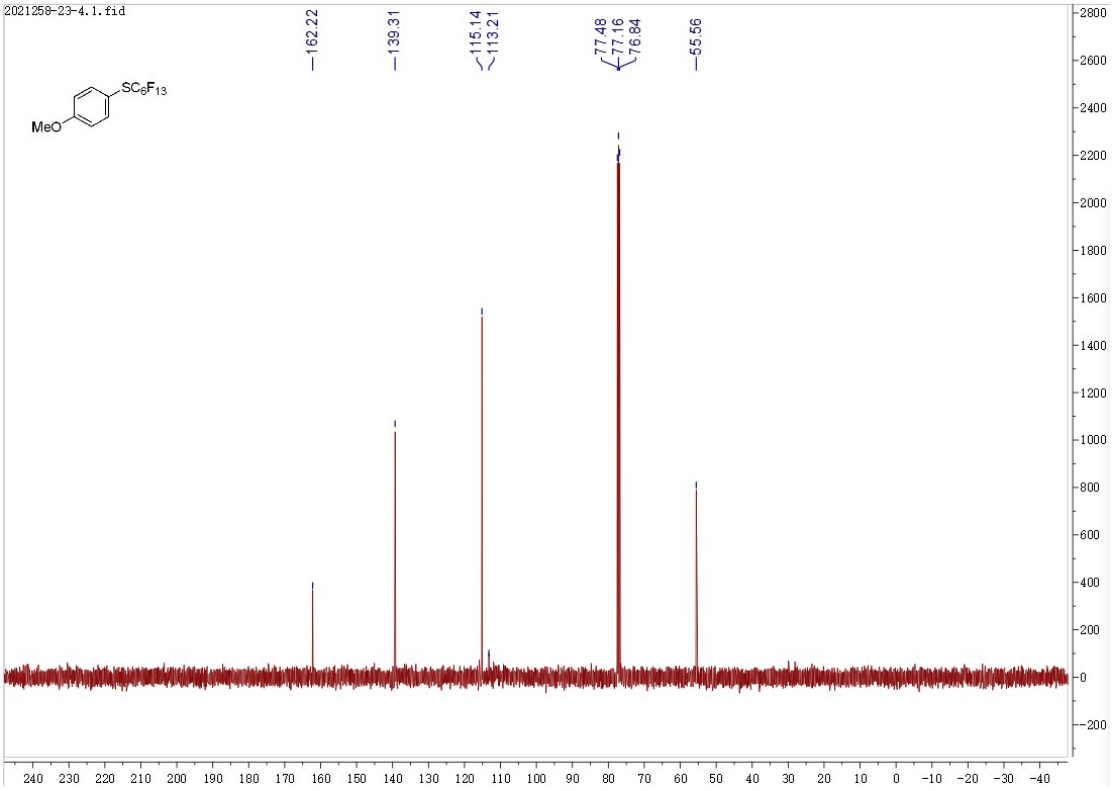

2021258-27-5_PROTON_01
2021258-27-5
7.58
7.56
7.26
6.94
6.92
3.84
SC4F9
MeO
2.00
2.06
3.20
f1 (ppm)

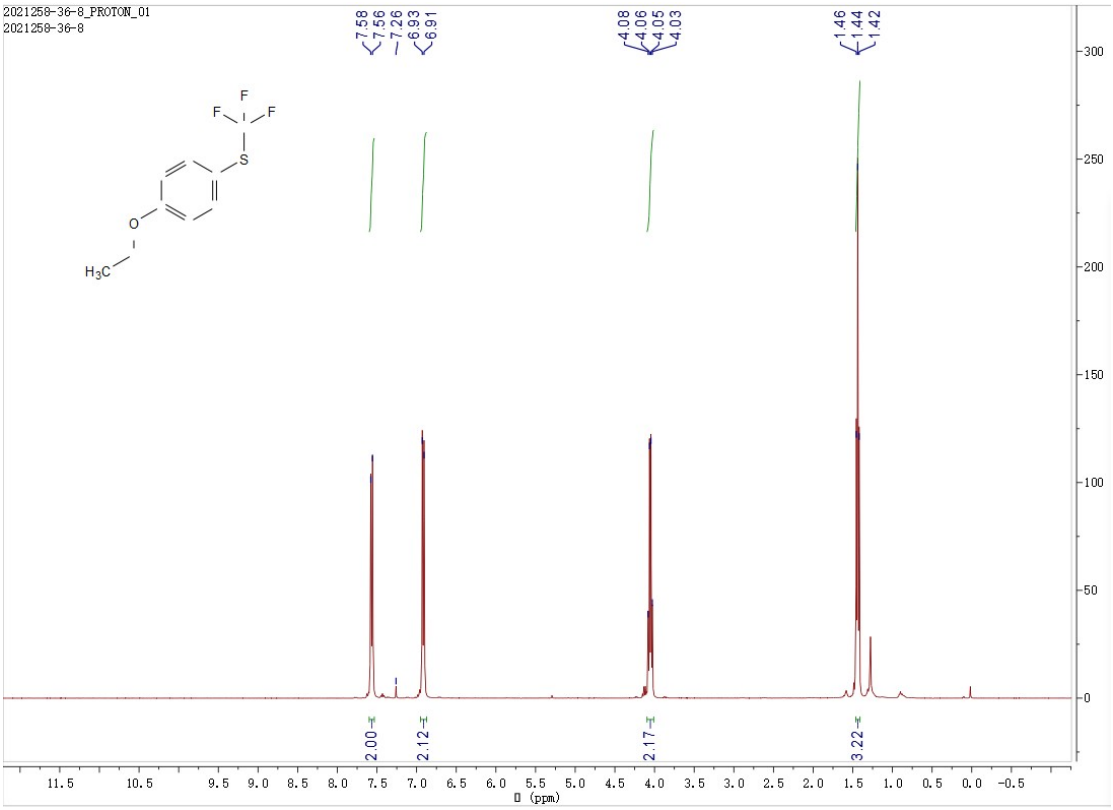

2021258-27-5_FLUORINE_01
2021258-27-5
MeO
SC4F9
-81.00
-81.02
-81.05
-88.09
-88.13
-88.16
-120.18
-120.19
-120.21
-120.22
-120.23
-120.25
-120.26
-120.27
-120.29
-120.30
-125.56
-125.58
-125.60
-125.62
-125.63
-125.65
-125.66
-125.69
-125.70
-125.72
3.04
0.11
2.00
1.93
2.03
f1 (ppm)

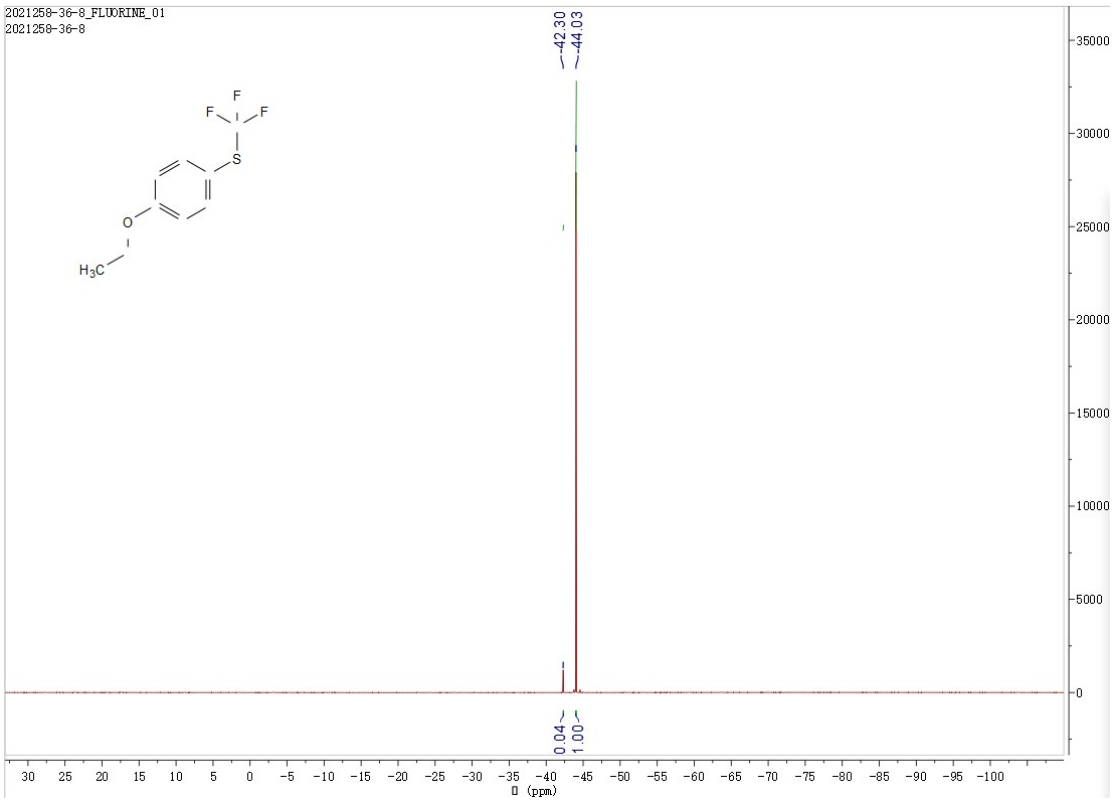

2021258-27-5.1.fid
MeO
SC4F9
162.21
139.29
115.15
113.15
77.48
77.16
76.84
55.57
f1 (ppm)

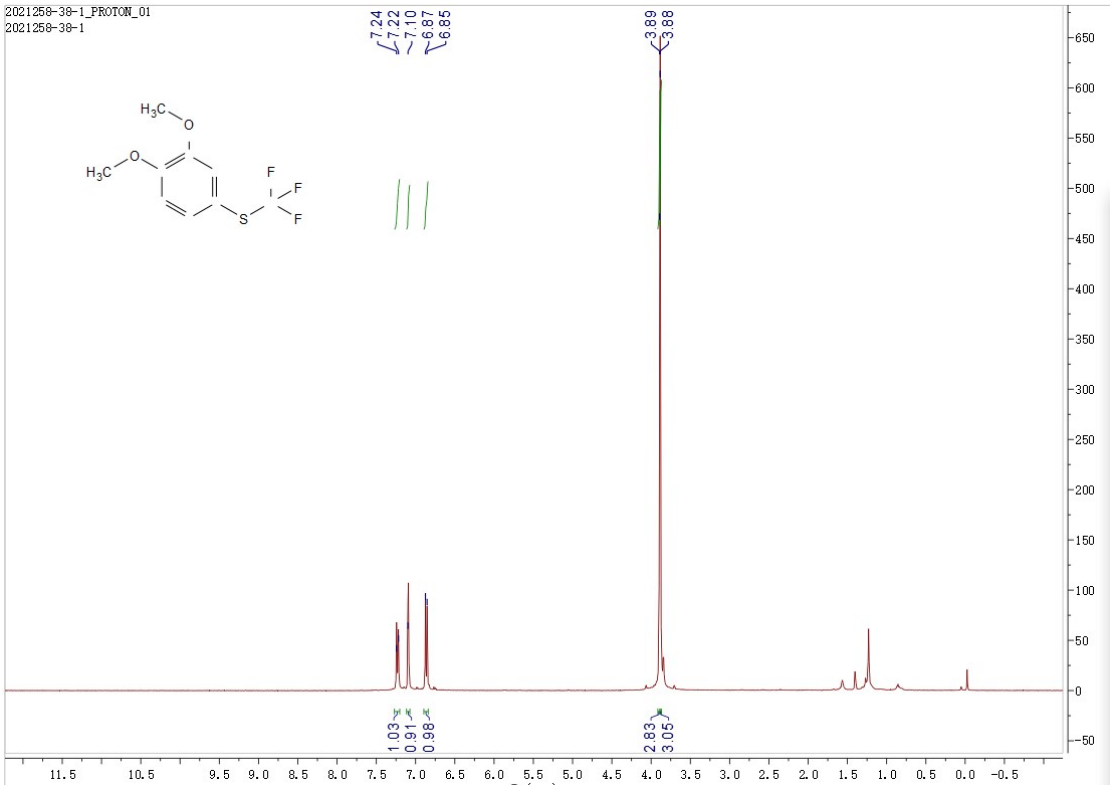

2021258-23-4_PROTON_01
2021258-23-4
7.58
7.56
7.26
6.94
6.92
3.84
MeO
SC6F13
2.07
2.06
3.00

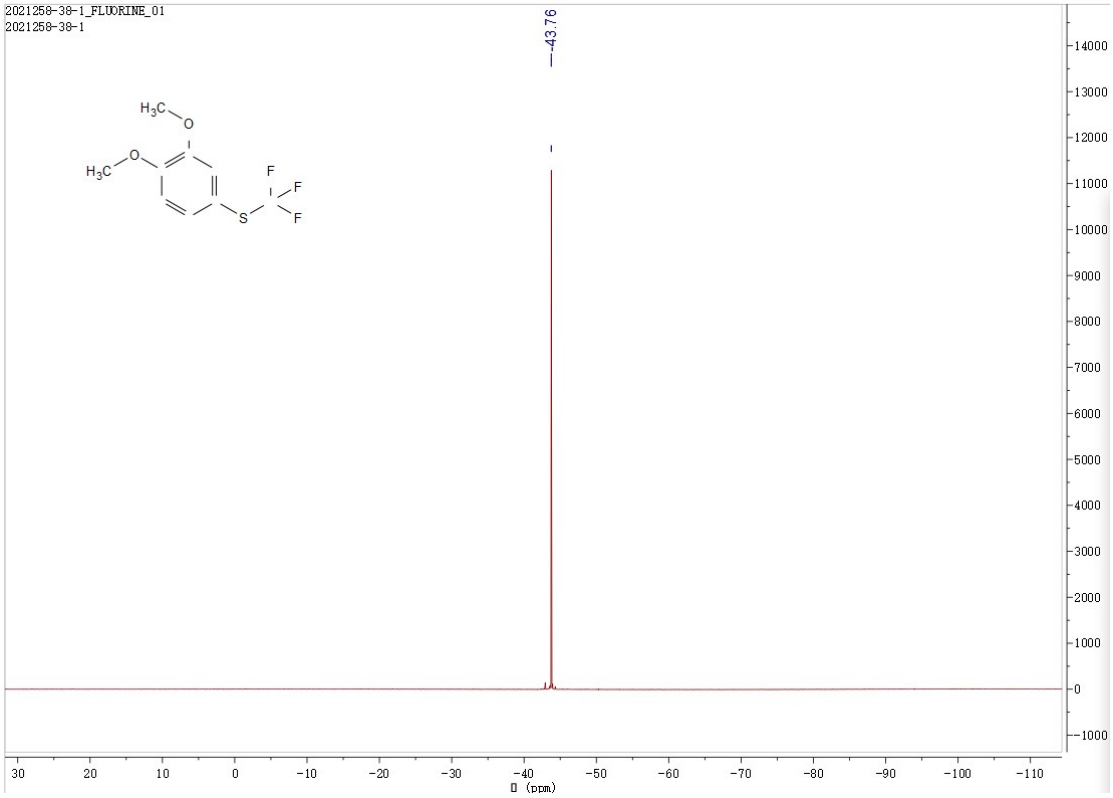

2021258-23-4_FLUORINE_01
2021258-23-4
-80.86
-80.89
-80.92
-87.01
-87.05
-87.09
-87.90
-87.93
-87.97
MeO
SC6F13
3.11
0.05
2.00
1.92
2.07
2.08
2.09
f1 (ppm)

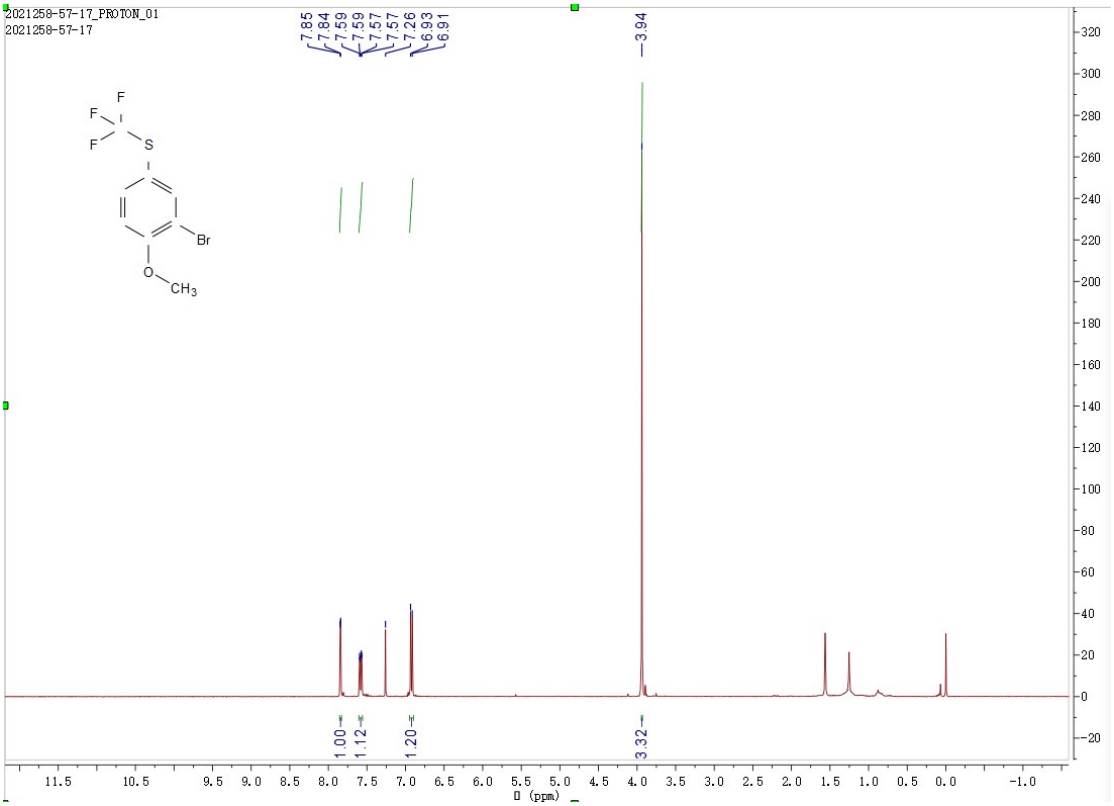

2021258-23-4.1.fid
162.22
139.31
115.14
113.21
77.48
77.16
76.84
55.56
SC6F13
MeO

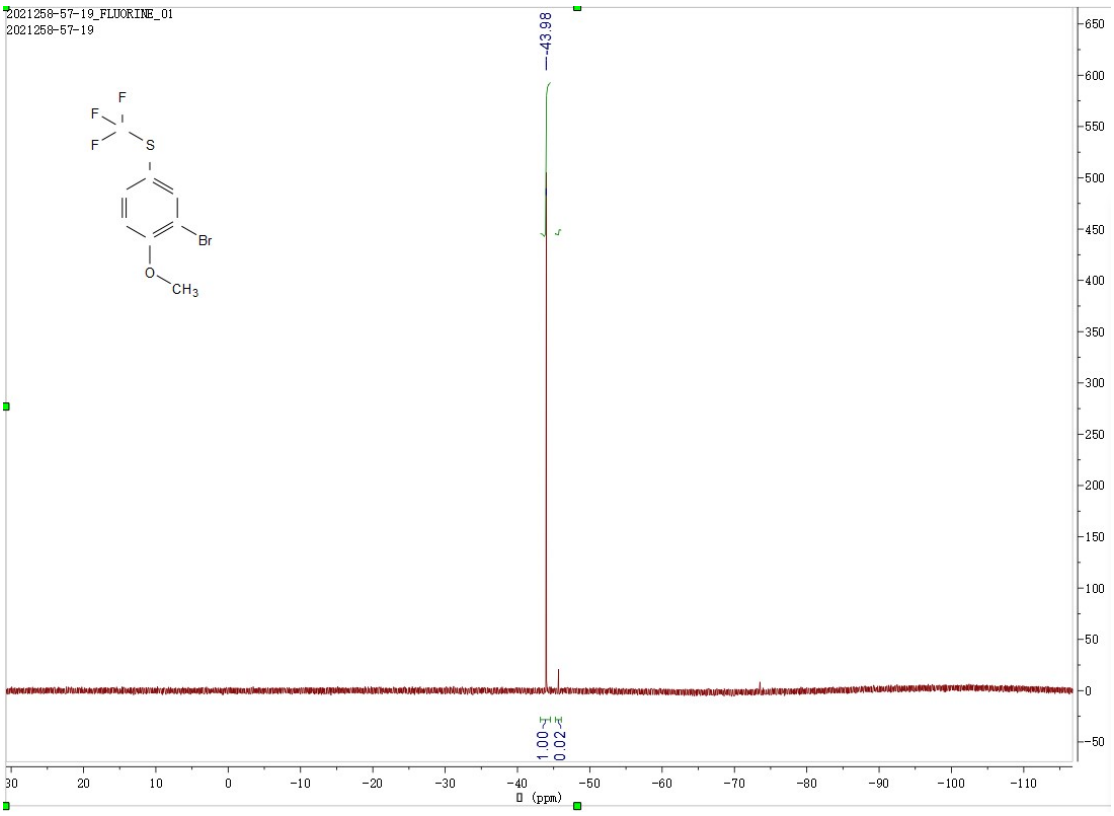

2021258-36-8_PROTON_01
2021258-36-8
7.58
7.56
7.26
6.93
6.91
4.08
4.06
4.05
4.03
1.46
1.44
1.42
2.00
2.12
2.17
3.22
F
F
F
I
S
O
H3C
(ppm)


2021258-36-8_FLUORINE_01
2021258-36-8
-42.30
-44.03
0.04
1.00
δ (ppm)


2021258-38-1_PROTON_01
2021258-38-1
7.24
7.22
7.10
6.87
6.85
3.89
3.88
1.03
0.91
0.98
2.83
3.05


2021258-38-1_FLUORINE_01
2021258-38-1
-43.76
f1 (ppm)


2021258-57-17_PROTON_01
2021258-57-17
7.85
7.84
7.59
7.59
7.57
7.57
7.26
6.93
6.91
3.94
1.00
1.12
1.20
3.32
f1 (ppm)


2021258-57-19_FLUORINE_01
2021258-57-19
-43.98
F
F
F
S
Br
O
CH3
1.00
0.02
650
600
550
500
450
400
350
300
250
200
150
100
50
0
-50
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
(ppm)