

# Supporting Information

## Three Component Hydroxyletherification and Hydroxylazidation of (Trifluoromethyl)alkenes: Access to $\alpha$ - Trifluoromethyl $\beta$ -Heteroatom Substituted Tertiary Alcohols

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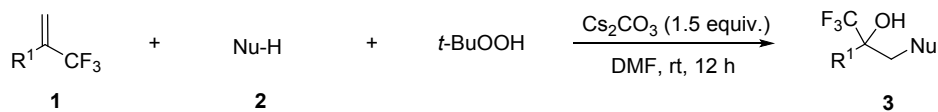
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## A. General information

Melting points were measured using a melting point instrument and are uncorrected. Chemical shifts were reported in ppm from the solvent resonance as the internal standard ( $\text{CDCl}_3$   $\delta_{\text{H}} = 7.26$  ppm,  $\delta_{\text{C}} = 77.16$  ppm). Multiplicity was indicated as follows: s (singlet), d (doublet), t (triplet), q (quartet), quint (quintet), m (multiplet). Coupling constants were reported in Hertz (Hz). IR spectra were obtained with an infrared spectrometer on either potassium bromide pellets or liquid films between two potassium bromide pellets. GC-MS data were obtained using electron ionization (Thermo Trace DSQ GC-MS). HRMS was carried out on a high-resolution mass spectrometer (Agilent 6210 ESI/TOF MS or Thermo Q Exactive Plus). TLC was performed using commercially available 100–400 mesh silica gel plates ( $\text{GF}_{254}$ ). X-ray structural analyses were conducted on Bruker APEX-II CCD Diffractometer.

**Materials.** Tetrahydrofuran (THF) and toluene were distilled from sodium/benzophenone; 1,2-dichloroethane (DCE) was distilled from calcium hydride; acetonitrile ( $\text{CH}_3\text{CN}$ ) was distilled from phosphorus pentoxide. Other commercially available reagents were purchased and used without further purification. Analytical thin-layer chromatography was performed on 0.20 mm silica gel plates ( $\text{GF}_{254}$ ) using UV light as a visualizing agent. Flash column chromatography was carried out using silica gel (200–300 mesh) with the indicated solvent system. All reactions were conducted in oven-dried Schlenk tubes. All the reaction temperatures reported are oil bath temperatures.

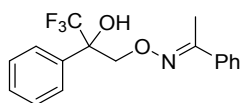
## B. General Procedure for Hydroxylfunctionalization of (Trifluoromethyl)alkenes



A 25 mL oven-dried Schlenk tube equipped with a magnetic stirring bar, (trifluoromethyl)alkenes **1** (0.2 mmol), nucleophile **2** (0.3 mmol), TBHP (0.4 mmol, 5 M in decane), Cs<sub>2</sub>CO<sub>3</sub> (0.3 mmol), and DMF (2 mL) was vigorously stirred at room temperature for 12 h. Then the mixture was stopped stirring, added water (15 mL), extracted with EtOAc (15 mL × 3). The combined organic phases were dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>, filtered and concentrated *in vacuo*. Further purification by flash column chromatography on silica gel (eluting with petroleum ether/ethyl acetate) provided the product **3**.

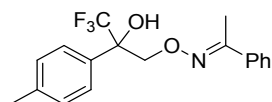
### C. Analysis Data for the Products

**(E)-Acetophenone O-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3a)**



60.7 mg, 89% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 (d,  $J = 7.2$  Hz, 2H), 7.57 (d,  $J = 6.8$  Hz, 2H), 7.34–7.42 (m, 6H), 5.30 (brs, 1H), 4.79 (d,  $J = 13.2$  Hz, 1H), 4.50 (d,  $J = 12.8$  Hz, 1H), 2.19 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.9, 135.4, 135.2, 129.9, 128.6, 128.6, 128.3, 126.3, 126.1, 124.9 (q,  $^1J_{F-C} = 284.7$  Hz), 78.2 (q,  $^2J_{F-C} = 27.7$  Hz), 75.0, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3370, 3061, 2935, 1452, 1174, 1063  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{16}\text{F}_3\text{NO}_2+\text{H}$ , 324.1206; found, 324.1210.

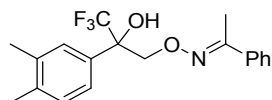
**(E)-Acetophenone O-(3,3,3-Trifluoro-2-Hydroxy-2-(p-Tolyl)propyl) Oxime (3b)**



54.7 mg, 81% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 (d,  $J = 6.8$  Hz, 2H), 7.53 (d,  $J = 8.0$  Hz, 2H), 7.35–7.41 (m, 3H), 7.21 (d,  $J = 7.6$  Hz, 2H), 5.15 (brs, 1H), 4.77 (d,  $J = 12.8$  Hz, 1H), 4.48 (d,  $J = 12.8$  Hz, 1H), 2.35 (s, 3H), 2.21 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.8, 138.5, 135.3, 132.5, 129.9, 129.0, 128.6, 126.2, 126.1, 125.0 (q,  $^1J_{F-C} = 284.7$  Hz), 78.0 (q,  $^2J_{F-C} =$

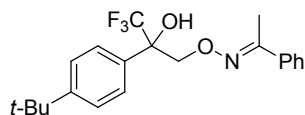
27.7 Hz), 75.0, 21.0, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.3 (s, 3F); IR (KBr): 3354, 3070, 2932, 1440, 1170, 1063  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 338.1362; found, 338.1366.

**(*E*)-Acetophenone *O*-(2-(3,4-Dimethylphenyl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3c)**



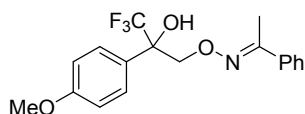
63.3 mg, 90% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 (d,  $J$  = 7.6 Hz, 2H), 7.42 (s, 1H), 7.34–7.37 (m, 4H), 7.15 (d,  $J$  = 8.0 Hz, 1H), 5.16 (brs, 1H), 4.77 (d,  $J$  = 12.8 Hz, 1H), 4.45 (d,  $J$  = 12.8 Hz, 1H), 2.28 (s, 3H), 2.25 (s, 3H), 2.22 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.7, 137.1, 136.6, 135.3, 132.8, 129.9, 129.6, 128.6, 127.4, 126.1, 125.1 (q,  $^1J_{\text{F-C}}$  = 284.9 Hz), 123.6, 78.0 (q,  $^2J_{\text{F-C}}$  = 27.6 Hz), 75.2, 19.9, 19.4, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.0 (s, 3F); IR (KBr): 3370, 3067, 2933, 1450, 1163, 1062  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{20}\text{F}_3\text{NO}_2+\text{H}$ , 352.1519; found, 352.1520.

**(*E*)-Acetophenone *O*-(2-(4-(*tert*-Butyl)phenyl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3d)**



64.5 mg, 85% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.55–7.59 (m, 4H), 7.42 (d,  $J$  = 8.4 Hz, 2H), 7.36–7.39 (m, 3H), 5.24 (brs, 1H), 4.78 (d,  $J$  = 12.8 Hz, 1H), 4.47 (d,  $J$  = 12.8 Hz, 1H), 2.22 (s, 3H), 1.32 (s, 9H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.8, 151.6, 135.3, 132.4, 129.9, 128.6, 126.2, 125.9, 125.2, 125.1 (q,  $^1J_{\text{F-C}}$  = 284.8 Hz), 78.0 (q,  $^2J_{\text{F-C}}$  = 27.7 Hz), 75.1, 34.5, 31.2, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.1 (s, 3F); IR (KBr): 3367, 3059, 2957, 1446, 1173, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{21}\text{H}_{24}\text{F}_3\text{NO}_2+\text{H}$ , 380.1832; found, 380.1833.

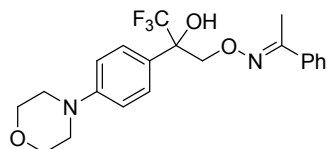
**(*E*)-Acetophenone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-(4-Methoxyphenyl)propyl) Oxime (3e)**



50.2 mg, 72% yield, white solid, mp: 71–72  $^{\circ}\text{C}$ ;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.55–7.59 (m, 4H), 7.35–7.41 (m, 3H), 6.93 (d,  $J$  = 8.4 Hz, 2H), 5.26 (brs, 1H), 4.76 (d,  $J$  = 13.2 Hz, 1H), 4.48 (d,  $J$  =

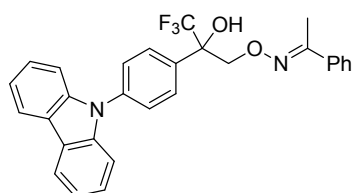
12.8 Hz, 1H), 3.81 (s, 3H), 2.21 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  159.8, 157.8, 135.3, 129.9, 128.6, 127.7, 127.4, 126.1, 125.0 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 113.7, 77.9 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 74.9, 55.2, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.6 (s, 3F); IR (KBr): 3419, 3072, 2944, 1510, 1169, 1056  $\text{cm}^{-1}$ ; HRMS (ESI, m/z):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_3+\text{H}$ , 354.1312; found, 354.1320.

**(E)-Acetophenone O-(3,3,3-Trifluoro-2-Hydroxy-2-(4-Morpholinophenyl)propyl) Oxime (3f)**



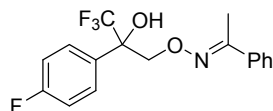
49.0 mg, 60% yield, brown oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 (d,  $J = 7.2$  Hz, 2H), 7.53 (d,  $J = 8.8$  Hz, 2H), 7.35–7.41 (m, 3H), 6.92 (d,  $J = 8.4$  Hz, 2H), 5.23 (brs, 1H), 4.75 (d,  $J = 12.8$  Hz, 1H), 4.47 (d,  $J = 12.8$  Hz, 1H), 3.85 (t,  $J = 4.4$  Hz, 4H), 3.18 (t,  $J = 4.4$  Hz, 4H), 2.22 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.7, 151.1, 135.3, 129.8, 128.6, 127.3, 126.1, 125.0 (q,  $^1J_{\text{F-C}} = 284.7$  Hz), 114.9, 77.8 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.0, 66.8, 48.7, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.5 (s, 3F); IR (KBr): 3408, 2908, 2846, 1622, 1163, 1066  $\text{cm}^{-1}$ ; HRMS (ESI, m/z):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{21}\text{H}_{23}\text{F}_3\text{N}_2\text{O}_3+\text{H}$ , 409.1734; found, 409.1736.

**(E)-Acetophenone O-(2-(4-(9H-Carbazol-9-yl)phenyl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3g)**



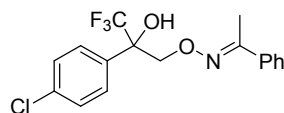
86.0 mg, 88% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.11 (d,  $J = 7.6$  Hz, 2H), 7.86 (d,  $J = 8.4$  Hz, 2H), 7.58 (d,  $J = 7.6$  Hz, 4H), 7.33–7.43 (m, 8H), 7.25 (d,  $J = 7.2$  Hz, 1H), 5.44 (brs, 1H), 4.84 (d,  $J = 13.2$  Hz, 1H), 4.60 (d,  $J = 12.8$  Hz, 1H), 2.22 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.3, 140.7, 138.3, 135.3, 134.6, 130.1, 128.8, 128.2, 126.8, 126.3, 126.1, 125.0 (q,  $^1J_{\text{F-C}} = 284.3$  Hz), 123.6, 120.4, 120.2, 109.9, 78.3 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.0, 13.1;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3353, 3057, 2923, 1450, 1170, 1062  $\text{cm}^{-1}$ ; HRMS (ESI, m/z):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{29}\text{H}_{23}\text{F}_3\text{N}_2\text{O}_2+\text{H}$ , 489.1784; found, 489.1782.

**(E)-Acetophenone O-(3,3,3-Trifluoro-2-(4-Fluorophenyl)-2-Hydroxypropyl) Oxime (3h)**



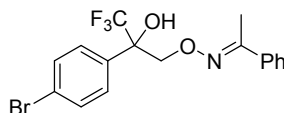
54.6 mg, 80% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.62 (t,  $J = 6.8$  Hz, 2H), 7.57 (d,  $J = 6.8$  Hz, 2H), 7.36–7.42 (m, 3H), 7.08 (t,  $J = 8.4$  Hz, 2H), 5.34 (brs, 1H), 4.76 (d,  $J = 13.2$  Hz, 1H), 4.49 (d,  $J = 13.2$  Hz, 1H), 2.20 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  162.9 (d,  $^1J_{\text{F-C}} = 245.4$  Hz), 158.1, 135.2, 131.3 (d,  $^4J_{\text{F-C}} = 3.1$  Hz), 130.0, 128.6, 128.4 (d,  $^3J_{\text{F-C}} = 9.0$  Hz), 126.1, 124.8 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 115.2 (d,  $^2J_{\text{F-C}} = 21.4$  Hz), 77.9 (q,  $^2J_{\text{F-C}} = 27.9$  Hz), 74.7, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.6 (s, 3F), -110.54 – -110.46(m, 1F); IR (KBr): 3380, 3064, 2956, 1609, 1180, 950  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{F}_4\text{NO}_2+\text{H}$ , 342.1112; found, 342.1110.

**(E)-Acetophenone O-(2-(4-Chlorophenyl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3i)**



46.5 mg, 65% yield, white solid, mp: 62–63  $^{\circ}\text{C}$ ;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.56–7.59 (m, 4H), 7.36–7.39 (m, 5H), 5.37 (brs, 1H), 4.75 (d,  $J = 12.8$  Hz, 1H), 4.49 (d,  $J = 12.8$  Hz, 1H), 2.19 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.2, 135.1, 134.8, 134.1, 130.0, 128.6, 128.5, 128.0, 126.1, 124.7 (q,  $^1J_{\text{F-C}} = 284.7$  Hz), 78.0 (q,  $^2J_{\text{F-C}} = 28.0$  Hz), 74.5, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.5 (s, 3F); IR (KBr): 3369, 3077, 2950, 1443, 1179, 1079  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{ClF}_3\text{NO}_2+\text{H}$ , 358.0816; found, 358.0822.

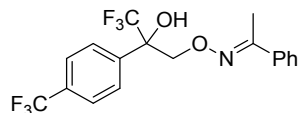
**(E)-Acetophenone O-(2-(4-Bromophenyl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3j)**



59.4 mg, 74% yield, white solid, mp: 69–70  $^{\circ}\text{C}$ ;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.56 (d,  $J = 8.0$  Hz, 2H), 7.50–7.52 (m, 4H), 7.36–7.40 (m, 3H), 5.35 (brs, 1H), 4.74 (d,  $J = 12.8$  Hz, 1H), 4.49 (d,  $J = 12.8$  Hz, 1H), 2.20 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.2, 135.1, 134.6, 131.5, 130.0, 128.6, 128.3, 126.1, 124.6 (q,  $^1J_{\text{F-C}} = 284.6$  Hz), 123.1, 78.0 (q,  $^2J_{\text{F-C}} = 27.9$  Hz), 74.5, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.5 (s, 3F); IR (KBr): 3360, 3067, 2933, 1485, 1173, 1070  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{BrF}_3\text{NO}_2+\text{H}$ , 402.0311; found, 402.0309.

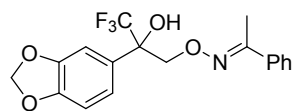
**(E)-Acetophenone O-(3,3,3-Trifluoro-2-Hydroxy-2-(4-(Trifluoromethyl)phenyl)propyl)**

**Oxime (3k)**



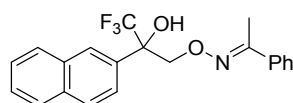
33.0 mg, 42% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.79 (d,  $J$  = 8.4 Hz, 2H), 7.67 (d,  $J$  = 8.4 Hz, 2H), 7.56 (d,  $J$  = 7.2 Hz, 2H), 7.37–7.41 (m, 3H), 5.43 (brs, 1H), 4.78 (d,  $J$  = 13.2 Hz, 1H), 4.54 (d,  $J$  = 12.8 Hz, 1H), 2.20 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.4, 139.6, 135.1, 130.9 ((q,  $^2J_{\text{F-C}}$  = 32.4 Hz), 130.1, 128.7, 127.1, 126.2, 125.2(q,  $^3J_{\text{F-C}}$  = 3.8 Hz), 124.6 (q,  $^1J_{\text{F-C}}$  = 284.5 Hz), 123.9 (q,  $^1J_{\text{F-C}}$  = 270.6 Hz), 78.2 (q,  $^2J_{\text{F-C}}$  = 28.0 Hz), 74.5, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -62.8 (s, 3F), -76.4 (s, 3F); IR (KBr): 3383, 3061, 2906, 1324, 1169, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{15}\text{F}_6\text{NO}_2+\text{H}$ , 392.1080; found, 392.1081.

**(E)-Acetophenone O-(2-(Benzo[d][1,3]dioxol-5-yl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3l)**



69.8 mg, 95% yield, brown oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 (d,  $J$  = 7.6 Hz, 2H), 7.35–7.41 (m, 3H), 7.16 (s, 1H), 7.10 (d,  $J$  = 8.0 Hz, 1H), 6.82 (d,  $J$  = 8.4 Hz, 1H), 5.95 (s, 2H), 5.31 (brs, 1H), 4.73 (d,  $J$  = 13.2 Hz, 1H), 4.45 (d,  $J$  = 12.8 Hz, 1H), 2.22 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.9, 147.8, 147.8, 135.2, 129.9, 129.2, 128.6, 126.1, 124.9 (q,  $^1J_{\text{F-C}}$  = 284.7 Hz), 120.0, 108.0, 107.2, 101.2, 77.9 (q,  $^2J_{\text{F-C}}$  = 27.8 Hz), 74.9, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.5 (s, 3F); IR (KBr): 3353, 3072, 2908, 1486, 1171, 1056  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{16}\text{F}_3\text{NO}_4+\text{H}$ , 368.1104; found, 368.1109.

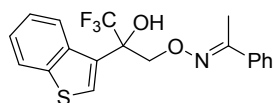
**(E)-Acetophenone O-(3,3,3-Trifluoro-2-Hydroxy-2-(Naphthalen-2-yl)propyl) Oxime (3m)**



64.2 mg, 86% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.19 (s, 1H), 7.81–7.89 (m, 3H), 7.71 (d,  $J$  = 8.4 Hz, 1H), 7.56 (d,  $J$  = 6.0 Hz, 2H), 7.46–7.52 (m, 2H), 7.34–7.40 (m, 3H), 5.44 (brs,

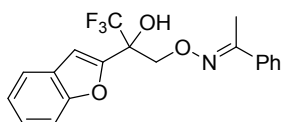
1H), 4.89 (d,  $J = 12.8$  Hz, 1H), 4.61 (d,  $J = 13.2$  Hz, 1H), 2.17 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.0, 135.2, 133.2, 133.0, 132.9, 129.9, 128.6, 128.5, 128.0, 127.5, 126.6, 126.4, 126.3, 126.2, 125.0 (q,  $^1J_{\text{F-C}} = 284.4$  Hz), 123.6, 78.4 (q,  $^2J_{\text{F-C}} = 27.6$  Hz), 75.0, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -75.9 (s, 3F); IR (KBr): 3364, 3058 2936, 1264, 1166, 751  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{21}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 374.1362; found, 374.1368.

**(*E*)-Acetophenone *O*-(2-(Benzo[*b*]thiophen-3-yl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3n)**



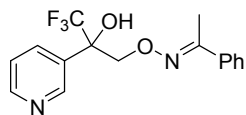
50.8 mg, 67% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.33 (d,  $J = 8.0$  Hz, 1H), 7.85 (d,  $J = 7.6$  Hz, 1H), 7.64 (s, 1H), 7.56 (d,  $J = 7.2$  Hz, 2H), 7.33–7.39 (m, 5H), 5.35 (brs, 1H), 4.94 (d,  $J = 13.2$  Hz, 1H), 4.83 (d,  $J = 13.2$  Hz, 1H), 2.20 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.1, 140.7, 135.2, 130.2, 129.9, 128.6, 126.5, 126.5, 126.1, 125.0, 124.9, 124.8 (q,  $^1J_{\text{F-C}} = 285.2$  Hz), 124.2, 122.7, 78.8 (q,  $^2J_{\text{F-C}} = 28.8$  Hz), 74.0, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.4 (s, 3F); IR (KBr): 3367, 3059, 2957, 1446, 1173, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{16}\text{F}_3\text{NO}_2\text{S}+\text{H}$ , 380.0927; found, 380.0931.

**(*E*)-Acetophenone *O*-(2-(Benzofuran-2-yl)-3,3,3-Trifluoro-2-Hydroxypropyl) Oxime (3o)**



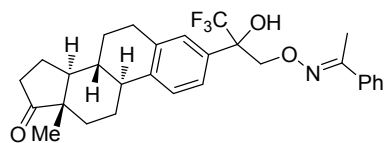
32.7 mg, 45% yield, yellow oil;  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.58 (d,  $J = 8.0$  Hz, 1H), 7.50–7.55 (m, 3H), 7.34–7.40 (m, 3H), 7.31 (t,  $J = 7.0$  Hz, 1H), 7.23–7.26 (m, 1H), 5.54 (brs, 1H), 4.82 (d,  $J = 12.5$  Hz, 1H), 4.77 (d,  $J = 13.0$  Hz, 1H), 2.19 (s, 3H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ )  $\delta$  158.3, 155.4, 151.7, 135.1, 130.1, 128.7, 127.7, 126.2, 124.8, 123.8 (q,  $^1J_{\text{F-C}} = 285.3$  Hz), 123.1, 121.5, 111.6, 107.1, 76.8 (q,  $^2J_{\text{F-C}} = 29.3$  Hz), 72.9, 13.0;  $^{19}\text{F}$  NMR (470 MHz,  $\text{CDCl}_3$ )  $\delta$  -77.2 (s, 3F); IR (KBr): 3425, 2930, 1630, 1448, 1171  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{16}\text{F}_3\text{NO}_3+\text{H}$ , 364.1155; found, 364.1159.

**(*E*)-Acetophenone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-(Pyridin-3-yl)propyl) Oxime (3p)**



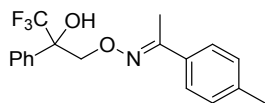
45.4 mg, 70% yield, brown oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.88 (s, 1H), 8.61 (d,  $J = 4.4$  Hz, 1H), 8.00 (d,  $J = 8.0$  Hz, 1H), 7.55 (d,  $J = 7.6$  Hz, 2H), 7.32–7.41 (m, 4H), 5.34 (brs, 1H), 4.79 (d,  $J = 12.8$  Hz, 1H), 4.61 (d,  $J = 13.2$  Hz, 1H), 2.16 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.2, 149.7, 148.0, 135.1, 134.7, 131.7, 130.0, 128.6, 126.1, 124.5 (q,  $^1J_{\text{F-C}} = 284.4$  Hz), 123.1, 77.3 (q,  $^2J_{\text{F-C}} = 28.3$  Hz), 74.3, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -77.0 (s, 3F); IR (KBr): 3560, 3063, 2950, 2348, 1434, 1173, 1069  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{16}\text{H}_{15}\text{F}_3\text{N}_2\text{O}_2+\text{H}$ , 325.1158; found, 325.1158.

**(8R,9S,13S,14S)-13-Methyl-3-(1,1,1-Trifluoro-2-Hydroxy-3-(((E)-1-Phenylethylidene)amino)oxy)propan-2-yl)-7,8,9,11,12,13,15,16-Octahydro-6H-Cyclopenta[*a*]phenanthren-17(14H)-one (3q)**



61.9 mg, 62% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.60 (d,  $J = 7.2$  Hz, 2H), 7.35–7.39 (m, 5H), 7.32 (d,  $J = 8.0$  Hz, 1H), 5.32 (brs, 1H), 4.77 (d,  $J = 13.2$  Hz, 1H), 4.45 (d,  $J = 13.2$  Hz, 1H), 2.95 (d,  $J = 5.2$  Hz, 2H), 2.40–2.54 (m, 2H), 2.31 (t,  $J = 8.4$  Hz, 1H), 2.25 (s, 3H), 1.96–2.18 (m, 4H), 1.41–1.64 (m, 6H), 0.91 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.7, 140.2, 136.5, 135.2, 132.7, 129.8, 128.5, 126.8, 126.1, 125.3, 125.0 (q,  $^1J_{\text{F-C}} = 284.3$  Hz), 123.4, 77.8 (q,  $^2J_{\text{F-C}} = 27.9$  Hz), 75.1, 50.5, 47.9, 44.3, 37.9, 35.8, 31.5, 29.5, 26.4, 25.5, 21.5, 13.8, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -75.9 (s, 3F); IR (KBr): 3357, 3060, 2944, 1718, 1168, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{29}\text{H}_{32}\text{F}_3\text{NO}_3+\text{H}$ , 500.2407; found, 500.2408.

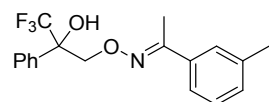
**(E)-1-(p-Tolyl)ethanone O-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3r)**



51.9 mg, 77% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.2$  Hz, 2H), 7.47 (d,  $J = 7.6$  Hz, 2H), 7.38 (m, 3H), 7.17 (d,  $J = 7.6$  Hz, 2H), 5.39 (brs, 1H), 4.77 (d,  $J = 13.2$  Hz, 1H),

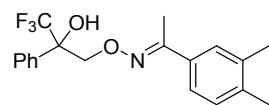
4.49 (d,  $J = 12.8$  Hz, 1H), 2.35 (s, 3H), 2.17 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.8, 140.1, 135.5, 132.4, 129.3, 128.6, 128.3, 126.4, 126.0, 124.9 (q,  $^1J_{\text{F-C}} = 284.4$  Hz), 78.2 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 74.8, 21.2, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3361, 3051, 2934, 1441, 1171, 1062  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 338.1362; found, 338.1361.

**(*E*)-1-(*m*-Tolyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3s)**



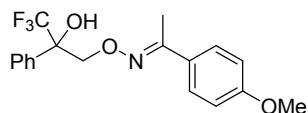
58.7 mg, 87% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 (d,  $J = 7.6$  Hz, 2H), 7.36–7.42 (m, 5H), 7.20–7.28 (m, 2H), 5.32 (brs, 1H), 4.78 (d,  $J = 12.8$  Hz, 1H), 4.50 (d,  $J = 13.2$  Hz, 1H), 2.37 (s, 3H), 2.18 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.1, 138.3, 135.5, 135.2, 130.7, 128.6, 128.5, 128.3, 126.7, 126.4, 124.9 (q,  $^1J_{\text{F-C}} = 284.7$  Hz), 123.4, 78.2 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 74.9, 21.4, 13.0;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3371, 3053, 2934, 1452, 1171, 1065  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 338.1362; found, 338.1363.

**(*E*)-1-(3,4-Dimethylphenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3t)**



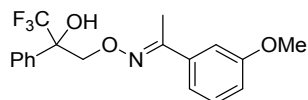
54.2 mg, 77% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 (d,  $J = 7.6$  Hz, 2H), 7.35–7.41 (m, 4H), 7.30 (d,  $J = 8.0$  Hz, 1H), 7.12 (d,  $J = 8.0$  Hz, 1H), 5.35 (brs, 1H), 4.77 (d,  $J = 13.2$  Hz, 1H), 4.49 (d,  $J = 13.2$  Hz, 1H), 2.27 (s, 3H), 2.26 (s, 3H), 2.16 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.0, 138.8, 136.9, 135.5, 132.8, 129.8, 128.6, 128.3, 127.2, 126.4, 125.0 (q,  $^1J_{\text{F-C}} = 284.7$  Hz), 123.7, 78.2 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 74.8, 19.8, 19.6, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3372, 3059, 2935, 1450, 1171, 1059  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{20}\text{F}_3\text{NO}_2+\text{H}$ , 352.1519; found, 352.1517.

**(*E*)-1-(4-Methoxyphenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3u)**



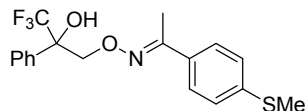
55.2 mg, 78% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 (d,  $J = 7.2$  Hz, 2H), 7.53 (d,  $J = 8.4$  Hz, 2H), 7.34–7.42 (m, 3H), 6.89 (d,  $J = 8.4$  Hz, 2H), 5.40 (brs, 1H), 4.76 (d,  $J = 12.8$  Hz, 1H), 4.48 (d,  $J = 12.8$  Hz, 1H), 3.81 (s, 3H), 2.17 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  161.1, 157.5, 135.6, 128.7, 128.3, 127.7, 127.6, 126.4, 125.0 (q,  $^1J_{\text{F-C}} = 284.4$  Hz), 114.0, 78.2 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 74.9, 55.4, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3370, 3062, 2939, 1471, 1171, 1054  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_3+\text{H}$ , 354.1312; found, 354.1321.

**(*E*)-1-(3-Methoxyphenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3v)**



50.2 mg, 71% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.6$  Hz, 2H), 7.36–7.42 (m, 3H), 7.29 (t,  $J = 7.6$  Hz, 1H), 7.15 (d,  $J = 8.0$  Hz, 1H), 7.12 (s, 1H), 6.94 (d,  $J = 8.4$  Hz, 1H), 5.17 (brs, 1H), 4.79 (d,  $J = 13.2$  Hz, 1H), 4.51 (d,  $J = 13.2$  Hz, 1H), 3.81 (s, 3H), 2.18 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  159.7, 157.8, 136.6, 135.4, 129.6, 128.6, 128.3, 126.3, 124.8 (q,  $^1J_{\text{F-C}} = 284.6$  Hz), 118.7, 115.4, 111.7, 78.1 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.0, 55.3, 13.0;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3381, 3066, 2942, 1456, 1188, 1062  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_3+\text{H}$ , 354.1312; found, 354.1314.

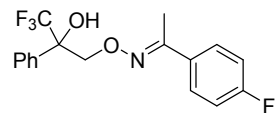
**(*E*)-1-(4-(Methylthio)phenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3w)**



66.5 mg, 90% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.04 (d,  $J = 8.0$  Hz, 2H), 7.65 (d,  $J = 8.0$  Hz, 4H), 7.37–7.43 (m, 3H), 4.95 (brs, 1H), 4.83 (d,  $J = 12.8$  Hz, 1H), 4.54 (d,  $J = 12.8$  Hz, 1H), 3.92 (s, 3H), 2.22 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  166.4, 157.0, 139.4, 135.2, 131.2, 129.8, 128.7, 128.3, 126.3, 126.1, 124.9 (q,  $^1J_{\text{F-C}} = 284.8$  Hz), 77.9 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.3, 52.2, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.3 (s, 3F); IR (KBr): 3449, 3052, 2946, 1715, 1436, 1284,

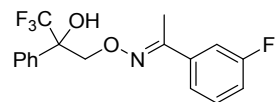
1166  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_2\text{S}+\text{H}$ , 370.1083; found, 370.1085.

**(*E*)-1-(4-Fluorophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3x)**



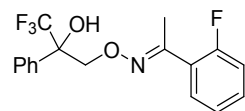
43.0 mg, 80% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.2$  Hz, 2H), 7.57 (dd,  $J = 8.4, 5.6$  Hz, 2H), 7.33–7.42 (m, 3H), 7.06 (t,  $J = 8.4$  Hz, 2H), 5.05 (brs, 1H), 4.79 (d,  $J = 13.2$  Hz, 1H), 4.50 (d,  $J = 12.8$  Hz, 1H), 2.18 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  163.8 (d,  $^1J_{\text{F-C}} = 248.8$  Hz), 156.9, 135.4, 131.4 (d,  $^4J_{\text{F-C}} = 3.4$  Hz), 128.7, 128.3, 128.1 (d,  $^3J_{\text{F-C}} = 8.4$  Hz), 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 115.6 (d,  $^2J_{\text{F-C}} = 21.7$  Hz), 78.1 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 75.1, 12.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F), -110.7 – -110.8 (m, 1F); IR (KBr): 3380, 3064, 2936, 1609, 1180, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{F}_4\text{NO}_2+\text{H}$ , 342.1112; found, 342.1113.

**(*E*)-1-(3-Fluorophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3y)**



64.8 mg, 93% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.2$  Hz, 2H), 7.28–7.43 (m, 6H), 7.09 (t,  $J = 7.6$  Hz, 1H), 4.97 (brs, 1H), 4.80 (d,  $J = 12.8$  Hz, 1H), 4.51 (d,  $J = 12.8$  Hz, 1H), 2.19 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  162.8 (d,  $^1J_{\text{F-C}} = 244.9$  Hz), 156.7 (d,  $^4J_{\text{F-C}} = 2.6$  Hz), 137.4 (d,  $^3J_{\text{F-C}} = 7.7$  Hz), 135.3, 130.2 (d,  $^3J_{\text{F-C}} = 8.2$  Hz), 128.7, 128.3, 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 121.8 (d,  $^4J_{\text{F-C}} = 2.9$  Hz), 116.8 (d,  $^2J_{\text{F-C}} = 21.2$  Hz), 113.1 (d,  $^2J_{\text{F-C}} = 23.0$  Hz), 78.0 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.2, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F), -112.2 – -112.3 (m, 1F); IR (KBr): 3406, 3069, 2937, 1451, 1176, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{F}_4\text{NO}_2+\text{H}$ , 342.1112; found, 342.1114.

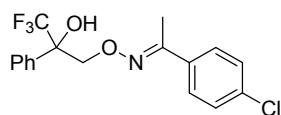
**(*E*)-1-(2-Fluorophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3z)**



61.4 mg, 90% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 (d,  $J = 7.6$  Hz, 2H), 7.34–7.42

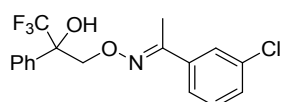
(m, 5H), 7.06–7.16 (m, 2H), 5.23 (brs, 1H), 4.78 (d,  $J = 12.8$  Hz, 1H), 4.50 (d,  $J = 12.8$  Hz, 1H), 2.20 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  160.3 (d,  $^1J_{\text{F-C}} = 249.7$  Hz), 156.0 (d,  $^3J_{\text{F-C}} = 2.0$  Hz), 135.4, 131.2 (d,  $^3J_{\text{F-C}} = 8.5$  Hz), 129.3 (d,  $^4J_{\text{F-C}} = 2.9$  Hz), 128.7, 128.3, 126.4, 124.9 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 124.3 (d,  $^3J_{\text{F-C}} = 3.4$  Hz), 124.0 (d,  $^2J_{\text{F-C}} = 11.9$  Hz), 116.4 (d,  $^2J_{\text{F-C}} = 22.0$  Hz), 78.2 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 75.1, 15.2;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F), -113.9 – -114.0 (s, 1F); IR (KBr): 3404, 3064, 2936, 1461, 1172, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{F}_4\text{NO}_2+\text{H}$ , 342.1112; found, 342.1113.

**(*E*)-1-(4-Chlorophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3aa)**



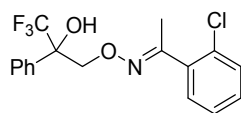
60.9 mg, 85% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.2$  Hz, 2H), 7.51 (d,  $J = 8.0$  Hz, 2H), 7.32–7.42 (m, 5H), 5.00 (brs, 1H), 4.79 (d,  $J = 12.8$  Hz, 1H), 4.50 (d,  $J = 12.8$  Hz, 1H), 2.17 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  156.8, 136.0, 135.3, 133.7, 128.8, 128.7, 128.3, 127.4, 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 284.7$  Hz), 77.9 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.1, 12.7;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3397, 3063, 2936, 1488, 1171, 1070  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{ClF}_3\text{NO}_2+\text{H}$ , 358.0816; found, 358.0819.

**(*E*)-1-(3-Chlorophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ab)**



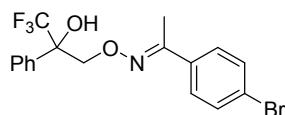
64.3 mg, 90% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.6$  Hz, 2H), 7.55 (s, 1H), 7.35–7.46 (m, 5H), 7.30 (d,  $J = 7.6$  Hz, 1H), 4.92 (brs, 1H), 4.80 (d,  $J = 12.8$  Hz, 1H), 4.52 (d,  $J = 12.8$  Hz, 1H), 2.17 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  156.7, 137.0, 135.2, 134.7, 129.9, 129.8, 128.7, 128.3, 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 284.8$  Hz), 124.3, 78.0 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 75.2, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3415, 3067, 2938, 1455, 1171, 1066  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{ClF}_3\text{NO}_2+\text{H}$ , 358.0816; found, 358.0822.

**(*E*)-1-(2-Chlorophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ac)**



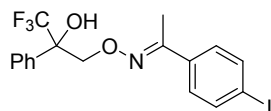
48.6 mg, 68% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J$  = 7.6 Hz, 2H), 7.23–7.42 (m, 7H), 5.05 (brs, 1H), 4.77 (d,  $J$  = 12.8 Hz, 1H), 4.49 (d,  $J$  = 13.2 Hz, 1H), 2.18 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.9, 135.7, 135.3, 132.4, 130.4, 130.1, 129.8, 128.7, 128.3, 126.9, 126.3, 124.9 (q,  $^1J_{\text{F-C}}$  = 284.6 Hz), 78.2 (q,  $^2J_{\text{F-C}}$  = 27.7 Hz), 75.2, 16.5;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.1 (s, 3F); IR (KBr): 3409, 3063, 2934, 1443, 1169, 1060  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{ClF}_3\text{NO}_2+\text{H}$ , 358.0816; found, 358.0818.

**(*E*)-1-(4-Bromophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ad)**



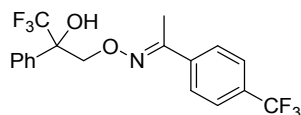
66.8 mg, 83% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J$  = 7.6 Hz, 2H), 7.50 (d,  $J$  = 8.0 Hz, 2H), 7.36–7.46 (m, 5H), 5.00 (brs, 1H), 4.79 (d,  $J$  = 12.8 Hz, 1H), 4.50 (d,  $J$  = 12.8 Hz, 1H), 2.17 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  156.9, 135.3, 134.1, 131.8, 128.7, 128.3, 127.6, 126.3, 124.3, 124.9 (q,  $^1J_{\text{F-C}}$  = 284.3 Hz), 78.0 (q,  $^2J_{\text{F-C}}$  = 27.8 Hz), 75.2, 12.7;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3453, 2930, 1640, 1382, 1189, 1069  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{BrF}_3\text{NO}_2+\text{H}$ , 402.0311; found, 402.0312.

**(*E*)-1-(4-Iodophenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ae)**

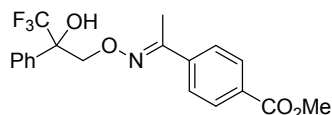


72.8 mg, 81% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.70 (d,  $J$  = 7.6 Hz, 2H), 7.63 (d,  $J$  = 7.2 Hz, 2H), 7.35–7.42 (m, 3H), 7.30 (d,  $J$  = 7.6 Hz, 2H), 4.99 (brs, 1H), 4.79 (d,  $J$  = 12.8 Hz, 1H), 4.50 (d,  $J$  = 12.8 Hz, 1H), 2.16 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.0, 137.7, 135.3, 134.7, 128.7, 128.3, 127.7, 126.3, 124.9 (q,  $^1J_{\text{F-C}}$  = 284.3 Hz), 96.2, 78.0 (q,  $^2J_{\text{F-C}}$  = 27.7 Hz), 75.2, 12.6;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3391, 3062, 2933, 1472, 1171, 1062  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{15}\text{F}_3\text{INO}_2+\text{H}$ , 450.0172; found, 450.0173.

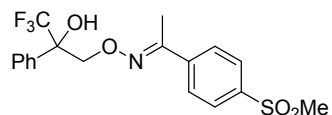
**(*E*)-1-(4-(Trifluoromethyl)phenyl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl)**

**Oxime (3af)**

69.7 mg, 88% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.62–7.70 (m, 6H), 7.35–7.43 (m, 3H), 4.83 (brs, 1H), 4.83 (d,  $J = 12.8$  Hz, 1H), 4.54 (d,  $J = 12.8$  Hz, 1H), 2.22 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  156.7, 138.7, 135.2, 131.7 (q,  $^2J_{\text{F-C}} = 32.5$  Hz), 128.8, 128.4, 126.5, 126.3, 125.5 (q,  $^3J_{\text{F-C}} = 3.7$  Hz), 124.9 (q,  $^1J_{\text{F-C}} = 285.0$  Hz), 123.9 (q,  $^1J_{\text{F-C}} = 270.5$  Hz), 77.9 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.4, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -62.9 (s, 3F), -76.3 (s, 3F); IR (KBr): 3416, 3066, 2939, 1324, 1158  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{15}\text{F}_6\text{NO}_2+\text{H}$ , 392.1080; found, 392.1078.

**(E)-Methyl 4-(1-((3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropoxy)imino)ethyl)benzoate (3ag)**

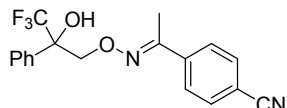
54.2 mg, 70% yield, white solid, mp: 60–61  $^{\circ}\text{C}$ ;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.4$  Hz, 2H), 7.50 (d,  $J = 8.0$  Hz, 2H), 7.35–7.43 (m, 3H), 7.23 (d,  $J = 8.4$  Hz, 2H), 5.20 (brs, 1H), 4.78 (d,  $J = 13.2$  Hz, 1H), 4.49 (d,  $J = 13.2$  Hz, 1H), 2.48 (s, 3H), 2.17 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  141.3, 135.4, 131.6, 128.6, 128.3, 126.4, 126.3, 125.9, 124.9 (q,  $^1J_{\text{F-C}} = 284.8$  Hz), 78.1 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 74.9, 15.3, 12.6;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3372, 3061, 2930, 1438, 1169, 1067  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{18}\text{F}_3\text{NO}_4+\text{H}$ , 382.1261; found, 382.1267.

**(E)-1-(4-(Methylsulfonyl)phenyl)ethanone O-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl)****Oxime (3ah)**

70.6 mg, 88% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.94 (d,  $J = 8.4$  Hz, 2H), 7.76 (d,  $J = 8.4$  Hz, 2H), 7.64 (d,  $J = 7.6$  Hz, 2H), 7.36–7.43 (m, 3H), 4.85 (d,  $J = 12.8$  Hz, 1H), 4.68 (brs, 1H), 4.57 (d,  $J = 12.8$  Hz, 1H), 3.05 (s, 3H), 2.23 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  156.1, 141.3, 140.5, 135.0, 128.7, 128.3, 127.6, 127.0, 126.1, 124.8 (q,  $^1J_{\text{F-C}} = 284.4$  Hz), 77.6 (q,  $^2J_{\text{F-C}} =$

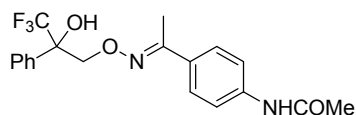
27.8 Hz), 75.6, 44.3, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3457, 3051, 2935, 1301, 1161, 1074  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_4\text{S}+\text{H}$ , 402.0981; found, 402.0988.

**(E)-4-(1-((3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropoxy)imino)ethyl)benzonitrile (3ai)**



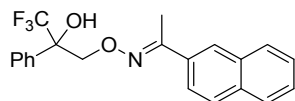
60.6 mg, 87% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.63–7.69 (m, 6H), 7.36–7.43 (m, 3H), 4.84 (d,  $J$  = 12.8 Hz, 1H), 4.66 (brs, 1H), 4.55 (d,  $J$  = 12.8 Hz, 1H), 2.21 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  156.0, 139.4, 135.0, 132.3, 128.8, 128.3, 126.6, 126.1, 124.8 (q,  $^1J_{\text{F-C}}$  = 284.5 Hz), 118.3, 113.2, 77.6 (q,  $^2J_{\text{F-C}}$  = 27.7 Hz), 75.6, 12.6;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3428, 3063, 2944, 2232, 1606, 1171, 1067  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{15}\text{F}_3\text{N}_2\text{O}_2+\text{H}$ , 349.1158; found, 349.1163.

**(E)-N-(4-(1-((3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropoxy)imino)ethyl)phenyl)acetamide (3aj)**



68.5 mg, 90% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  8.17 (s, 1H), 7.71 (s, 1H), 7.62 (d,  $J$  = 7.2 Hz, 3H), 7.35–7.42 (m, 3H), 7.27 (s, 1H), 5.23 (brs, 1H), 4.76 (d,  $J$  = 13.2 Hz, 1H), 4.48 (d,  $J$  = 13.2 Hz, 1H), 2.90 (d,  $J$  = 23.6 Hz, 1H), 2.14 (s, 3H), 2.13 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  169.1, 157.5, 138.4, 135.9, 135.3, 129.1, 128.6, 128.3, 126.3, 124.9 (q,  $^1J_{\text{F-C}}$  = 284.5 Hz), 121.9, 121.5, 117.5, 78.1 (q,  $^2J_{\text{F-C}}$  = 27.7 Hz), 74.9, 24.3, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3302, 3060, 2947, 1670, 1168, 1062  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{19}\text{F}_3\text{N}_2\text{O}_3+\text{H}$ , 381.1421; found, 381.1426.

**(E)-1-(Naphthalen-2-yl)ethanone O-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ak)**

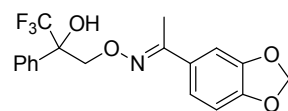


61.3 mg, 82% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.95 (s, 1H), 7.75–7.81 (m, 4H),

7.67 (d,  $J = 6.8$  Hz, 2H), 7.49 (d,  $J = 4.8$  Hz, 2H), 7.34–7.43 (m, 3H), 5.27 (brs, 1H), 4.83 (d,  $J = 13.2$  Hz, 1H), 4.55 (d,  $J = 13.2$  Hz, 1H), 2.29 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.7, 135.4, 133.9, 132.9, 132.4, 128.7, 128.5, 128.3, 127.6, 127.0, 126.6, 126.4, 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 284.4$  Hz), 122.9, 78.1 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 75.0, 12.7;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.1 (s, 3F); IR (KBr): 3395, 3055, 2933, 1452, 1170, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{21}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 374.1362; found, 374.1366.

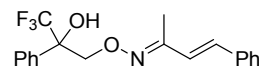
**(*E*)-1-(Benzo[*d*][1,3]dioxol-5-yl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl)**

**Oxime (3al)**



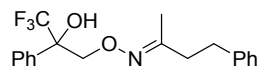
60.2 mg, 82% yield, brown oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.6$  Hz, 2H), 7.34–7.42 (m, 3H), 7.10 (s, 1H), 7.06 (d,  $J = 8.0$  Hz, 1H), 6.78 (d,  $J = 8.0$  Hz, 1H), 5.96 (s, 2H), 5.26 (brs, 1H), 4.76 (d,  $J = 12.8$  Hz, 1H), 4.48 (d,  $J = 12.8$  Hz, 1H), 2.14 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.3, 149.2, 148.0, 135.5, 129.3, 128.6, 128.3, 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 284.7$  Hz), 120.7, 108.1, 106.1, 101.4, 78.1 (q,  $^2J_{\text{F-C}} = 27.6$  Hz), 74.9, 12.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3372, 3067, 2911, 1470, 1170, 1054  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{16}\text{F}_3\text{NO}_4+\text{H}$ , 368.1104; found, 368.1106.

**(2*E*,3*E*)-4-Phenylbut-3-en-2-one *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3am)**



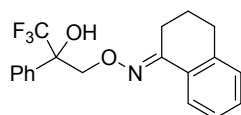
59.4 mg, 85% yield, white solid, mp: 67–68  $^{\circ}\text{C}$ ;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J = 7.6$  Hz, 2H), 7.29–7.45 (m, 8H), 6.91 (d,  $J = 16.4$  Hz, 1H), 6.75 (d,  $J = 16.4$  Hz, 1H), 5.25 (brs, 1H), 4.74 (d,  $J = 12.8$  Hz, 1H), 4.44 (d,  $J = 12.8$  Hz, 1H), 2.03 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  158.3, 135.8, 135.4, 135.0, 128.8, 128.8, 128.6, 128.3, 127.0, 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 284.8$  Hz), 124.4, 78.2 (q,  $^2J_{\text{F-C}} = 27.7$  Hz), 74.9, 10.3;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.1 (s, 3F); IR (KBr): 3386, 3053, 2931, 1457, 1169, 1065  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 350.1362; found, 350.1365.

**(E)-4-Phenylbutan-2-one O-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3an)**



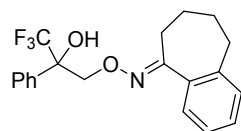
21.1 mg, 30% yield (*E/Z* = 2.6/1), colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.59 (d,  $J$  = 7.2 Hz, 2H), 7.15–7.40 (m, 8H), 5.27 (brs, 1H), 4.61 (d,  $J$  = 13.2 Hz, 1H), 4.34 (t,  $J$  = 13.2 Hz, 1H), 2.81 (t,  $J$  = 8.0 Hz, 2H), 2.50 (t,  $J$  = 8.0 Hz, 2H), 1.81 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  160.4, 140.5, 135.7, 128.6, 128.5, 128.3, 128.3, 126.5, 126.4, 126.3, 125.0 (q,  $^1J_{\text{F-C}}$  = 284.5 Hz), 78.3 (q,  $^2J_{\text{F-C}}$  = 27.6 Hz), 74.4, 37.5, 32.3, 14.6;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.3 (s, 3F); IR (KBr): 3363, 3050, 2931, 1448, 1170, 1067  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{20}\text{F}_3\text{NO}_2+\text{H}$ , 352.1519; found, 352.1523.

**(E)-3,4-Dihydronaphthalen-1(2H)-one O-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ao)**



55.9 mg, 80% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.84 (d,  $J$  = 8.0 Hz, 1H), 7.65 (d,  $J$  = 7.2 Hz, 2H), 7.34–7.42 (m, 3H), 7.28 (t,  $J$  = 7.6 Hz, 1H), 7.20 (t,  $J$  = 7.6 Hz, 1H), 7.13 (d,  $J$  = 7.2 Hz, 1H), 5.33 (brs, 1H), 4.78 (d,  $J$  = 13.2 Hz, 1H), 4.49 (d,  $J$  = 13.2 Hz, 1H), 2.57–2.76 (m, 4H), 1.73–1.85 (m, 2H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  157.2, 140.2, 135.5, 129.9, 129.3, 128.8, 128.6, 128.3, 126.5, 126.3, 124.9 (q,  $^1J_{\text{F-C}}$  = 284.7 Hz), 124.2, 78.2 (q,  $^2J_{\text{F-C}}$  = 27.8 Hz), 74.9, 29.5, 24.3, 21.0;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3376, 3060, 2937, 1452, 1170, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 350.1362; found, 350.1368.

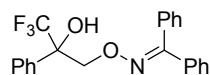
**(E)-6,7,8,9-Tetrahydro-5H-Benzo[7]annulen-5-one O-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ap)**



56.7 mg, 78% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.64 (d,  $J$  = 7.2 Hz, 2H), 7.34–7.42 (m, 3H), 7.31 (t,  $J$  = 7.2 Hz, 2H), 7.22 (t,  $J$  = 7.2 Hz, 1H), 7.13 (d,  $J$  = 7.6 Hz, 1H), 5.43 (brs, 1H), 4.76 (d,  $J$  = 13.2 Hz, 1H), 4.49 (d,  $J$  = 13.2 Hz, 1H), 2.50–2.75 (m, 4H), 1.65–1.77 (m, 2H), 1.51–

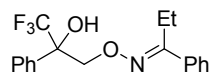
1.60 (m, 2H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  165.1, 139.6, 135.5, 135.0, 129.8, 129.0, 128.6, 128.3, 127.4, 126.5, 126.4, 124.9 (q,  $^1J_{F-C} = 284.8$  Hz), 78.4 (q,  $^2J_{F-C} = 27.8$  Hz), 74.8, 31.7, 26.6, 25.8, 21.4;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s); IR (KBr): 3375, 3057, 2934, 1449, 1170, 1065  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{20}\text{H}_{20}\text{F}_3\text{NO}_2+\text{H}$ , 364.1519; found, 364.1527.

**Benzophenone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3aq)**



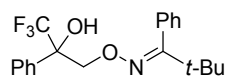
67.1 mg, 87% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.62 (d,  $J = 6.8$  Hz, 2H), 7.32–7.42 (m, 11H), 7.10 (d,  $J = 6.8$  Hz, 2H), 5.11 (brs, 1H), 4.75 (d,  $J = 13.2$  Hz, 1H), 4.51 (d,  $J = 13.2$  Hz, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  159.4, 135.5, 135.2, 132.0, 130.1, 129.3, 129.0, 128.6, 128.4, 128.3, 128.1, 128.1, 126.5, 124.8 (q,  $^1J_{F-C} = 284.5$  Hz), 78.1 (q,  $^2J_{F-C} = 27.8$  Hz), 75.1;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.5 (s, 3F); IR (KBr): 3392, 3058, 2930, 1449, 1168, 1064  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{22}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 386.1362; found, 386.1364.

**(*E*)-Propiophenone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ar)**



53.3 mg, 80% yield, white solid, mp: 71–72  $^{\circ}\text{C}$ ;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 (d,  $J = 7.2$  Hz, 2H), 7.57 (d,  $J = 4.4$  Hz, 2H), 7.33–7.43 (m, 6H), 5.27 (brs, 1H), 4.78 (d,  $J = 13.2$  Hz, 1H), 4.51 (d,  $J = 12.8$  Hz, 1H), 2.69 (q,  $J = 7.2$  Hz, 2H), 1.01 (t,  $J = 7.2$  Hz, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  162.6, 135.5, 134.3, 129.9, 128.7, 128.6, 128.3, 126.4, 126.3, 124.9 (q,  $^1J_{F-C} = 284.4$  Hz), 78.2 (q,  $^2J_{F-C} = 27.6$  Hz), 74.8, 20.3, 10.6;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.3 (s, 3F); IR (KBr): 3389, 3070, 2950, 1456, 1169, 1063  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{18}\text{F}_3\text{NO}_2+\text{H}$ , 338.1362; found, 338.1365.

**(*Z*)-2,2-Dimethyl-1-Phenylpropan-1-one *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3as)**



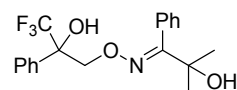
36.5 mg, 50% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.56 (d,  $J = 4.8$  Hz, 2H), 7.35–7.41 (m, 3H), 7.31 (s, 3H), 6.75 (d,  $J = 3.6$  Hz, 2H), 5.37 (brs, 1H), 4.54 (d,  $J = 12.8$  Hz, 1H), 4.32 (d,  $J$

= 12.8 Hz, 1H), 1.12 (s, 9H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  168.5, 135.7, 132.8, 128.5, 128.2, 128.0, 127.8, 127.1, 126.7, 124.7 (q,  $^1J_{\text{F-C}} = 284.3$  Hz), 78.3 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 74.3, 37.5, 27.9;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.7 (s, 3F); IR (KBr): 3377, 3065, 2958, 1462, 1171, 1073  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{20}\text{H}_{22}\text{F}_3\text{NO}_2+\text{H}$ , 366.1675; found, 366.1676.

**(*E*)-2-Hydroxy-2-Methyl-1-Phenylpropan-1-one**

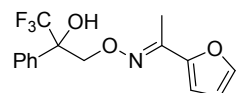
***O*-(3,3,3-Trifluoro-2-Hydroxy-2-**

**Phenylpropyl) Oxime (3at)**



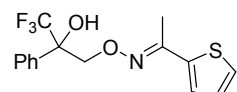
54.4 mg, 74% yield, white solid, mp: 97–98 °C;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.55 (d,  $J = 4.8$  Hz, 2H), 7.34–7.41 (m, 6H), 6.92–6.98 (m, 2H), 4.62 (d,  $J = 12.8$  Hz, 1H), 4.39 (d,  $J = 12.8$  Hz, 1H), 4.37 (brs, 1H), 2.38 (brs, 1H), 1.38 (s, 3H), 1.36 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  165.4, 135.4, 131.4, 128.7, 128.6, 128.3, 128.1, 127.3, 126.4, 124.6 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 77.5 (q,  $^2J_{\text{F-C}} = 28.0$  Hz), 75.1, 72.9, 28.1;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.8 (s, 3F); IR (KBr): 3410, 3060, 2977, 1456, 1169, 1075  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{20}\text{F}_3\text{NO}_3+\text{H}$ , 368.1468; found, 368.1474.

**(*E*)-1-(Furan-2-yl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3au)**



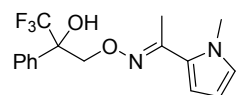
56.4 mg, 90% yield, black oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.65 (d,  $J = 7.2$  Hz, 2H), 7.46 (s, 1H), 7.34–7.42 (m, 3H), 6.66 (s, 1H), 6.43 (s, 1H), 5.24 (brs, 1H), 4.77 (d,  $J = 12.8$  Hz, 1H), 4.49 (d,  $J = 12.8$  Hz, 1H), 2.10 (s, 3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  149.3, 148.9, 144.3, 135.4, 128.6, 128.3, 126.3, 124.9 (q,  $^1J_{\text{F-C}} = 285.2$  Hz), 111.5, 111.4, 78.1 (q,  $^2J_{\text{F-C}} = 27.8$  Hz), 75.1, 11.7;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.2 (s, 3F); IR (KBr): 3364, 2937, 1449, 1401, 1170, 1074  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{15}\text{H}_{14}\text{F}_3\text{NO}_3+\text{H}$ , 314.0999; found, 314.0999.

**(*E*)-1-(Thiophen-2-yl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3av)**



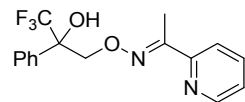
52.7 mg, 80% yield, white solid, mp: 86–87 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.64 (d, *J* = 7.6 Hz, 2H), 7.34–7.42 (m, 3H), 7.32 (d, *J* = 5.2 Hz, 1H), 7.24–7.26 (m, 1H), 7.02 (t, *J* = 4.4 Hz, 1H), 5.10 (brs, 1H), 4.75 (d, *J* = 12.8 Hz, 1H), 4.48 (d, *J* = 12.8 Hz, 1H), 2.20 (s, 3H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 153.5, 138.7, 135.3, 128.7, 128.3, 127.9, 127.5, 127.3, 126.4, 124.9 (q, <sup>1</sup>*J*<sub>F-C</sub> = 284.6 Hz), 78.1 (q, <sup>2</sup>*J*<sub>F-C</sub> = 27.8 Hz), 75.0, 13.0; <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -76.3 (s, 3F); IR (KBr): 3391, 3081, 2934, 1438, 1168, 1067 cm<sup>-1</sup>; HRMS (ESI, *m/z*): [M+H]<sup>+</sup> Calcd. for C<sub>15</sub>H<sub>14</sub>F<sub>3</sub>NO<sub>2</sub>S+H, 330.0770; found, 330.0769.

**(*E*)-1-(1-Methyl-1*H*-Pyrrol-2-yl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3aw)**



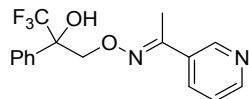
45.7 mg, 70% yield, brown oil; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.63 (d, *J* = 7.2 Hz, 2H), 7.36–7.42 (m, 3H), 6.67 (s, 1H), 6.48 (d, *J* = 1.6 Hz, 1H), 6.12 (d, *J* = 1.2 Hz, 1H), 4.98 (brs, 1H), 4.75 (d, *J* = 12.8 Hz, 1H), 4.43 (d, *J* = 12.8 Hz, 1H), 3.78 (s, 3H), 2.15 (s, 3H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 152.8, 135.5, 128.6, 128.3, 128.1, 127.2, 126.3, 124.9 (q, <sup>1</sup>*J*<sub>F-C</sub> = 284.7 Hz), 114.2, 107.7, 78.0 (q, <sup>2</sup>*J*<sub>F-C</sub> = 27.7 Hz), 74.9, 38.1, 13.7; <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -76.3 (s, 3F); IR (KBr): 3400, 2939, 1445, 1170, 1069 cm<sup>-1</sup>; HRMS (ESI, *m/z*): [M+H]<sup>+</sup> Calcd. for C<sub>16</sub>H<sub>17</sub>F<sub>3</sub>N<sub>2</sub>O<sub>2</sub>+H, 327.1315; found, 327.1315.

**(*E*)-1-(Pyridin-2-yl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ax)**



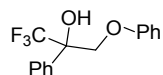
58.4 mg, 90% yield, white solid, mp: 67–68 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.61 (d, *J* = 4.0 Hz, 1H), 7.77 (d, *J* = 8.0 Hz, 1H), 7.64–7.70 (m, 3H), 7.35–7.43 (m, 3H), 7.25–7.29 (m, 1H), 4.99 (brs, 1H), 4.84 (d, *J* = 12.8 Hz, 1H), 4.56 (d, *J* = 12.8 Hz, 1H), 2.31 (s, 3H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 158.8, 153.0, 149.1, 136.4, 135.3, 128.7, 128.3, 126.3, 124.9 (q, <sup>1</sup>*J*<sub>F-C</sub> = 284.3 Hz), 124.2, 120.6, 77.9 (q, <sup>2</sup>*J*<sub>F-C</sub> = 27.8 Hz), 75.4, 11.4; <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -76.3 (s, 3F); IR (KBr): 3405, 3065, 2937, 1455, 1169, 1070 cm<sup>-1</sup>; HRMS (ESI, *m/z*): [M+H]<sup>+</sup> Calcd. for C<sub>16</sub>H<sub>15</sub>F<sub>3</sub>N<sub>2</sub>O<sub>2</sub>+H, 325.1158; found, 325.1162.

**(*E*)-1-(Pyridin-3-yl)ethanone *O*-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropyl) Oxime (3ay)**



57.1 mg, 88% yield, white solid, mp: 93–94 °C; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 8.75 (s, 1H), 8.58 (d, *J* = 4.0 Hz, 1H), 7.88 (d, *J* = 8.0 Hz, 1H), 7.66 (d, *J* = 7.2 Hz, 2H), 7.37–7.43 (m, 3H), 7.30 (dd, *J* = 7.6 Hz, 5.2 Hz, 1H), 5.33 (brs, 1H), 4.83 (d, *J* = 12.8 Hz, 1H), 4.58 (d, *J* = 12.8 Hz, 1H), 2.15 (s, 3H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 154.8, 150.2, 147.0, 135.4, 133.5, 131.3, 128.7, 128.3, 126.3, 124.9 (q, <sup>1</sup>*J*<sub>F-C</sub> = 284.5 Hz), 123.4, 77.5 (q, <sup>2</sup>*J*<sub>F-C</sub> = 27.8 Hz), 75.7, 12.5; <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -76.3 (s, 3F); IR (KBr): 3413, 3070, 2941, 1436, 1166, 1065 cm<sup>-1</sup>; HRMS (ESI, *m/z*): [M+H]<sup>+</sup> Calcd. for C<sub>16</sub>H<sub>15</sub>F<sub>3</sub>N<sub>2</sub>O<sub>2</sub>+H, 325.1158; found, 325.1158.

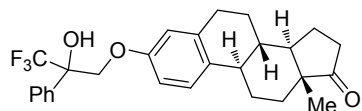
**1,1,1-Trifluoro-3-Phenoxy-2-Phenylpropan-2-ol (3az)**



50.8 mg, 90% yield, yellow oil; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.63 (d, *J* = 7.2 Hz, 2H), 7.40–7.45 (m, 3H), 7.29 (t, *J* = 8.0 Hz, 2H), 7.01 (t, *J* = 7.2 Hz, 1H), 6.92 (d, *J* = 8.0 Hz, 2H), 4.59 (d, *J* = 9.6 Hz, 1H), 4.22 (d, *J* = 9.6 Hz, 1H), 3.52 (brs, 1H); <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ 157.7, 135.1, 129.7, 129.0, 128.5, 125.9, 124.8 (q, <sup>1</sup>*J*<sub>F-C</sub> = 284.8 Hz), 122.2, 114.9, 75.9 (q, <sup>2</sup>*J*<sub>F-C</sub> = 28.3 Hz), 70.1; <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) δ -76.7 (s, 3F); IR (KBr): 3560, 3055, 2943, 2348, 1485, 1172, 1066 cm<sup>-1</sup>; HRMS (ESI, *m/z*): [M+H]<sup>+</sup> Calcd. for C<sub>15</sub>H<sub>13</sub>F<sub>3</sub>O<sub>2</sub>+Na, 305.0760; found, 305.0766.

**(8*S*,9*R*,13*R*,14*R*)-13-Methyl-3-(3,3,3-Trifluoro-2-Hydroxy-2-Phenylpropoxy)-**

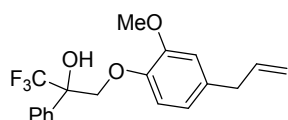
**7,8,9,11,12,13,15,16-Octahydro-6*H*-Cyclopenta[*a*]phenanthren-17(14*H*)-one (3ba)**



78.0 mg, 85% yield, yellow oil; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 7.63 (d, *J* = 6.0 Hz, 2H), 7.38–7.43 (m, 3H), 7.21 (d, *J* = 8.4 Hz, 1H), 6.73 (d, *J* = 8.8 Hz, 1H), 6.67 (s, 1H), 4.56 (d, *J* = 9.6 Hz, 1H), 4.20 (d, *J* = 8.4 Hz, 1H), 3.63 (brs, 1H), 2.88 (d, *J* = 6.0 Hz, 2H), 2.50 (dd, *J* = 19.2, 8.4 Hz, 1H), 2.38 (d, *J* = 10.0 Hz, 1H), 2.25 (t, *J* = 9.2 Hz, 1H), 1.94–2.18 (m, 4H), 1.38–1.67 (m, 6H), 0.90 (s,

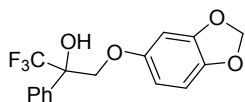
3H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  155.8, 138.1, 135.1, 133.6, 129.0, 128.5, 126.5, 125.9, 124.9 (q,  $^1J_{\text{F-C}} = 285.9$  Hz), 114.9, 112.4, 75.8 (q,  $^2J_{\text{F-C}} = 28.9$  Hz), 70.0, 50.4, 48.0, 43.9, 38.2, 35.8, 31.5, 29.6, 26.4, 25.9, 21.5, 13.8;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.7 (s, 3F); IR (KBr): 3563, 3043, 2933, 1730, 1494, 1168  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{27}\text{H}_{29}\text{F}_3\text{O}_3+\text{H}$ , 459.2142; found, 459.2145.

### 3-(4-Allyl-2-Methoxyphenoxy)-1,1,1-Trifluoro-2-Phenylpropan-2-ol (3bb)



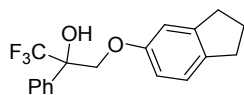
56.4 mg, 80% yield, colorless oil;  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.62 (d,  $J = 7.5$  Hz, 2H), 7.34–7.40 (m, 3H), 6.88 (d,  $J = 8.0$  Hz, 1H), 6.68–6.71 (m, 2H), 5.88–5.96 (m, 1H), 5.04–5.08 (m, 2H), 4.65 (d,  $J = 10.5$  Hz, 1H), 4.20 (dd,  $J = 10.5, 1.0$  Hz, 1H), 3.82 (s, 3H), 3.31 (d,  $J = 6.5$  Hz, 2H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ )  $\delta$  150.4, 146.5, 137.3, 136.2, 135.6, 128.8, 128.4, 126.1, 125.0 (q,  $^1J_{\text{F-C}} = 284.1$  Hz), 121.2, 118.6, 116.0, 112.9, 75.9 (q,  $^2J_{\text{F-C}} = 28.1$  Hz), 74.4, 56.0, 39.9;  $^{19}\text{F}$  NMR (470 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.9 (s, 3F); IR (KBr): 3454, 2929, 1634, 1508, 1165  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{19}\text{H}_{19}\text{F}_3\text{O}_3+\text{H}$ , 353.1359; found, 353.1363

### 3-(Benzo[d][1,3]dioxol-5-yloxy)-1,1,1-Trifluoro-2-Phenylpropan-2-ol (3bc)



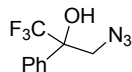
55.5 mg, 85% yield, brown oil;  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.60 (d,  $J = 7.0$  Hz, 2H), 7.38–7.42 (m, 3H), 6.67 (d,  $J = 8.5$  Hz, 1H), 6.47 (d,  $J = 2.5$  Hz, 1H), 6.32 (dd,  $J = 8.5, 2.5$  Hz, 1H), 5.87 (s, 2H), 4.50 (d,  $J = 10.0$  Hz, 1H), 4.14 (dd,  $J = 10.0, 1.5$  Hz, 1H), 3.80 (s, 1H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ )  $\delta$  153.2, 148.4, 142.8, 135.1, 129.1, 128.6, 126.0, 124.8 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 108.0, 106.5, 101.4, 98.8, 75.9 (q,  $^2J_{\text{F-C}} = 28.3$  Hz), 71.3;  $^{19}\text{F}$  NMR (470 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.7 (s, 3F); IR (KBr): 3524, 3066, 2900, 1622, 1481, 1173  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{16}\text{H}_{13}\text{F}_3\text{O}_4+\text{H}$ , 327.0839; found, 327.0836.

### 3-((2,3-Dihydro-1H-Inden-5-yl)oxy)-1,1,1-Trifluoro-2-Phenylpropan-2-ol (3bd)



56.7 mg, 88% yield, yellow oil;  $^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ )  $\delta$  7.62 (d,  $J = 7.0$  Hz, 2H), 7.35–7.42 (m, 3H), 7.10 (d,  $J = 8.0$  Hz, 1H), 6.80 (d,  $J = 2.0$  Hz, 1H), 6.69 (dd,  $J = 8.0$  Hz, 2.5 Hz, 1H), 4.56 (d,  $J = 10.0$  Hz, 1H), 4.19 (dq,  $J = 10.0$  Hz, 1.5 Hz, 1H), 3.76 (brs, 1H), 2.81–2.86 (m, 4H), 2.05 (quint,  $J = 7.5$  Hz, 2H);  $^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ )  $\delta$  156.8, 146.1, 137.9, 135.3, 129.0, 128.5, 126.0, 125.0, 124.9 (q,  $^1J_{\text{F-C}} = 284.9$  Hz), 113.0, 111.2, 76.0 (q,  $^2J_{\text{F-C}} = 28.3$  Hz), 70.5, 33.1, 32.0, 25.9;  $^{19}\text{F}$  NMR (470 MHz,  $\text{CDCl}_3$ )  $\delta$  -76.7 (s, 3F); IR (KBr): 3555, 2944, 2855, 1483, 1170  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{18}\text{H}_{17}\text{F}_3\text{O}_2+\text{Na}$ , 345.1073; found, 345.1075.

### 3-Azido-1,1,1-Trifluoro-2-Phenylpropan-2-ol (3be)



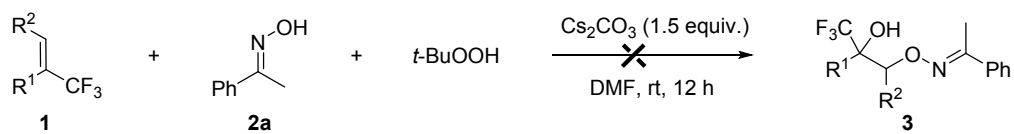
41.6 mg, 90% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.55 (d,  $J = 6.8$  Hz, 2H), 7.38–7.46 (m, 3H), 3.98 (d,  $J = 13.2$  Hz, 1H), 3.80 (d,  $J = 12.8$  Hz, 1H), 3.13 (brs, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  134.8, 129.3, 128.6, 126.0, 124.5 (q,  $^1J_{\text{F-C}} = 284.5$  Hz), 76.3 (q,  $^2J_{\text{F-C}} = 28.1$  Hz), 55.3;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -77.7 (s, 3F); IR (KBr): 3152, 3063, 2950, 1452, 1270, 1163  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_9\text{H}_8\text{F}_3\text{N}_3\text{O}+\text{Na}$ , 254.0512; found, 254.0519.

### 2-Phenyl-2-(Trifluoromethyl)oxirane (8)

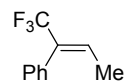
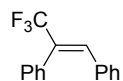


11.0 mg, 29% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.52 (s, 2H), 7.41 (s, 3H), 3.40 (d,  $J = 4.8$  Hz, 1H), 2.92 (s, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  131.1, 129.6, 128.5, 127.7, 123.4 (q,  $^1J_{\text{F-C}} = 276.6$  Hz), 58.0 (q,  $^2J_{\text{F-C}} = 36.6$  Hz), 50.9 (q,  $^3J_{\text{F-C}} = 2.2$  Hz);  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -74.5 (s, 3F); IR (KBr): 3069, 2906, 1720, 1334, 1174, 954  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_9\text{H}_7\text{F}_3\text{O}+\text{Na}$ , 211.0341; found, 211.0345.

#### D. Other (Trifluoromethyl)alkenes in this Hydroxyletherification Reaction

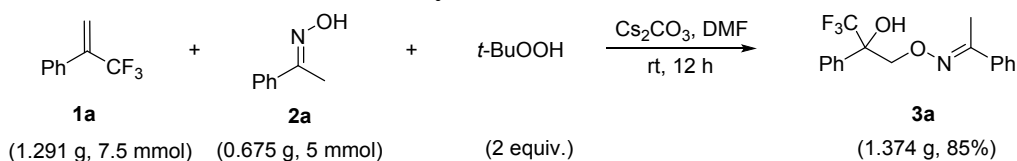


Failed (Trifluoromethyl)alkenes:



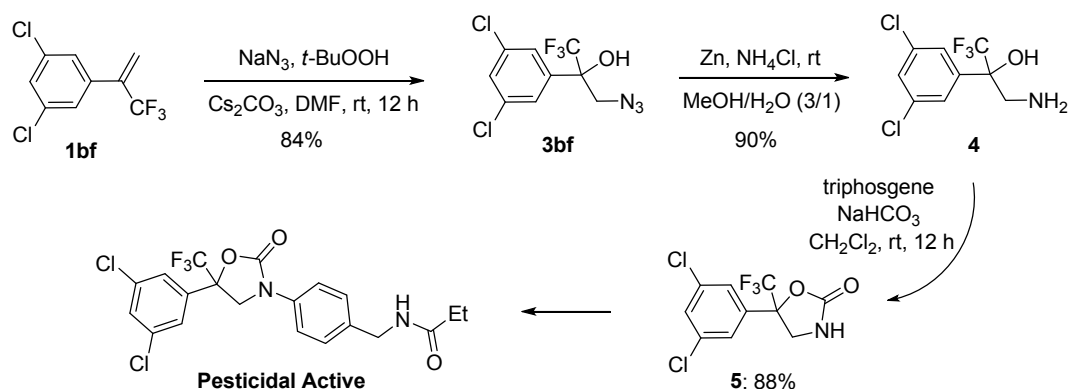
When these four (trifluoromethyl)alkenes were used as the substrates under our standard reaction conditions, no desired hydroxyletherification products were detected.

## E. Procedure for the Gram-Scale Synthesis and Transformation of the Products



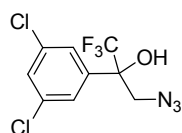
A 250 mL round-bottom flask equipped with a magnetic stirring bar, 2-trifluoromethyl-1-alkene **1a** (1.291 g, 7.5 mmol), oxime **2a** (0.675 g, 5 mmol), TBHP (10 mmol, 5 M in decane),  $\text{Cs}_2\text{CO}_3$  (7.5 mmol), and DMF (100 mL) was vigorously stirred at room temperature for 12 h. Then added distilled water (150 mL), extracted with EtOAc (150 mL  $\times$  3). The combined organic phases were washed with brine (150 mL  $\times$  3), dried over anhydrous  $\text{Na}_2\text{SO}_4$ , filtered and concentrated *in vacuo*. Further purification by flash column chromatography on silica gel (eluting with petroleum ether/ethyl acetate) provided the product **3a** in 85% isolated yield.

### Synthesis of product 5



#### Procedure 1 for Synthesis of 3-Azido-2-(3,5-Dichlorophenyl)-1,1,1-Trifluoropropan-2-ol (**3bf**):

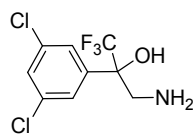
To a 25 mL round bottom flask equipped with a magnetic stirring bar was added trifluoromethyl alkene **1bf** (0.2 mmol),  $\text{NaN}_3$  (0.6 mmol), TBHP (0.4 mmol, 5 M in decane),  $\text{Cs}_2\text{CO}_3$  (0.3 mmol), and DMF (2 mL) at room temperature. The mixture was vigorously stirred at the same temperature for 12 h. Then added distilled water (10 mL), and extracted with EtOAc (15 mL  $\times$  3). The combined organic layers were dried over  $\text{Na}_2\text{SO}_4$ , and concentrated *in vacuo*. Further purification by flash column chromatography on silica gel (eluting with petroleum ether/ethyl acetate) provided the product **3bf** in 84% isolated yield.



50.4 mg, 84% yield, colorless oil;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.46 (s, 2H), 7.42 (s, 1H), 4.00 (d,  $J = 13.2$  Hz, 1H), 3.75 (d,  $J = 13.2$  Hz, 1H), 3.34 (brs, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  138.2, 135.5, 129.6, 124.9, 124.0 (q,  $^1J_{\text{F-C}} = 284.6$  Hz), 75.7 (q,  $^2J_{\text{F-C}} = 28.7$  Hz), 55.1;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -77.6 (s, 3F); IR (KBr): 3532, 3064, 2113, 1271, 1168  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_9\text{H}_6\text{Cl}_2\text{F}_3\text{N}_3\text{O}+\text{Na}$ , 321.9732; found, 321.9739.

**Procedure 2 for Synthesis of 3-Amino-2-(3,5-Dichlorophenyl)-1,1,1-Trifluoropropan-2-ol (4)**

To a 25 mL round bottom flask equipped with a magnetic stirring bar was added 3-azido-2-(3,5-dichlorophenyl)-1,1,1-trifluoropropan-2-ol **3bf** (0.2 mmol), Zn (0.3 mmol),  $\text{NH}_4\text{Cl}$  (0.3 mmol),  $\text{MeOH}/\text{H}_2\text{O}$  (4 mL, v/v = 3/1) at room temperature. The mixture was vigorously stirred at the same temperature for 12 h. Then added distilled water (10 mL), and extracted with EtOAc (15 mL  $\times$  3). The combined organic layers were dried over  $\text{Na}_2\text{SO}_4$ , and concentrated *in vacuo*. Further purification by flash column chromatography on silica gel (eluting with petroleum ether/ethyl acetate) provided the product **4** in 90% isolated yield.

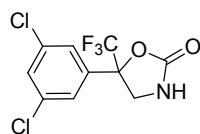


49.4 mg, 90% yield, yellow oil;  $^1\text{H}$  NMR (400 MHz,  $d_6$ -DMSO)  $\delta$  7.63 (s, 1H), 7.58 (s, 2H), 3.38 (brs, 1H), 3.25 (d,  $J = 13.6$  Hz, 1H), 3.17 (d,  $J = 13.6$  Hz, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $d_6$ -DMSO)  $\delta$  142.1, 134.5, 128.4, 126.4, 125.8 (q,  $^1J_{\text{F-C}} = 282.1$  Hz), 76.7 (q,  $^2J_{\text{F-C}} = 25.8$  Hz), 45.5;  $^{19}\text{F}$  NMR (376 MHz,  $d_6$ -DMSO)  $\delta$  -77.0 (s, 3F); IR (KBr): 3376, 3091, 2931, 1577, 1169, 753  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_9\text{H}_8\text{Cl}_2\text{F}_3\text{NO}+\text{H}$ , 274.0008; found, 274.0013.

**Procedure 3 for Synthesis of 5-(3,5-Dichlorophenyl)-5-(Trifluoromethyl)oxazolidin-2-one (5):**

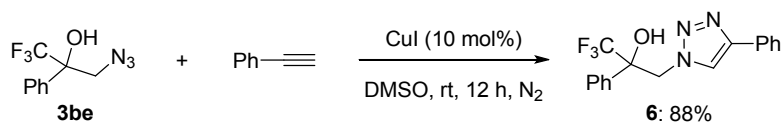
To a 25 mL round bottom flask equipped with a magnetic stirring bar was added 3-amino-2-(3,5-dichlorophenyl)-1,1,1-trifluoropropan-2-ol **4** (0.2 mmol), triphosgene (0.3 mmol),  $\text{NaHCO}_3$  (0.3 mmol),  $\text{CH}_2\text{Cl}_2$  (4 mL) was vigorously stirred at room temperature for 12 h under Air. Then added distilled water (10 mL), and extracted with EtOAc (15 mL  $\times$  3). The combined organic layers were dried over  $\text{Na}_2\text{SO}_4$ , and concentrated *in vacuo*. Further purification by flash column chromatography on silica gel (eluting with petroleum ether/ethyl acetate) provided the product **5** in 88% isolated

yield.

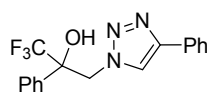


52.6 mg, 88% yield, white solid, mp: 100–101 °C;  $^1\text{H}$  NMR (400 MHz,  $d_6$ -DMSO)  $\delta$  7.78 (s, 1H), 7.59 (s, 2H), 4.22 (d,  $J$  = 10.8 Hz, 1H), 3.99 (d,  $J$  = 10.8 Hz, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $d_6$ -DMSO)  $\delta$  155.7, 138.4, 135.2, 130.1, 125.4, 123.8 (q,  $^1J_{\text{F-C}}$  = 283.0 Hz), 80.2 (q,  $^2J_{\text{F-C}}$  = 30.6 Hz), 47.4;  $^{19}\text{F}$  NMR (376 MHz,  $d_6$ -DMSO)  $\delta$  -80.4 (s, 3F); IR (KBr): 3300, 3086, 2920, 1779, 1191, 1072  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{10}\text{H}_6\text{Cl}_2\text{F}_3\text{NO}_2+\text{H}$ , 299.9800; found, 299.9808.

### Synthesis of product 6



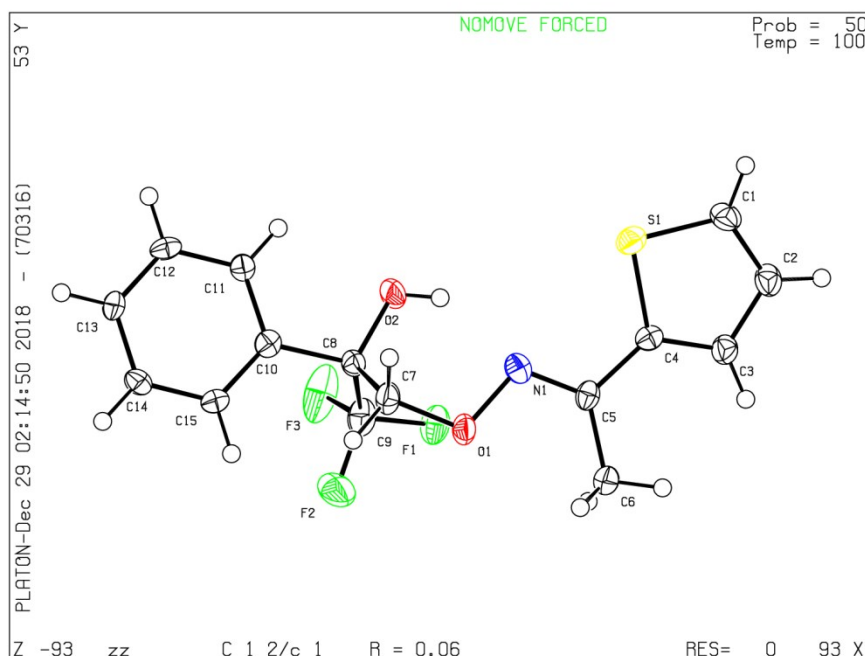
To a 25 mL round bottom flask equipped with a magnetic stirring bar was added 3-azido-1,1,1-trifluoro-2-phenylpropan-2-ol **3be** (0.2 mmol), phenylacetylene (0.3 mmol), CuI (0.02 mmol), DMSO (2 mL) at room temperature. The mixture was vigorously stirred at the same temperature for 12 h under  $\text{N}_2$ . Then added distilled water (10 mL), and extracted with EtOAc (15 mL  $\times$  3). The combined organic layers were dried over  $\text{Na}_2\text{SO}_4$ , and concentrated *in vacuo*. Further purification by flash column chromatography on silica gel (eluting with petroleum ether/ethyl acetate) provided the product **6** in 88% isolated yield.



58.7 mg, 88%, white solid, mp: 154–155 °C;  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta$  7.69 (d,  $J$  = 7.6 Hz, 2H), 7.63 (s, 1H), 7.59 (d,  $J$  = 4.8 Hz, 2H), 7.29–7.41 (m, 6H), 5.04 (d,  $J$  = 14.4 Hz, 1H), 4.96 (d,  $J$  = 14.4 Hz, 1H), 4.78 (brs, 1H);  $^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )  $\delta$  147.6, 133.8, 129.7, 129.4, 128.9, 128.7, 128.5, 126.2, 125.8, 124.4 (q,  $^1J_{\text{F-C}}$  = 284.5 Hz), 121.5, 76.7 (q,  $^2J_{\text{F-C}}$  = 28.1 Hz), 54.4;  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ )  $\delta$  -77.5 (s, 3F); IR (KBr): 3148, 3053, 2915, 1450, 1270, 1160  $\text{cm}^{-1}$ ; HRMS (ESI,  $m/z$ ):  $[\text{M}+\text{H}]^+$  Calcd. for  $\text{C}_{17}\text{H}_{14}\text{F}_3\text{N}_3\text{O}+\text{H}$ , 334.1162; found, 334.1165.

## F. X-ray Crystallographic Data

The X-ray crystallographic structures for **3av**. ORTEP representation with 50% probability thermal ellipsoids. Solvent and hydrogen are omitted for clarity. Crystal data have been deposited to CCDC, number 1956248.



|                                  |                                                                                                                                                                                   |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Empirical formula                | C <sub>15</sub> H <sub>14</sub> F <sub>3</sub> NO <sub>2</sub> S                                                                                                                  |
| Formula weight                   | 329.33                                                                                                                                                                            |
| Temperature                      | 100.00 (10) K                                                                                                                                                                     |
| Crystal system, Space group      | Monoclinic, C12/c1                                                                                                                                                                |
| Unit cell dimensions             | $a = 25.516(3) \text{ \AA}$ $\alpha = 90 \text{ deg.}$<br>$b = 5.6738(5) \text{ \AA}$ $\beta = 110.176(6) \text{ deg.}$<br>$c = 21.937(2) \text{ \AA}$ $\gamma = 90 \text{ deg.}$ |
| Volume                           | 2981.0(5) Å <sup>3</sup>                                                                                                                                                          |
| Z                                | 8                                                                                                                                                                                 |
| $\rho_{\text{calc}}/\text{cm}^3$ | 1.468                                                                                                                                                                             |
| $\mu/\text{mm}^{-1}$             | 0.256 mm <sup>-1</sup>                                                                                                                                                            |
| F(000)                           | 1360                                                                                                                                                                              |
| Crystal size                     | 0.12 × 0.06 × 0.03 mm <sup>3</sup>                                                                                                                                                |
| Radiation                        | MoK $\alpha$ ( $\lambda = 0.71073$ )                                                                                                                                              |
| Theta range for data collection  | 3.022 to 25.012 deg.                                                                                                                                                              |
| Index ranges                     | -25 ≤ h ≤ 31, -6 ≤ k ≤ 6, -26 ≤ l ≤ 26                                                                                                                                            |

|                                         |                                                                  |
|-----------------------------------------|------------------------------------------------------------------|
| Reflections collected                   | 10820                                                            |
| Independent reflections                 | 2829 [ $R_{\text{int}} = 0.1086$ , $R_{\text{sigma}} = 0.1074$ ] |
| Data/restraints/parameters              | 2829/0/201                                                       |
| Goodness-of-fit on $F^2$                | 1.026                                                            |
| Final R indexes [ $I \geq 2\sigma(I)$ ] | $R_1 = 0.0621$ , $wR_2 = 0.1020$                                 |
| Final R indexes [all data]              | $R_1 = 0.1356$ , $wR_2 = 0.1313$                                 |

## G. Mechanistic Studies

### The screen of oxidants

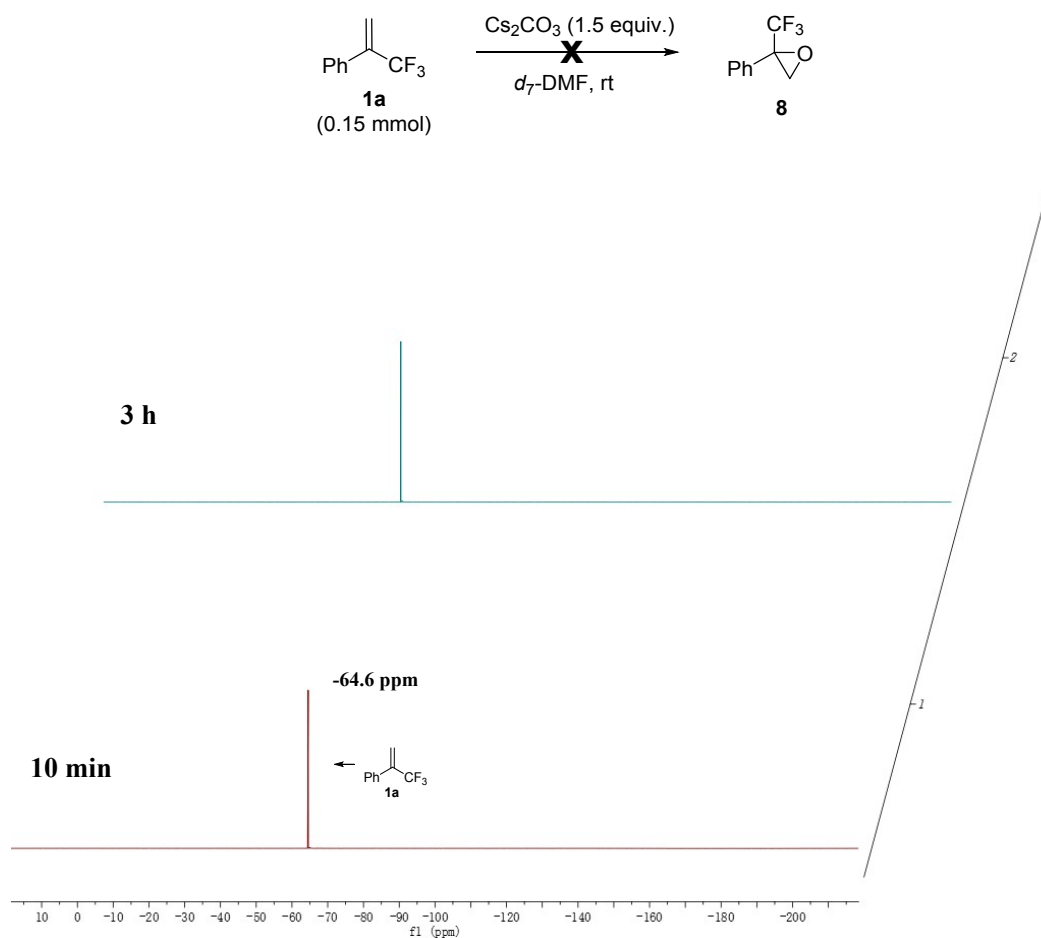
| Entry | Oxidants                                     | Yield of <b>8</b> (%) <sup>a</sup> |
|-------|----------------------------------------------|------------------------------------|
| 1     | AgOAc                                        | 0                                  |
| 2     | PhI(OAc) <sub>2</sub>                        | 0                                  |
| 3     | <i>m</i> -CPBA                               | 0                                  |
| 4     | BPO                                          | 0                                  |
| 5     | H <sub>2</sub> O <sub>2</sub>                | 4                                  |
| 6     | K <sub>2</sub> S <sub>2</sub> O <sub>8</sub> | 0                                  |
| 7     | BQ                                           | 0                                  |
| 8     | ( <i>t</i> -BuO) <sub>2</sub>                | 0                                  |
| 9     | TBHP                                         | 29                                 |

<sup>a</sup>The yields were determined by <sup>19</sup>F NMR spectroscopy of the crude product with PhCF<sub>3</sub> as an internal standard. *m*-CPBA = 3-Chloroperbenzoic acid. BPO = Benzoyl peroxide. BQ = 1,4-Benzoquinone. TBHP = *tert*-butyl hydroperoxide.

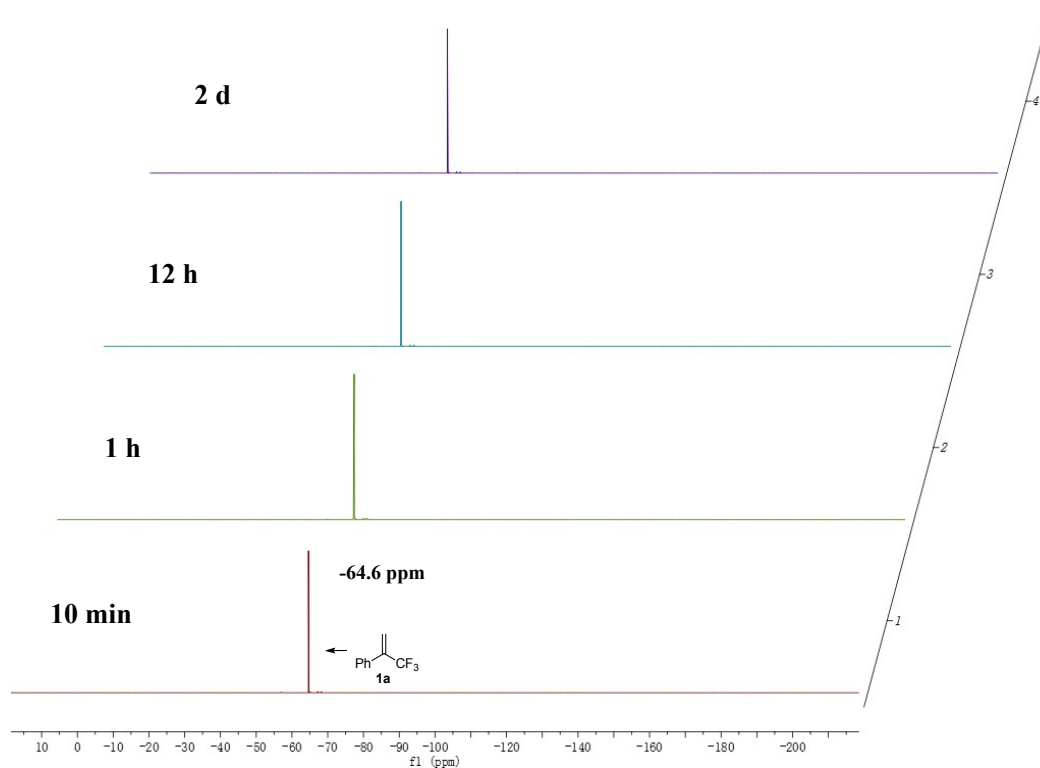
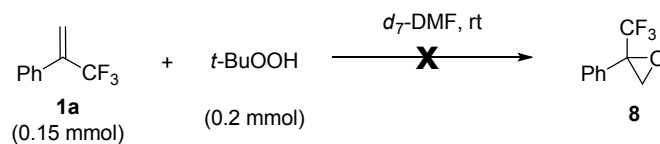
| Entry | Oxidants                                     | Yield of ( <b>3a</b> / <b>7a</b> ) (%) <sup>a</sup> |
|-------|----------------------------------------------|-----------------------------------------------------|
| 1     | AgOAc                                        | 0/0                                                 |
| 2     | PhI(OAc) <sub>2</sub>                        | 0/0                                                 |
| 3     | <i>m</i> -CPBA                               | 0/0                                                 |
| 4     | BPO                                          | 0/0                                                 |
| 5     | H <sub>2</sub> O <sub>2</sub>                | 0/0                                                 |
| 6     | K <sub>2</sub> S <sub>2</sub> O <sub>8</sub> | 0/0                                                 |
| 7     | BQ                                           | 0/0                                                 |
| 8     | DTBP                                         | 0/37                                                |
| 9     | TBHP                                         | 90/0                                                |

<sup>a</sup>The yields were determined by <sup>19</sup>F NMR spectroscopy of the crude product with PhCF<sub>3</sub> as an internal standard. *m*-CPBA = 3-Chloroperbenzoic acid. BPO = Benzoyl peroxide. BQ = 1,4-Benzoquinone. TBHP = *tert*-butyl hydroperoxide.

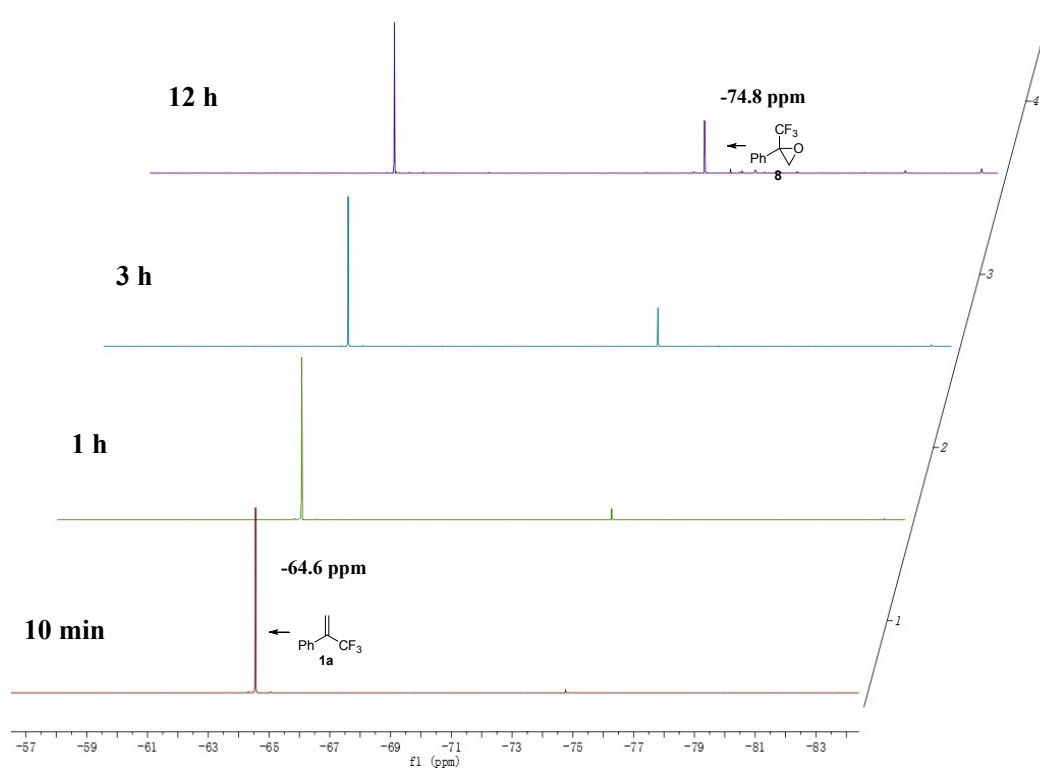
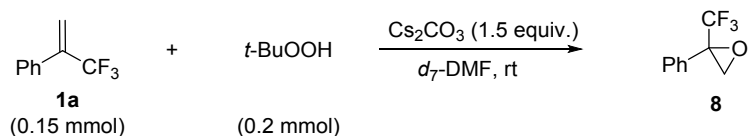
**$^{19}\text{F}$  NMR (376 MHz,  $d_7$ -DMF) Spectrum for the Reaction Mixture (25 °C)**



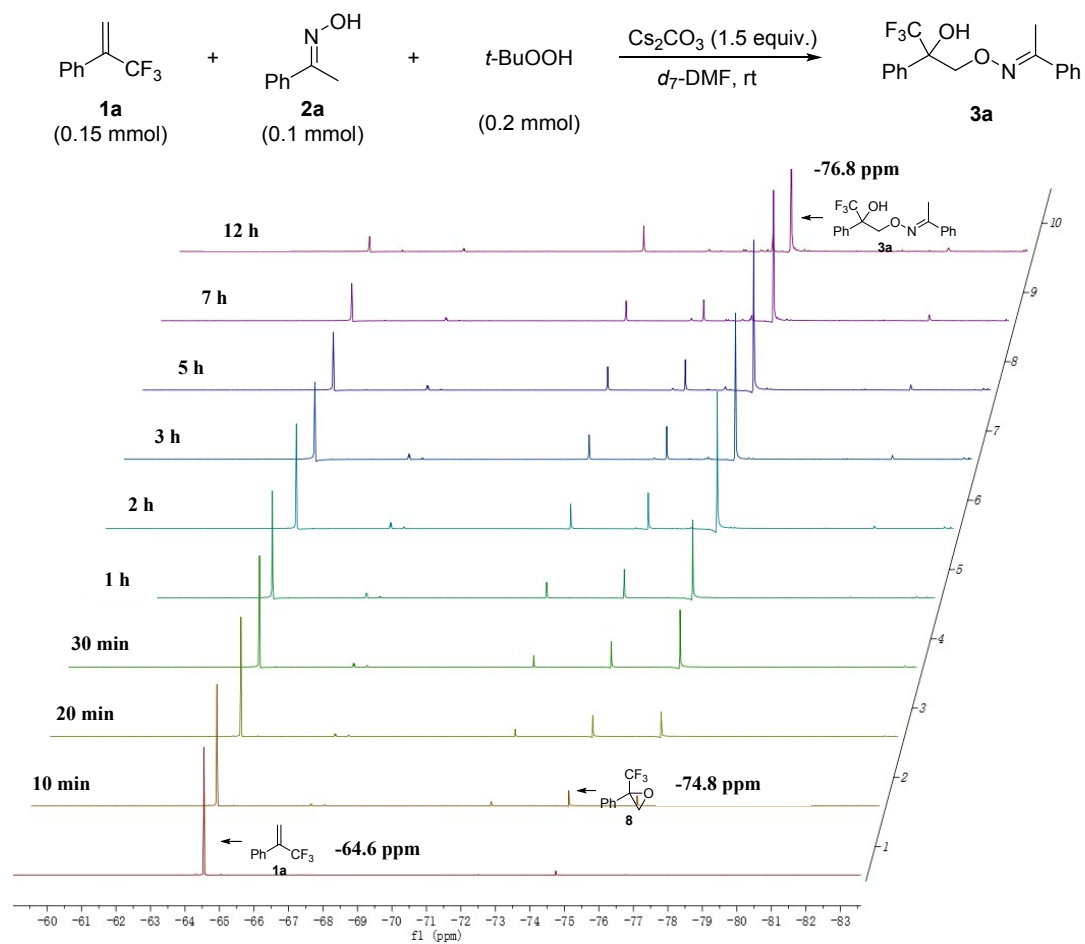
To a nuclear magnetic tube was only added 2-trifluoromethyl-1-alkene **1a** (0.15 mmol),  $\text{Cs}_2\text{CO}_3$  (1.5 equiv.), and  $d_7$ -DMF (1 mL) at room temperature. Shake the NMR tube quickly. After 10 minutes, 2-trifluoromethyl-1-alkene **1a** had no conversion and 2-phenyl-2-(trifluoromethyl)oxirane (**8**) was not detected through  $^{19}\text{F}$  NMR spectroscopy. The result was the same after 3 hour.



To a nuclear magnetic tube was only added 2-trifluoromethyl-1-alkene **1a** (0.15 mmol), TBHP (0.2 mmol, 5 M in decane), and  $d_7$ -DMF (1 mL) at room temperature. Shake the NMR tube quickly. After 10 minutes, 2-trifluoromethyl-1-alkene **1a** had no conversion and 2-phenyl-2-(trifluoromethyl)oxirane (**8**) was not detected through  $^{19}\text{F}$  NMR spectroscopy. The result was the same after 2 days.

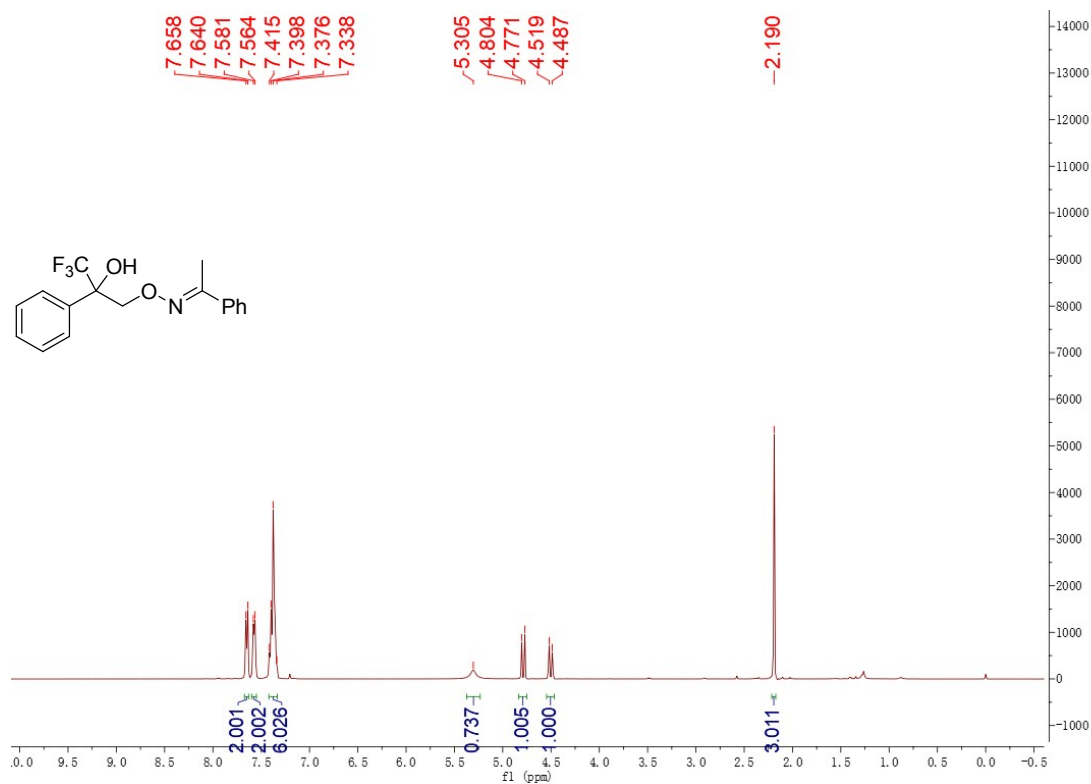


To a nuclear magnetic tube was added 2-trifluoromethyl-1-alkene **1a** (0.15 mmol), TBHP (0.2 mmol, 5 M in decane),  $\text{Cs}_2\text{CO}_3$  (1.5 equiv.), and  $d_7$ -DMF (1 mL) at room temperature. Shake the NMR tube quickly. After 1 hour, 2-phenyl-2-(trifluoromethyl)oxirane (**8**) was detected by  $^{19}\text{F}$  NMR spectroscopy with a single peak at  $\delta = -74.8 \text{ ppm}$ . The reaction time was extended to 12 hours, 2-trifluoromethyl-1-alkene **1a** could not be completely converted to 2-phenyl-2-(trifluoromethyl)oxirane (**8**).

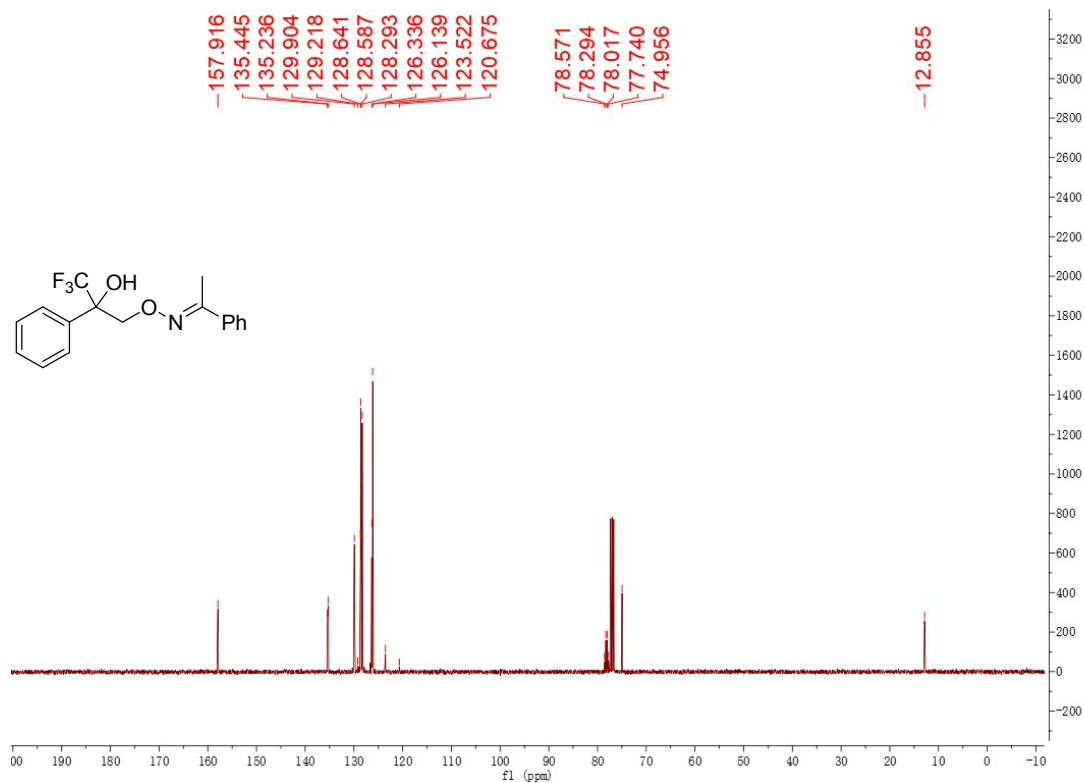


## H. NMR Spectra of New Compounds

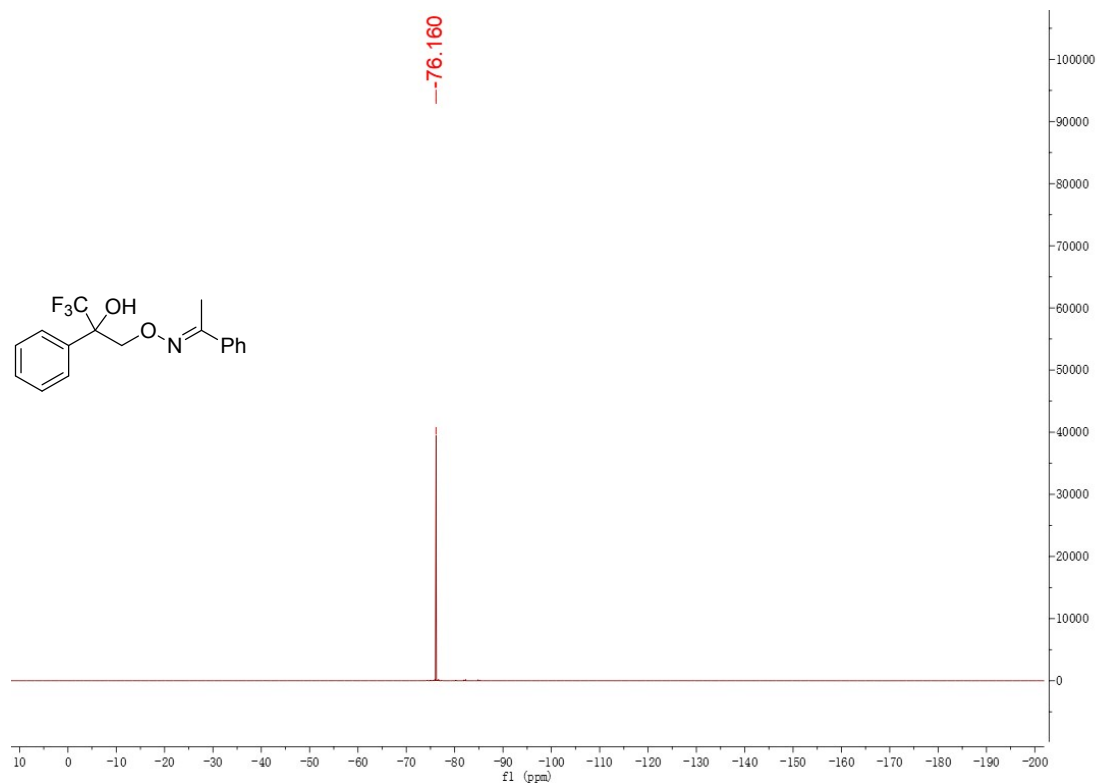
### <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3a



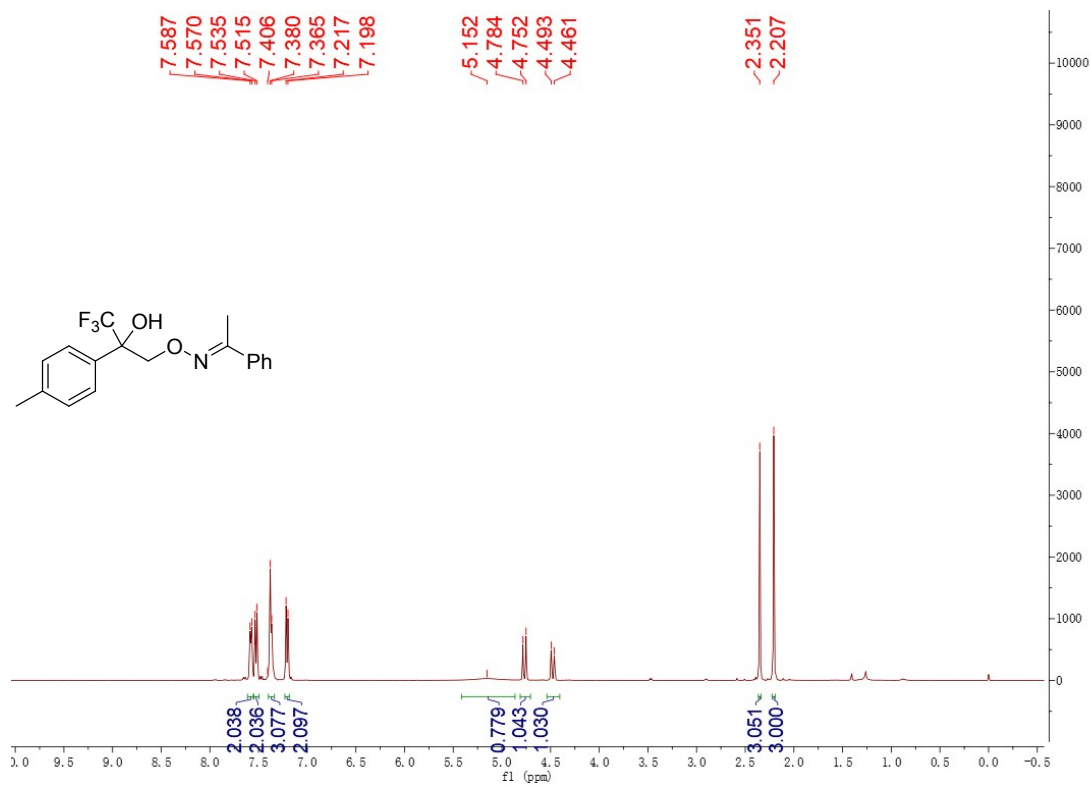
### <sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3a



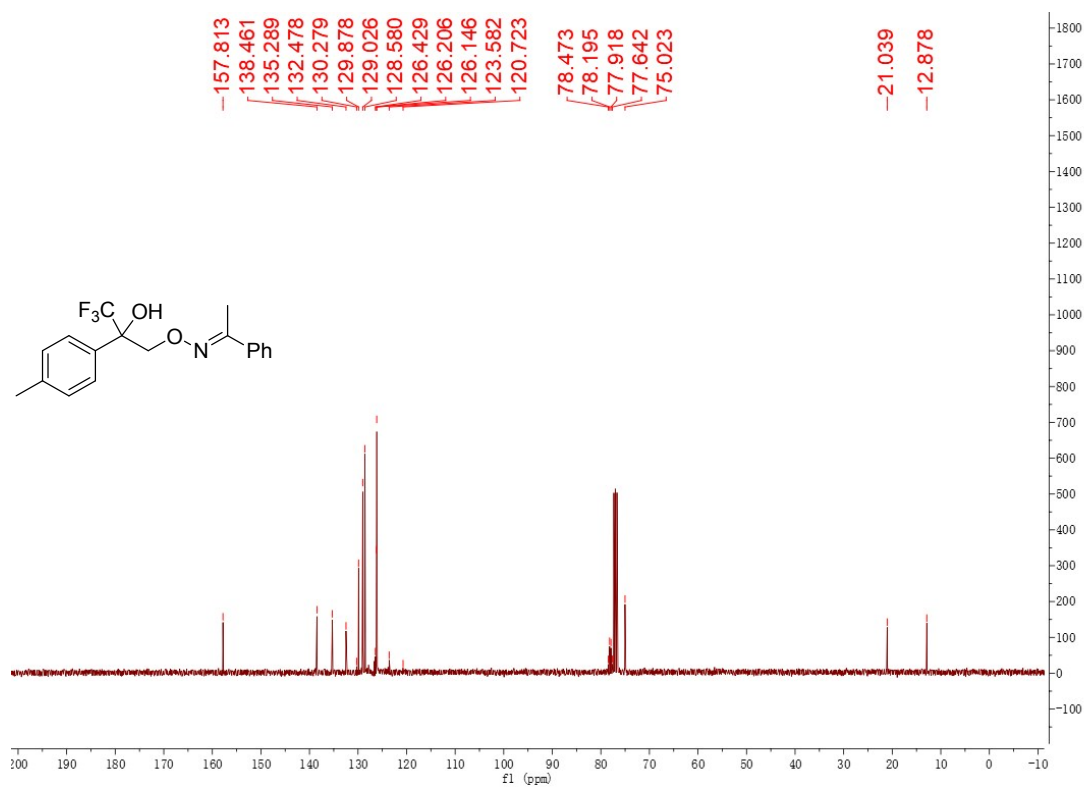
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3a**



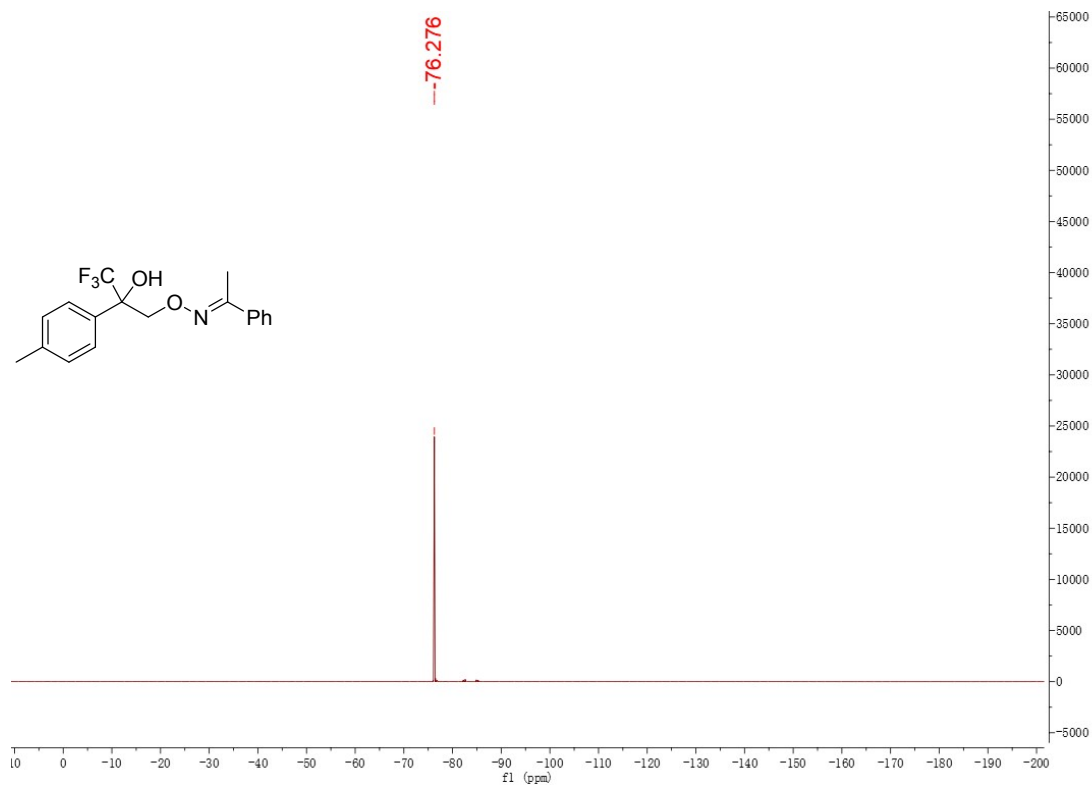
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3b**



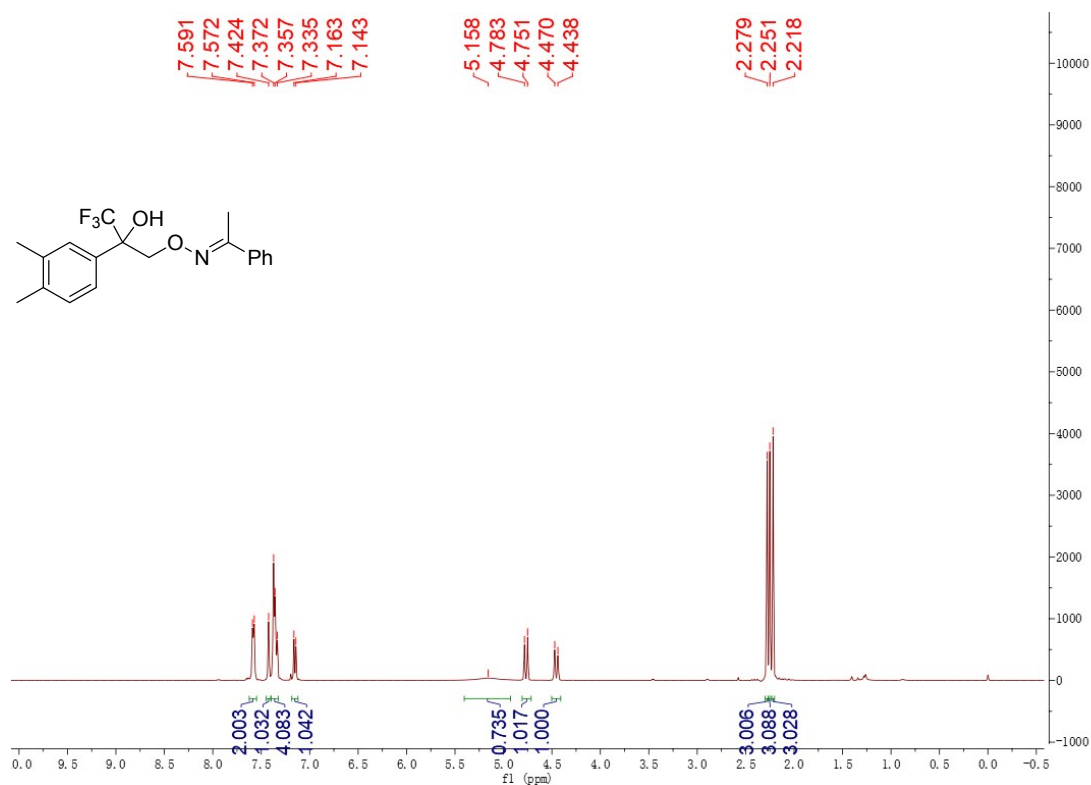
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3b**



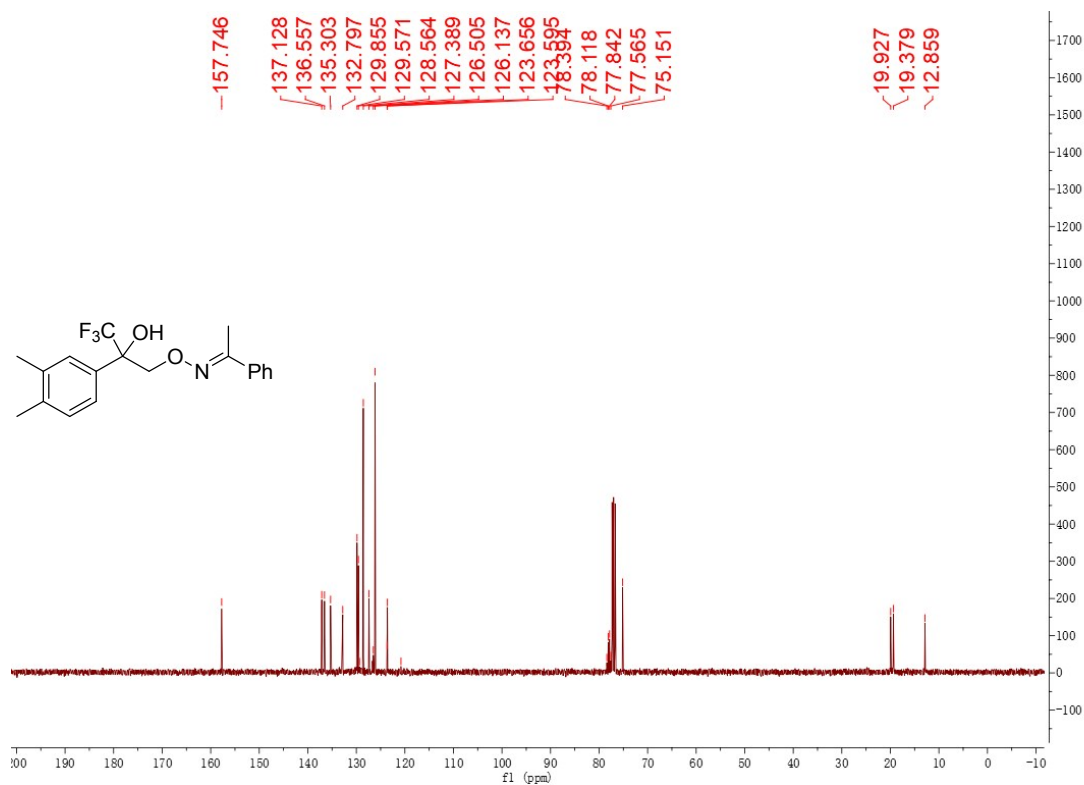
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3b**



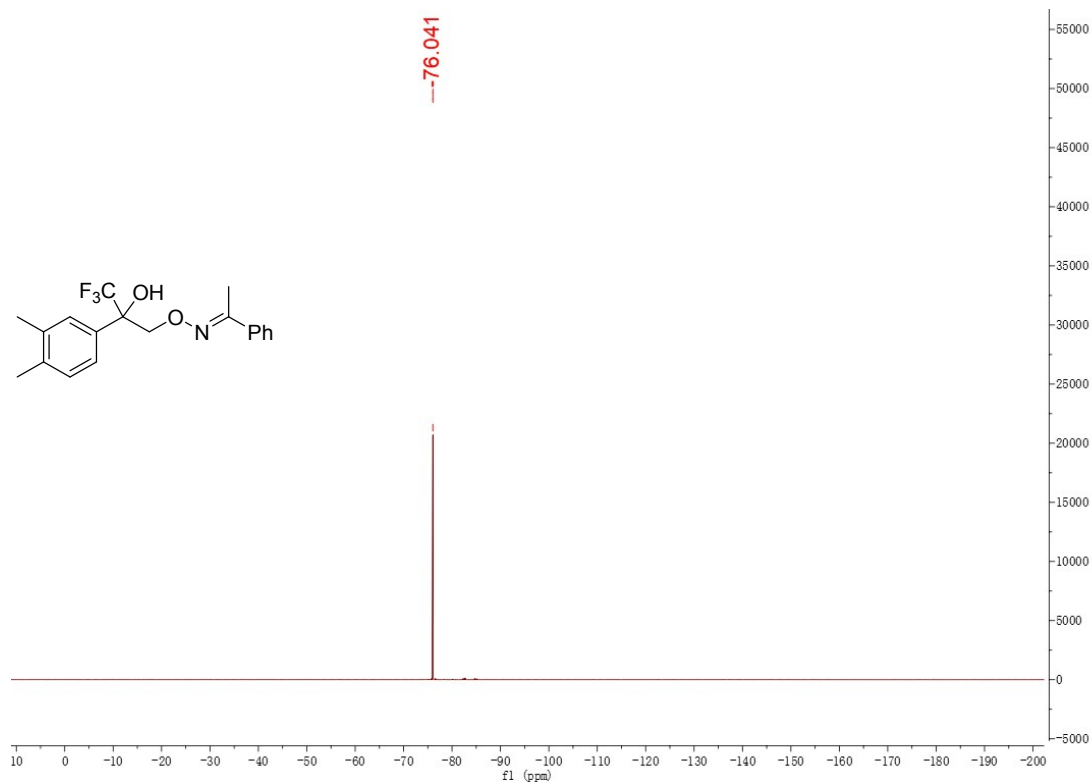
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3c**



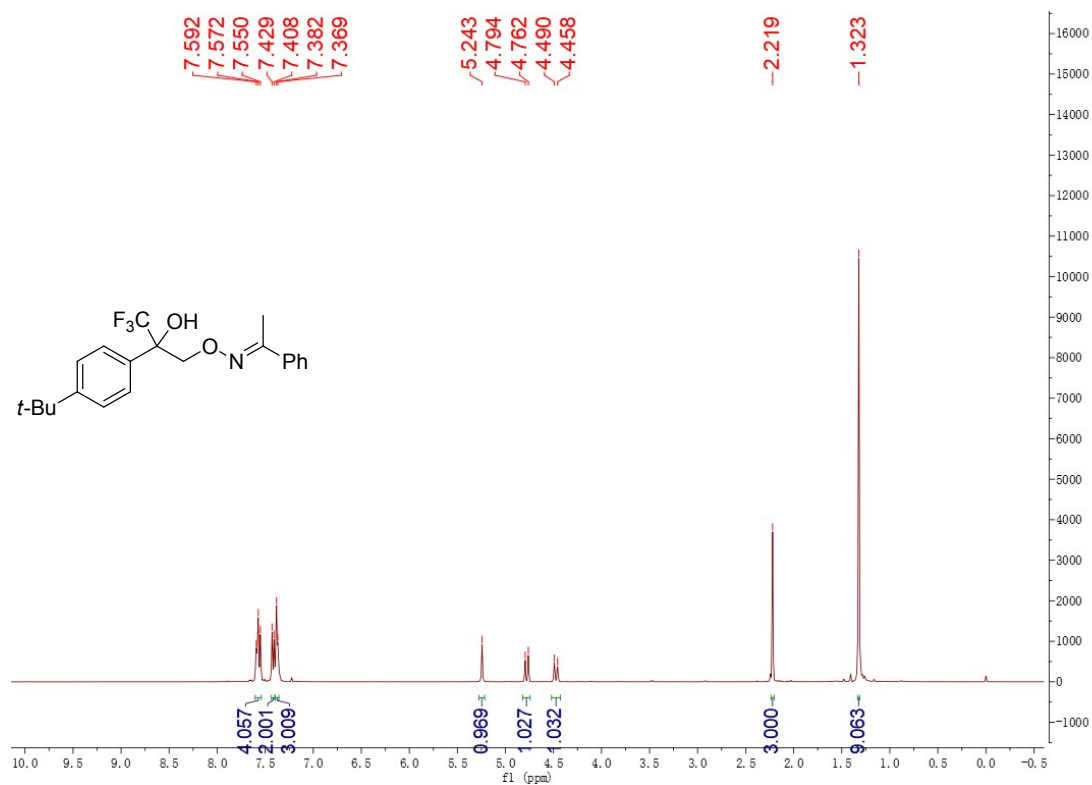
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3c**



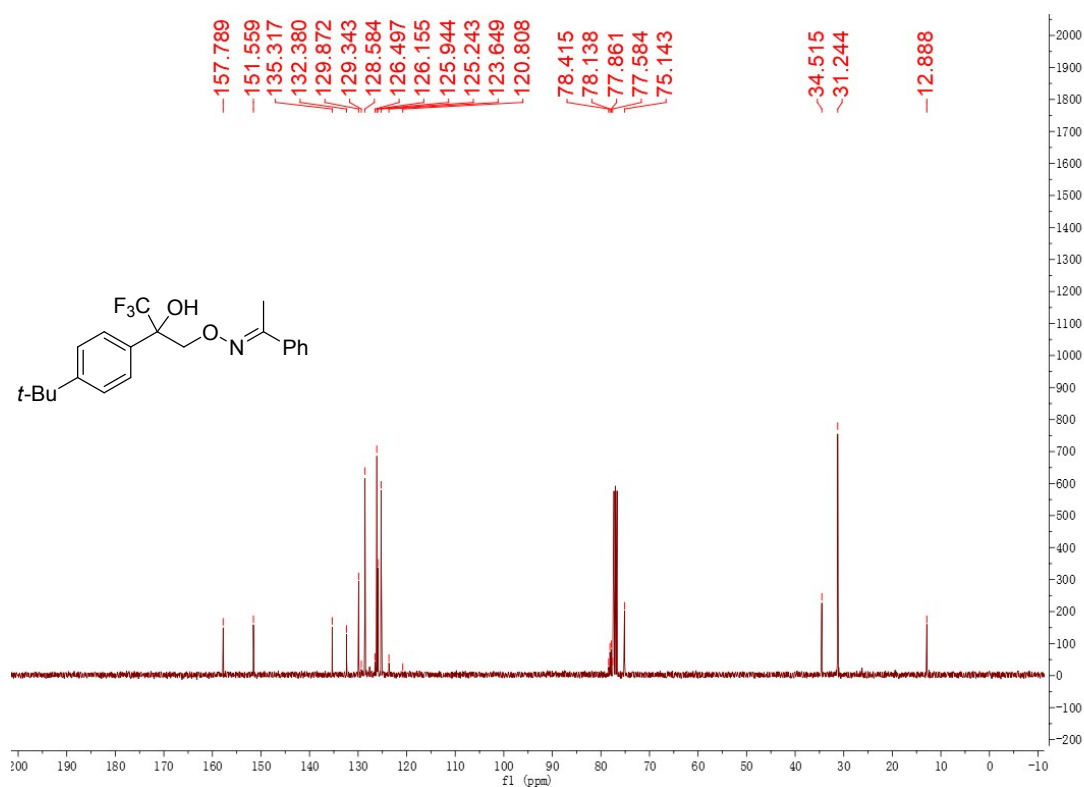
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3c**



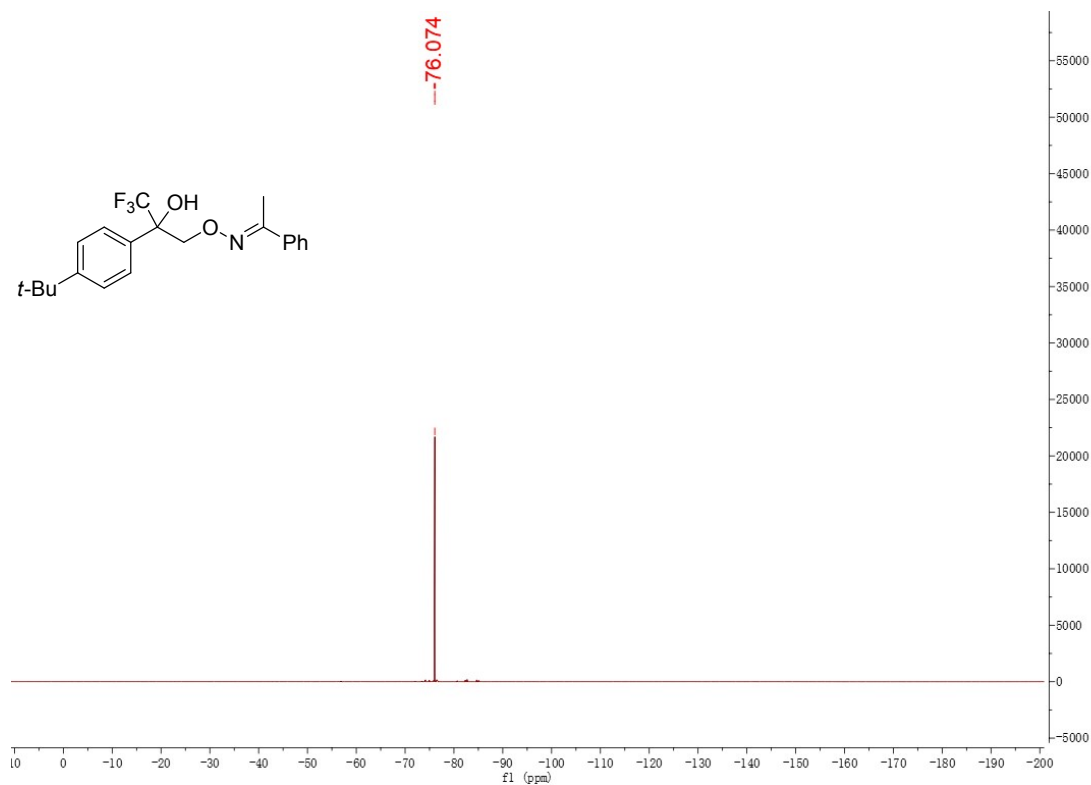
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3d**



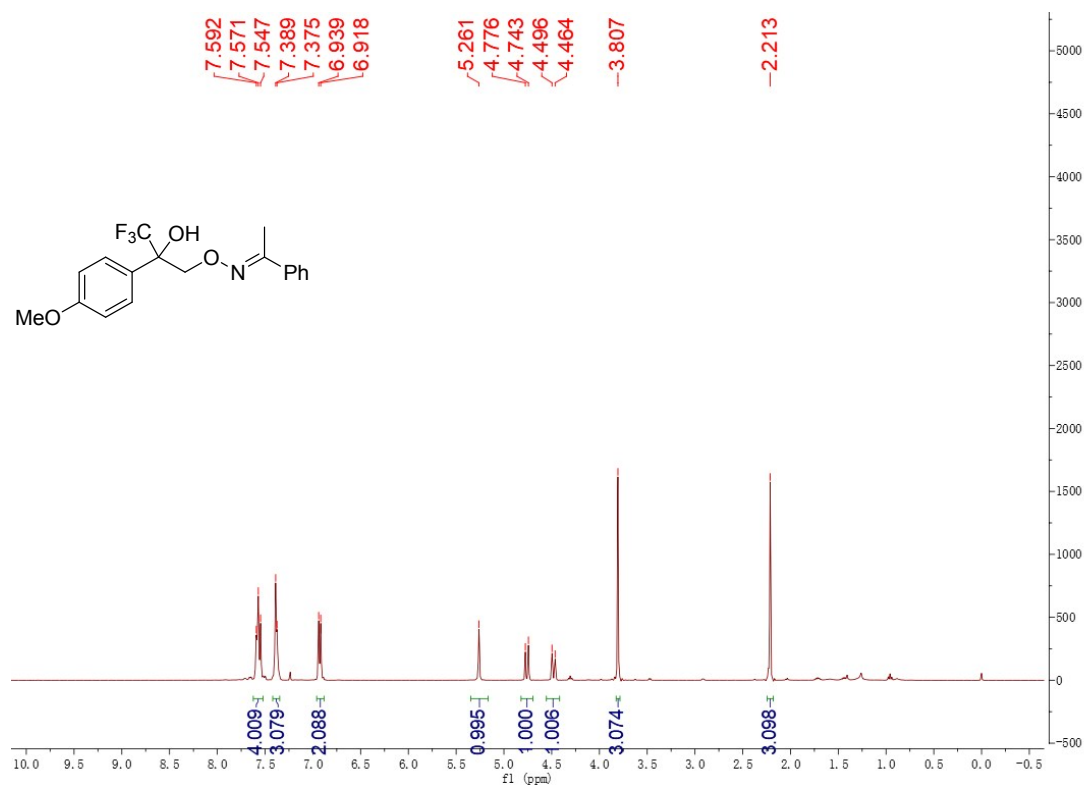
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3d**



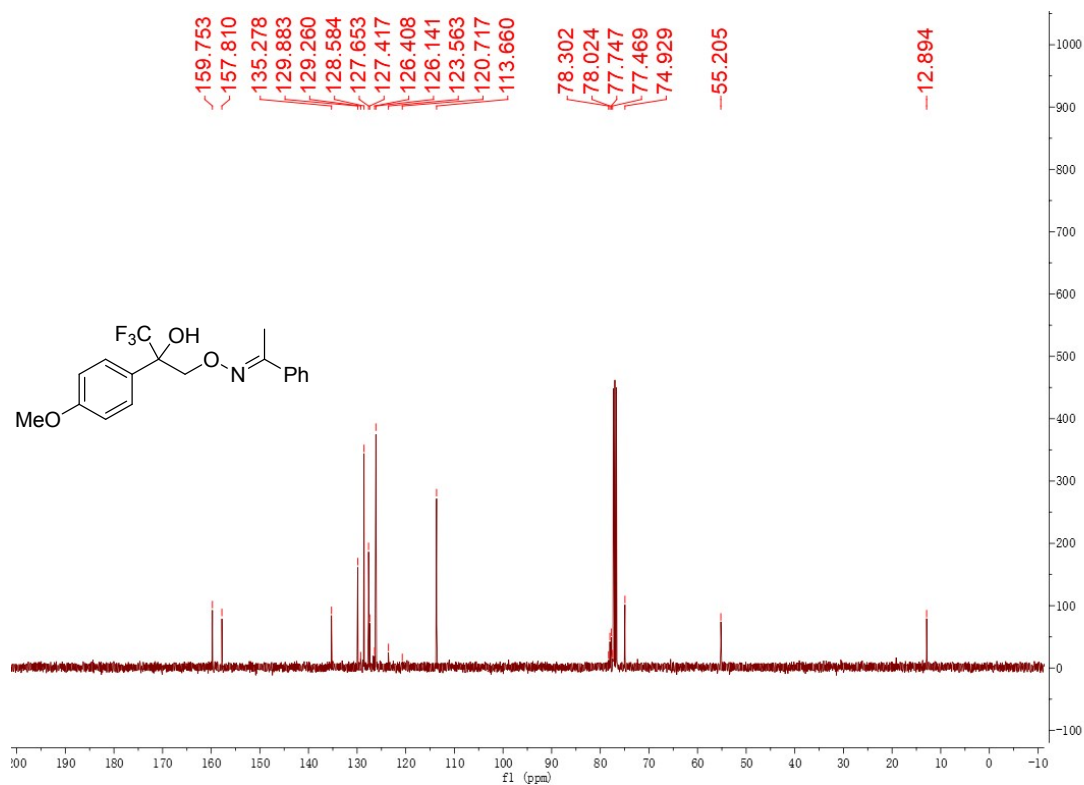
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3d**



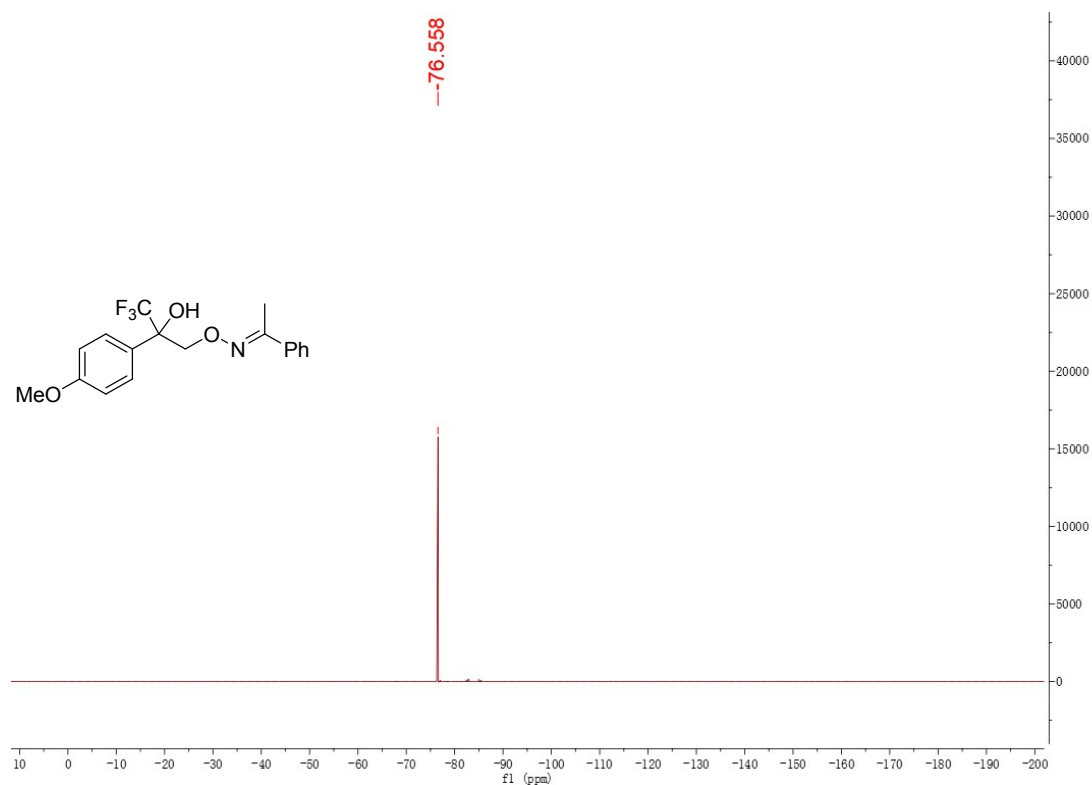
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3e**



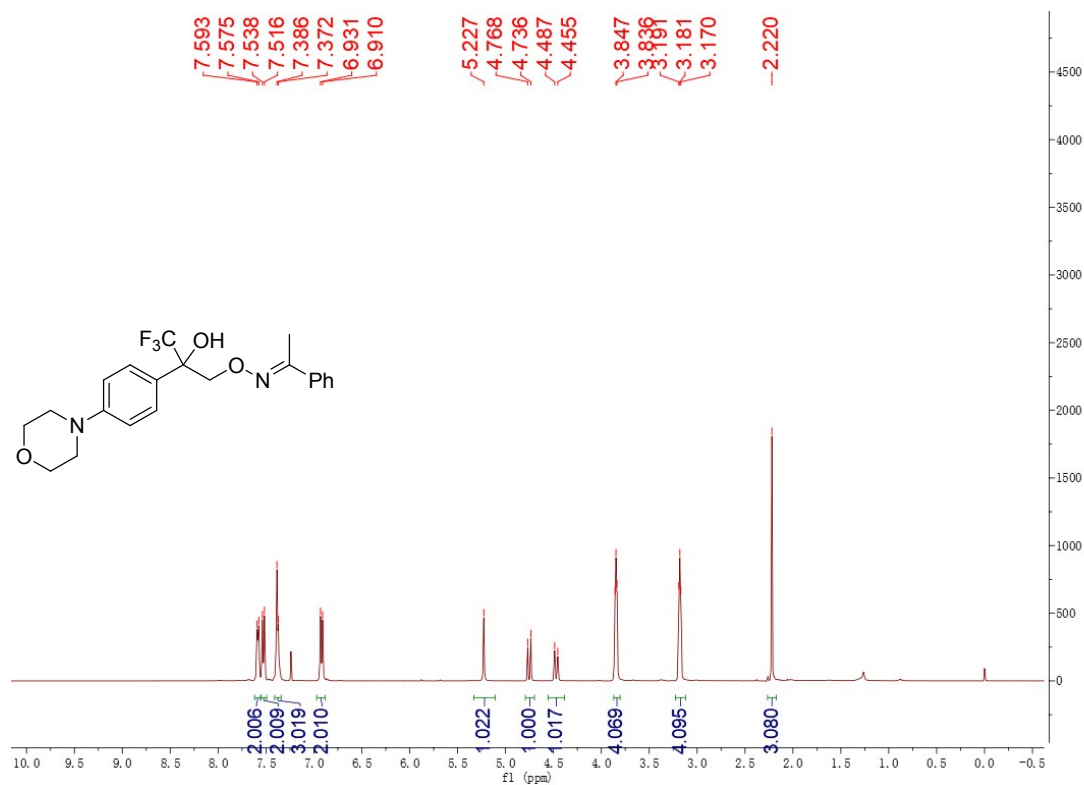
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3e**



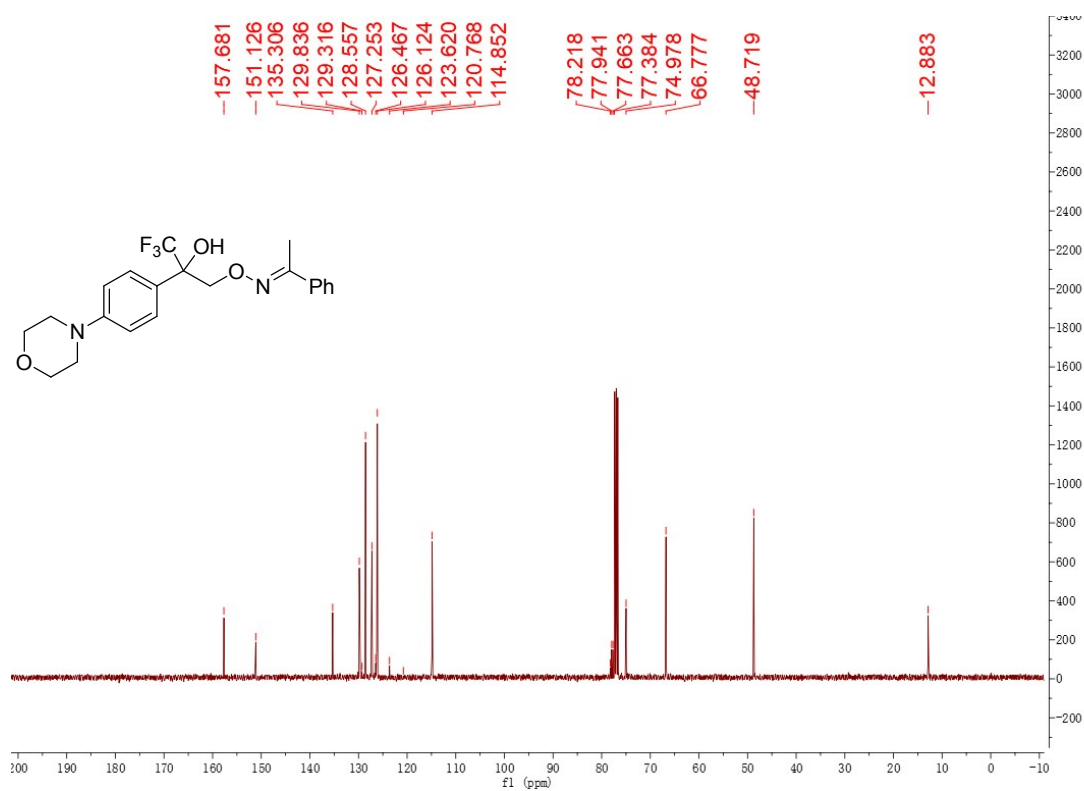
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3e**



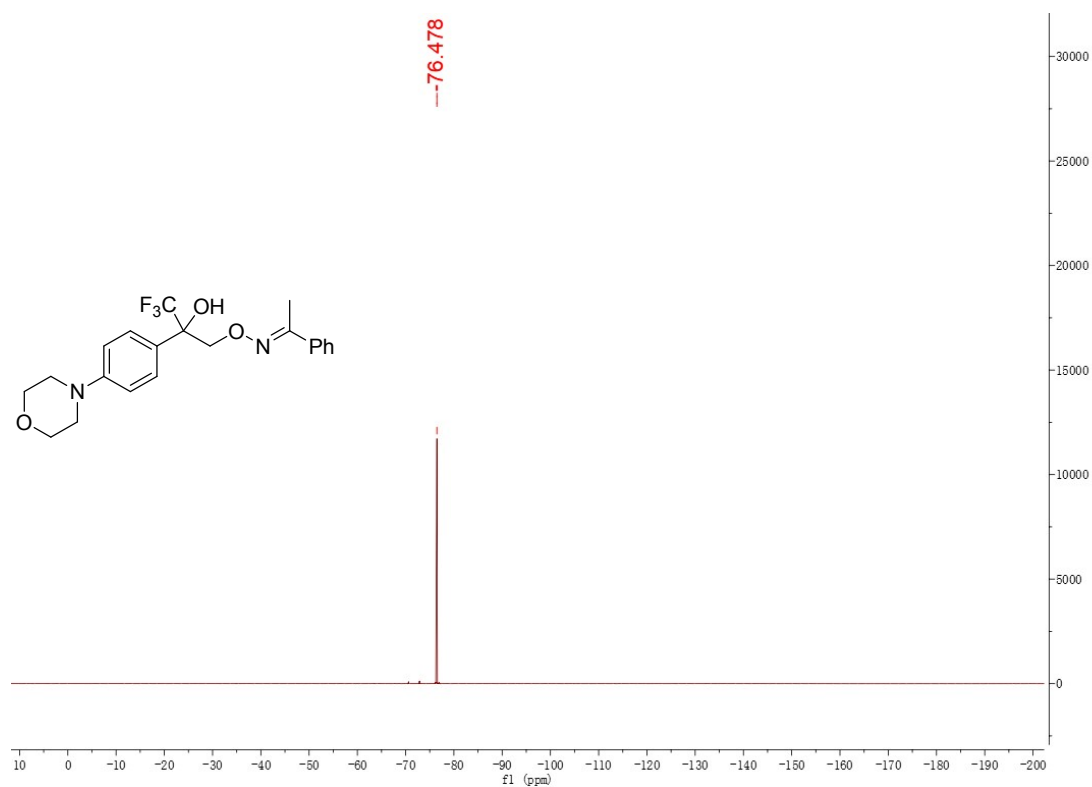
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3f**



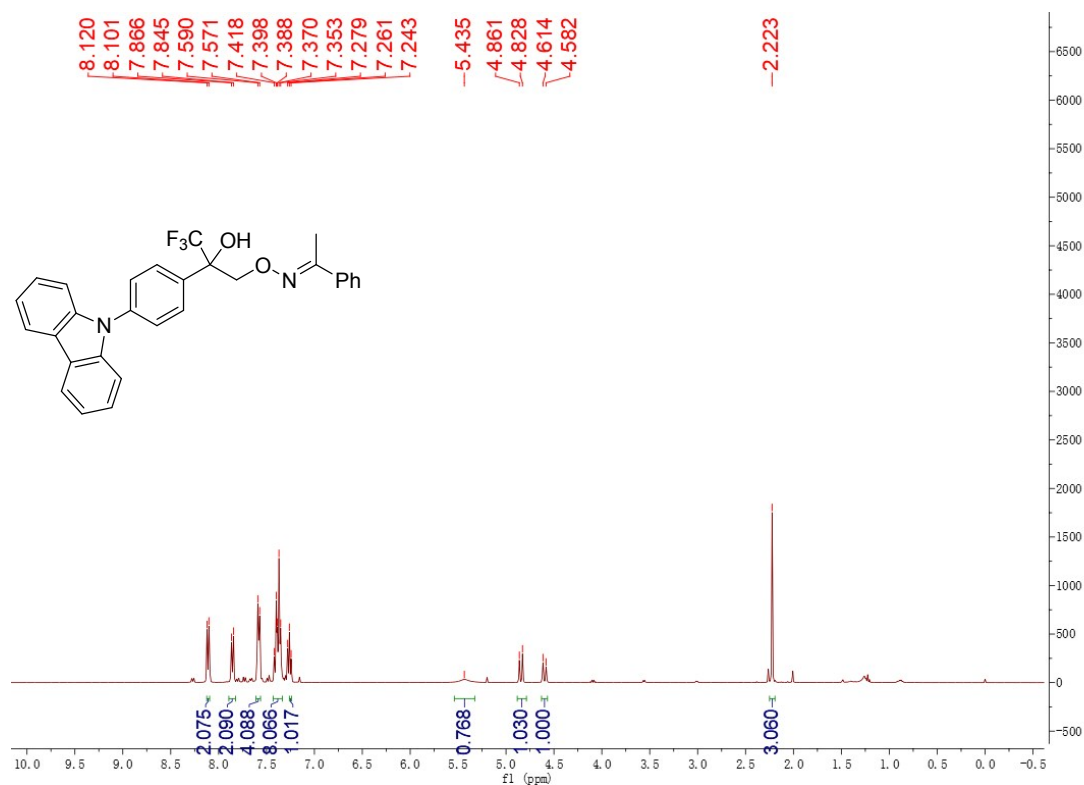
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3f**



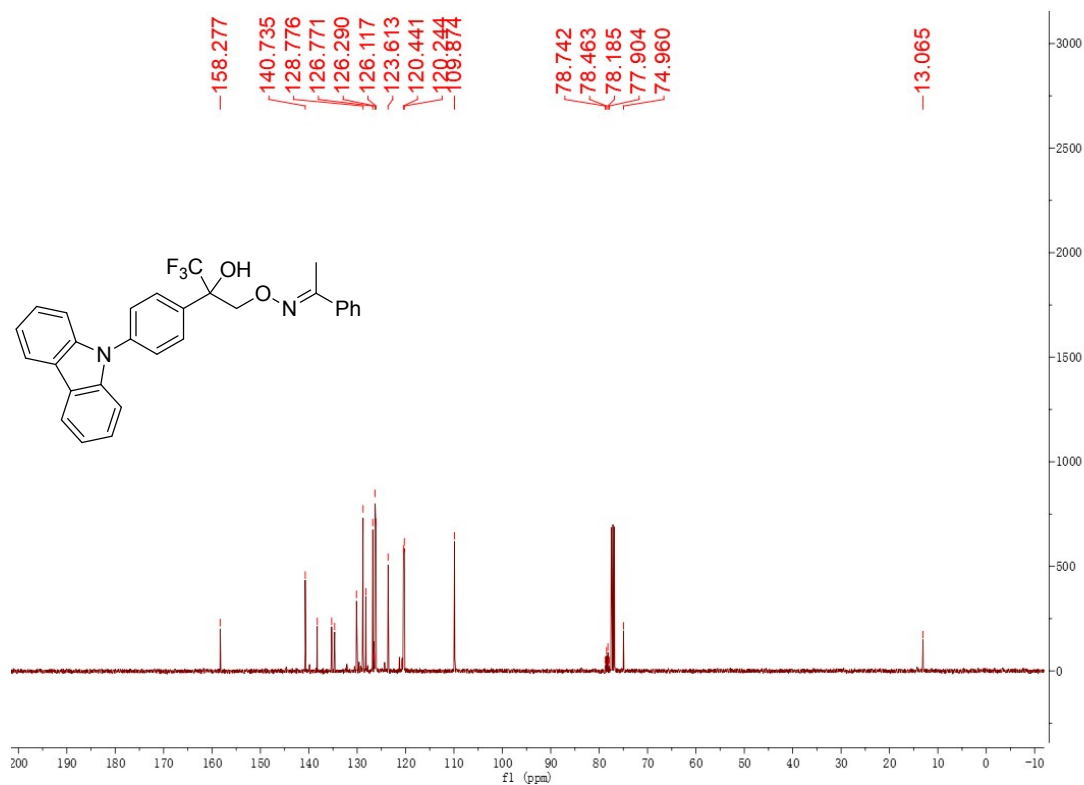
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3r**



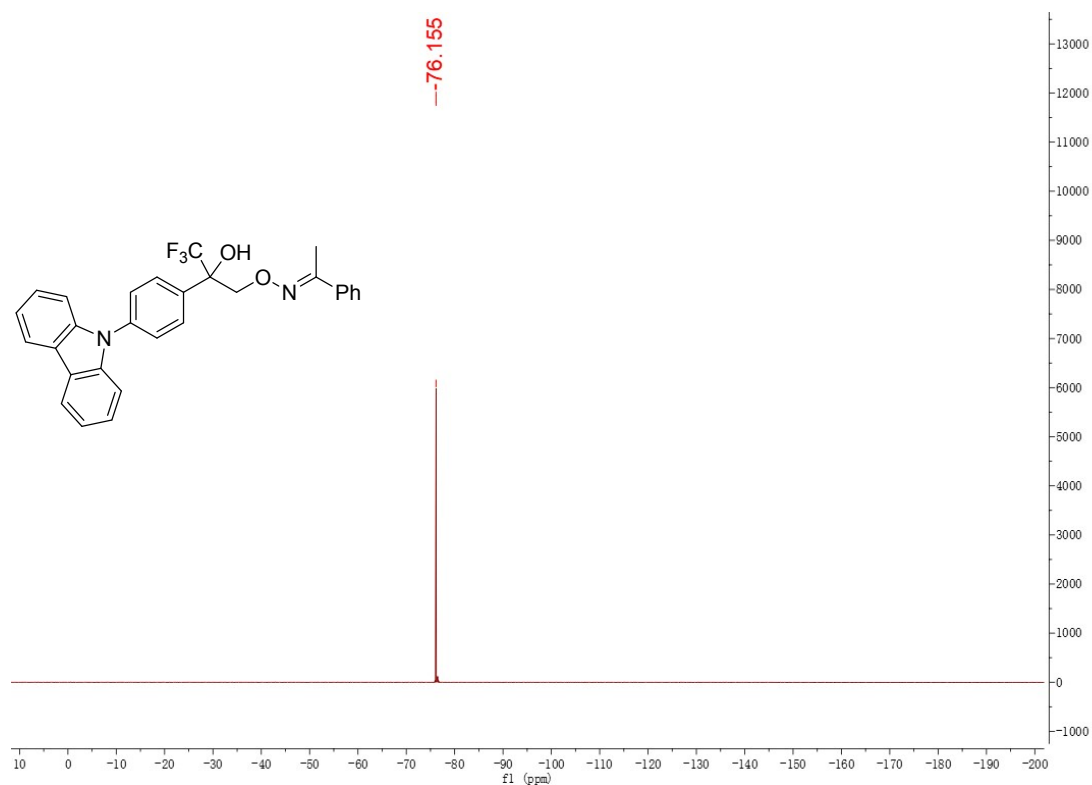
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3g**



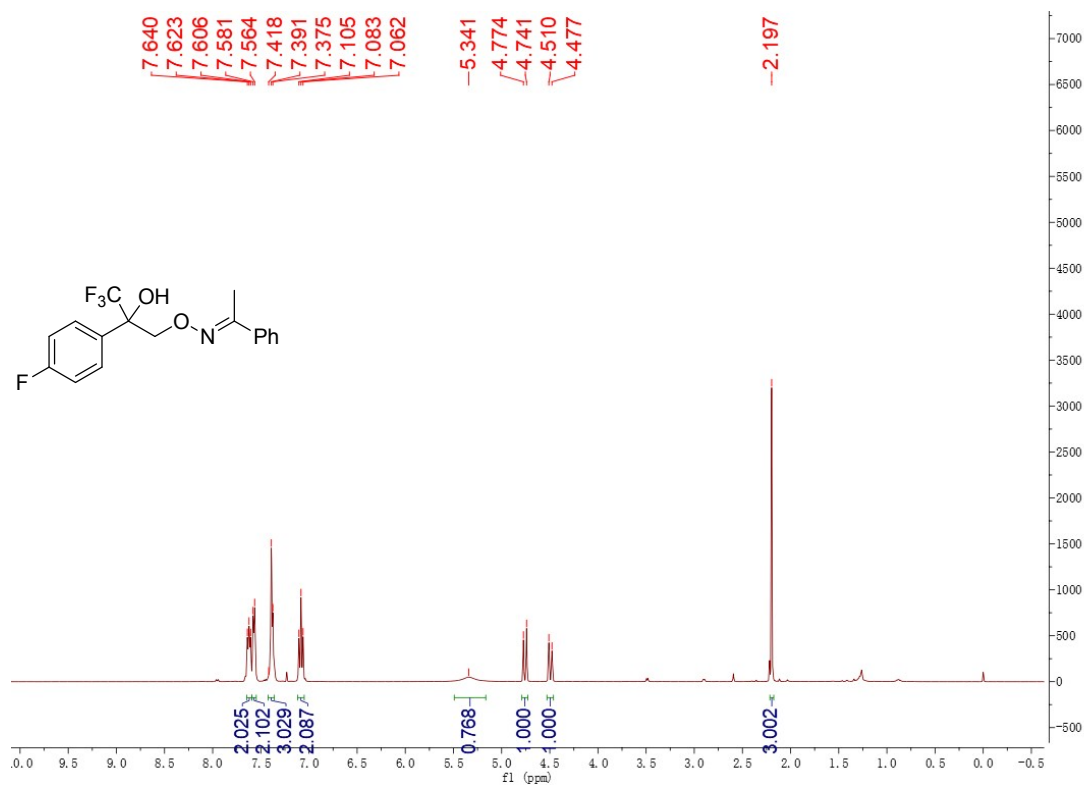
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3g**



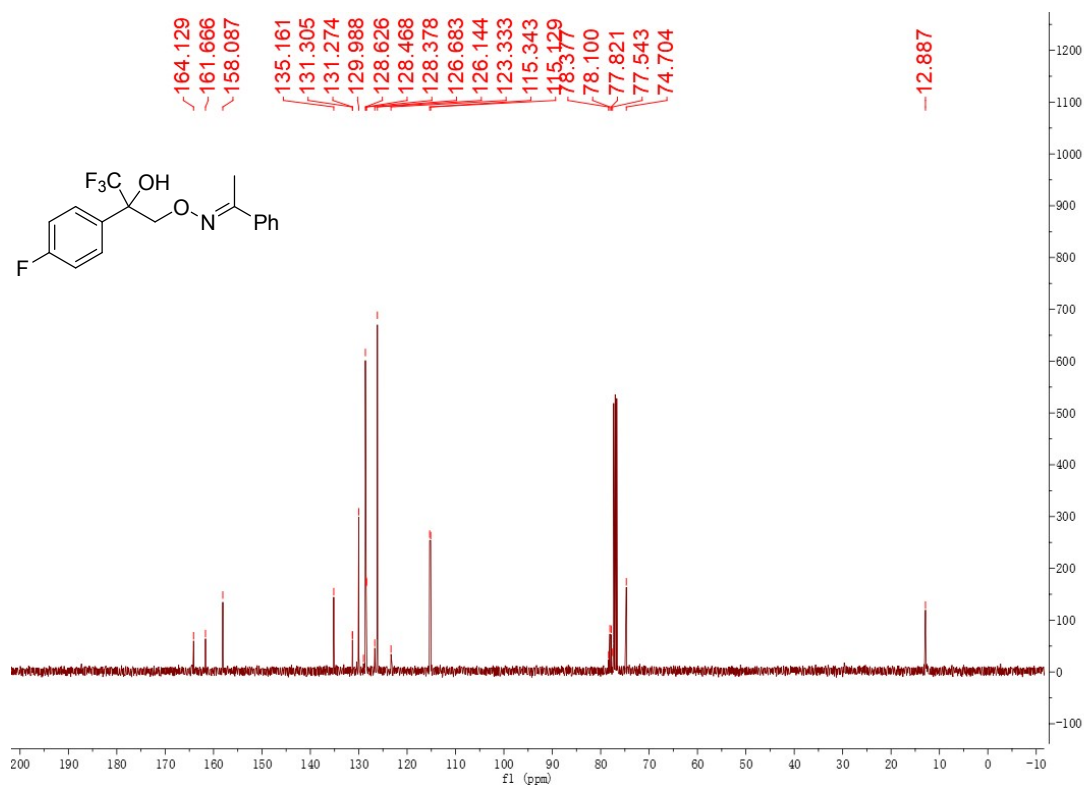
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3g**



**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3h**



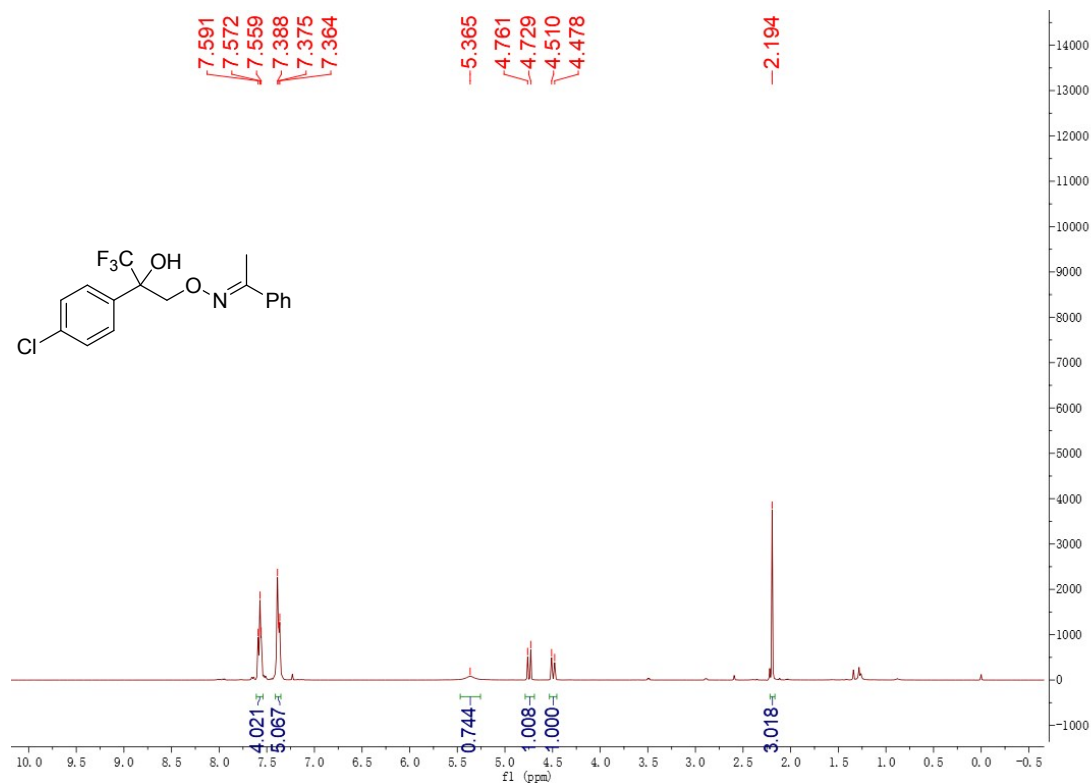
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3h**



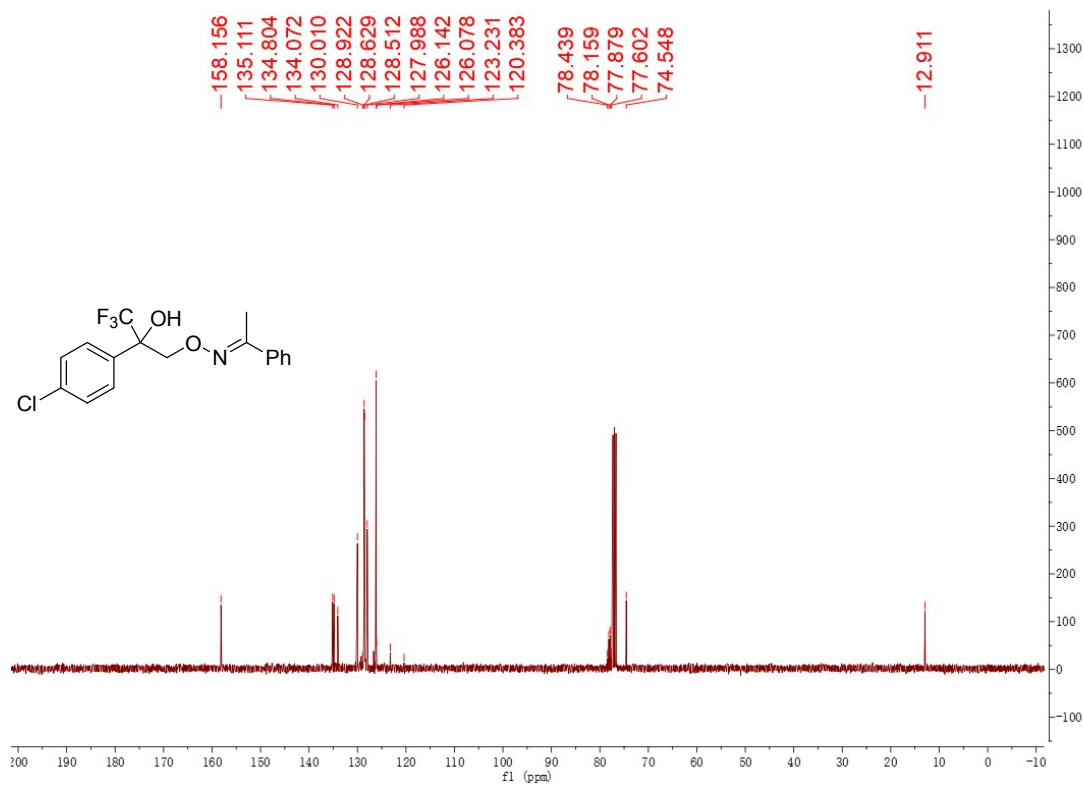
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3h**



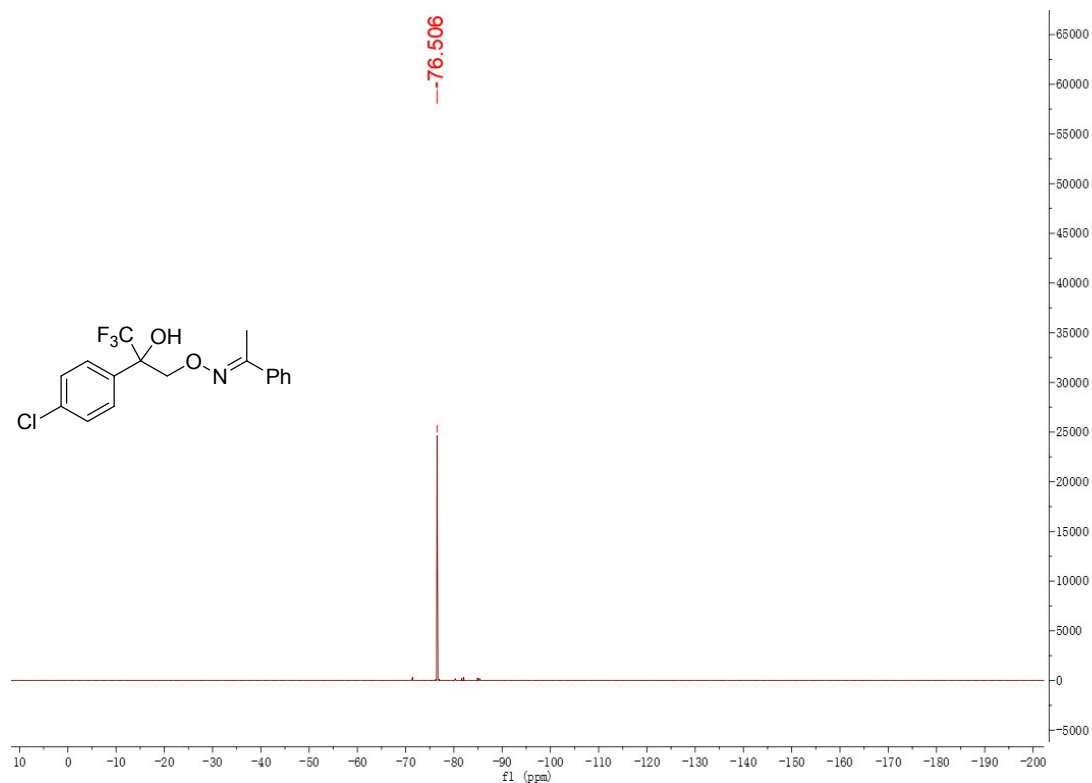
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3i**



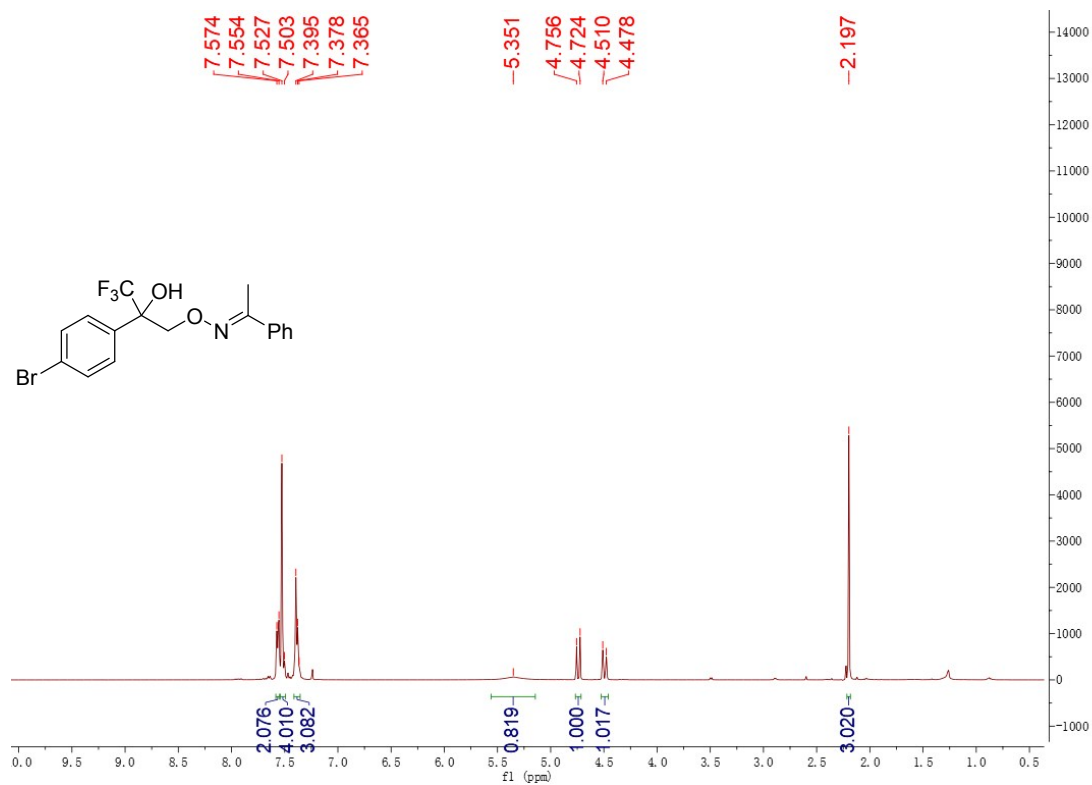
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3i**



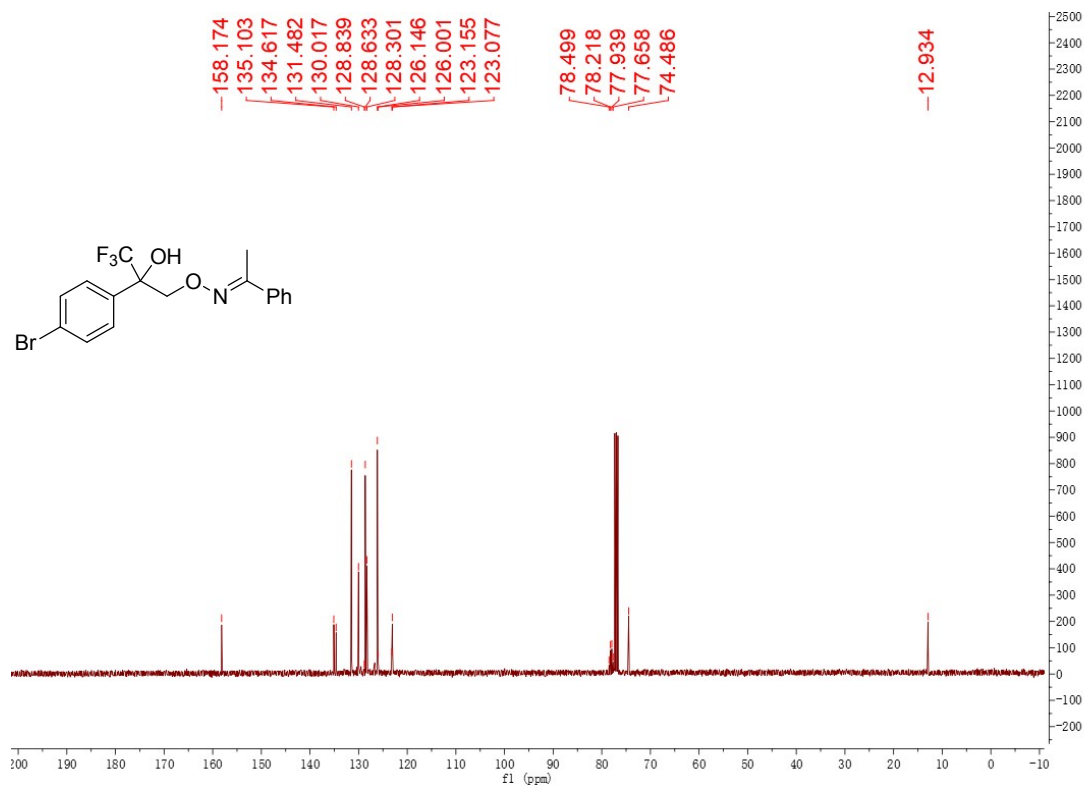
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3r**



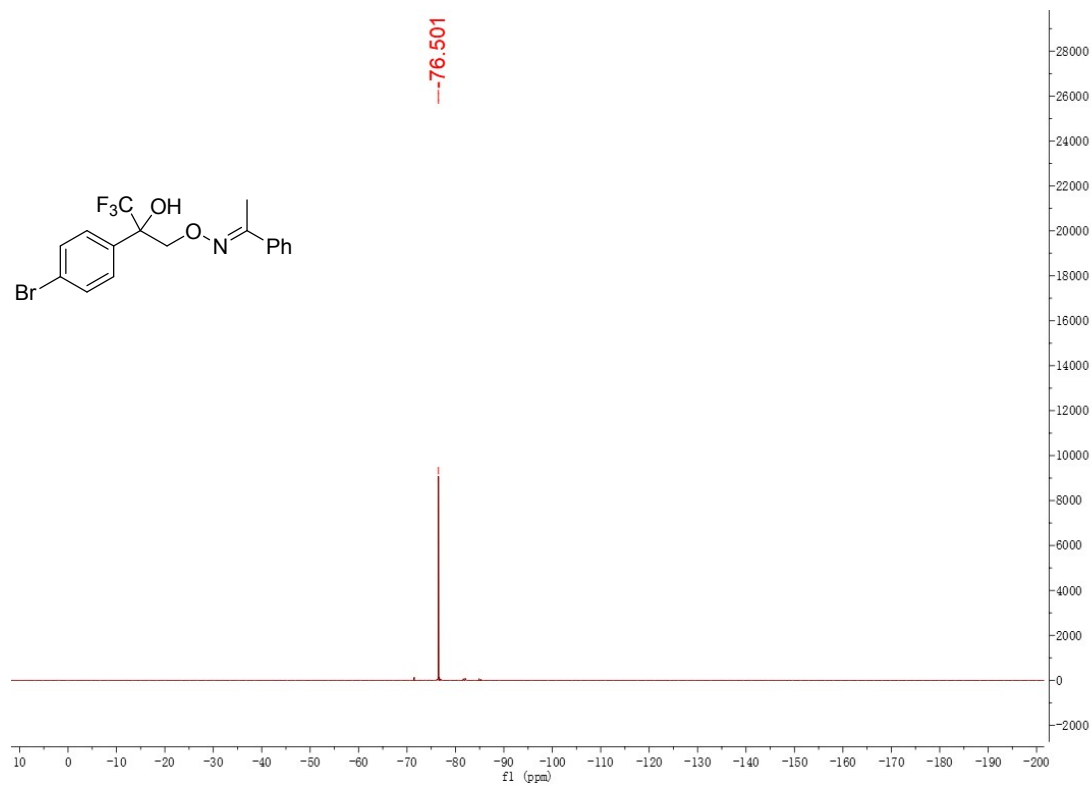
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3j**



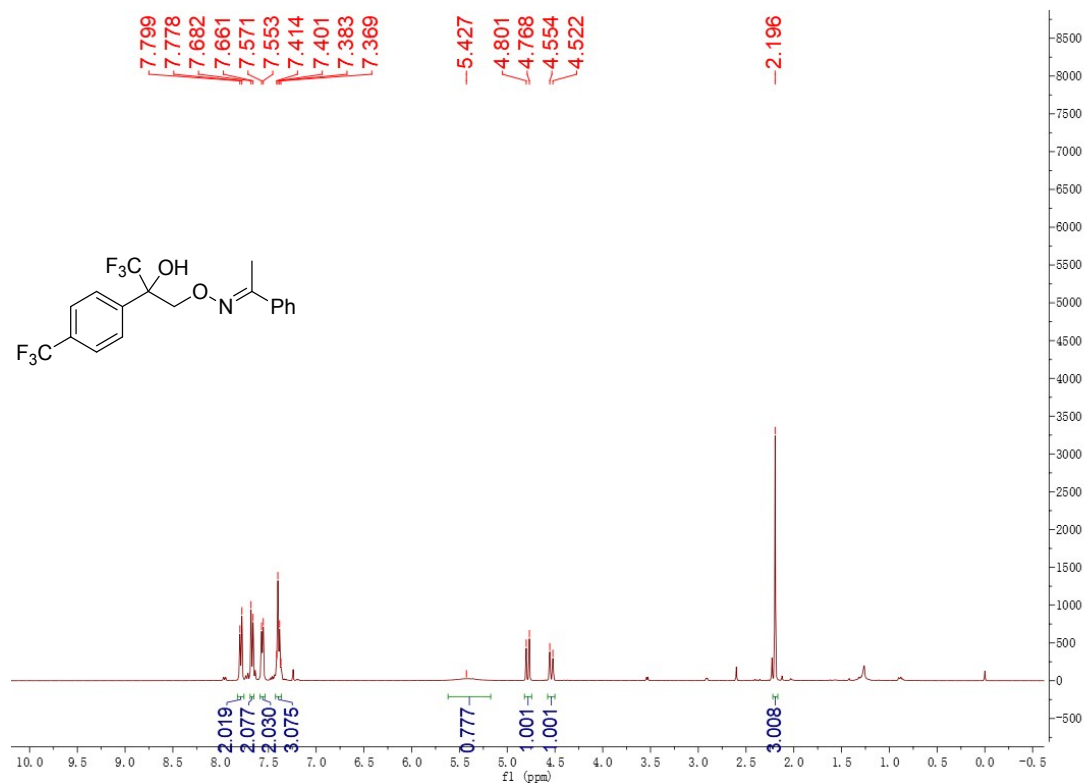
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3j**



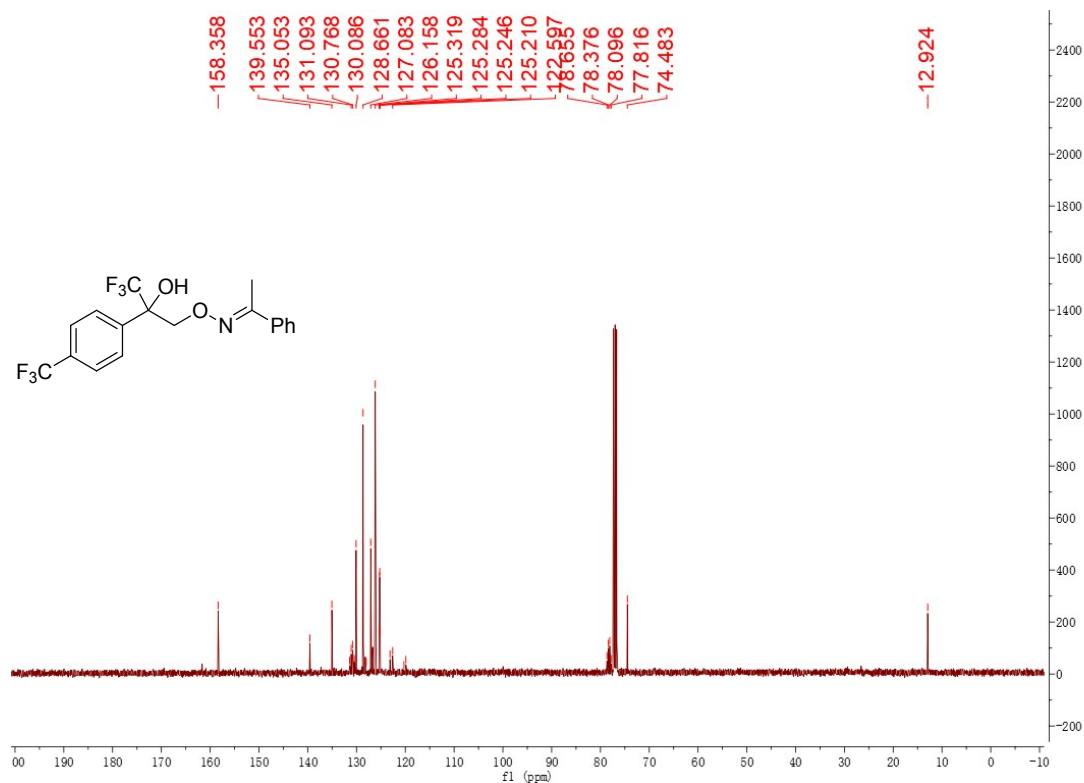
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3j**



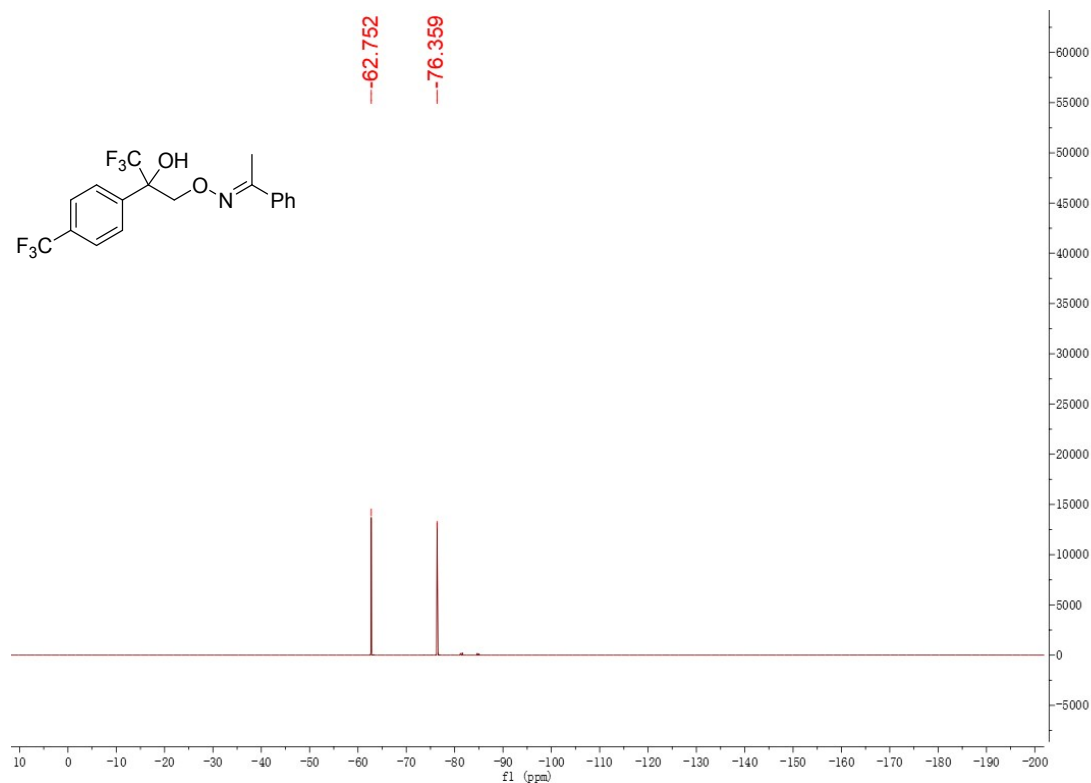
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3k**



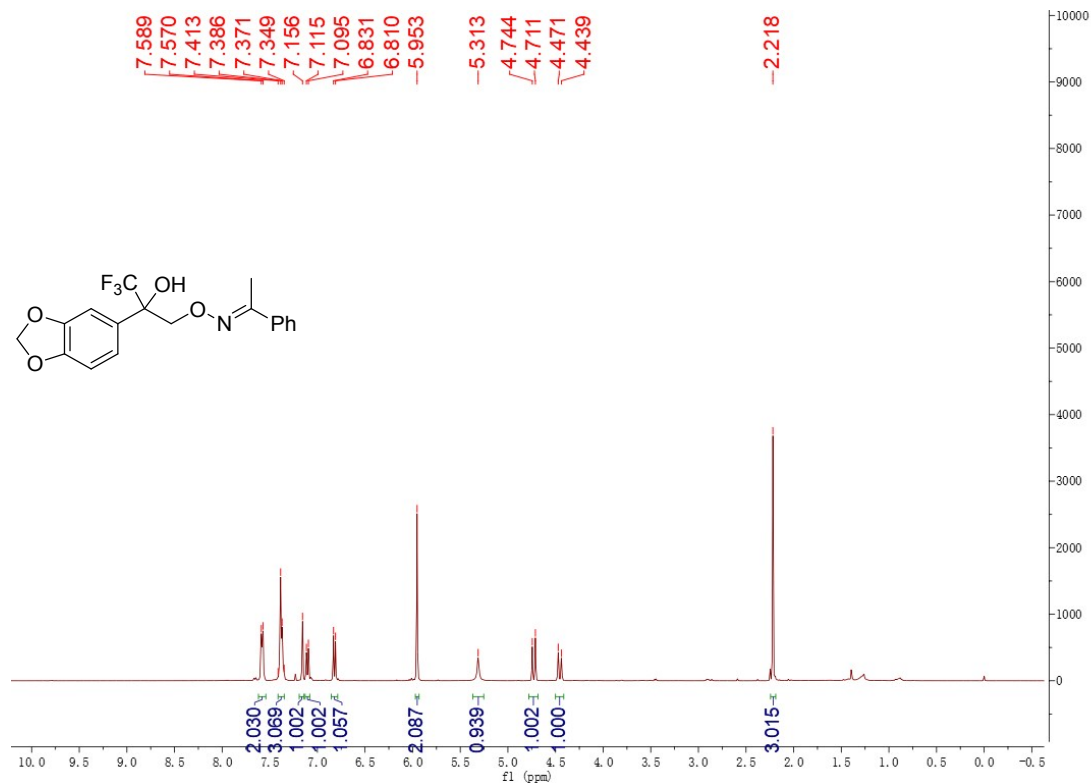
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3k**



**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3k**



**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3l**



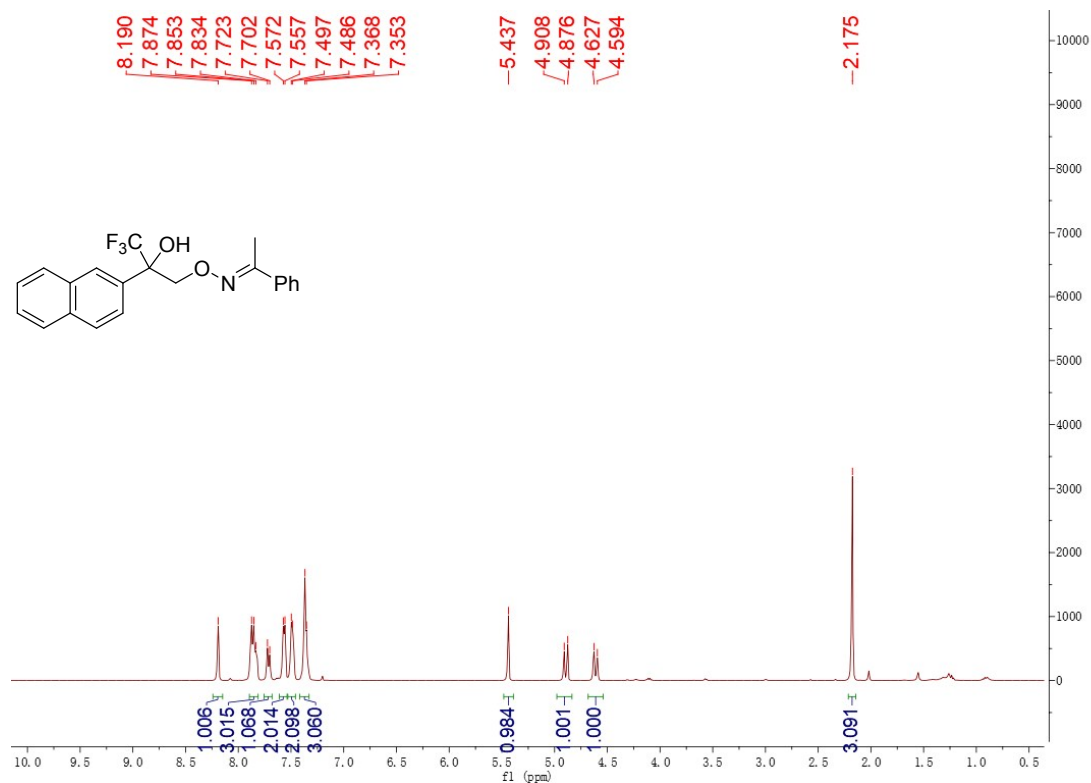
[illegible]

CC(=N)OCC(C)(O)C1=CC=C2C(=C1)OCOC2

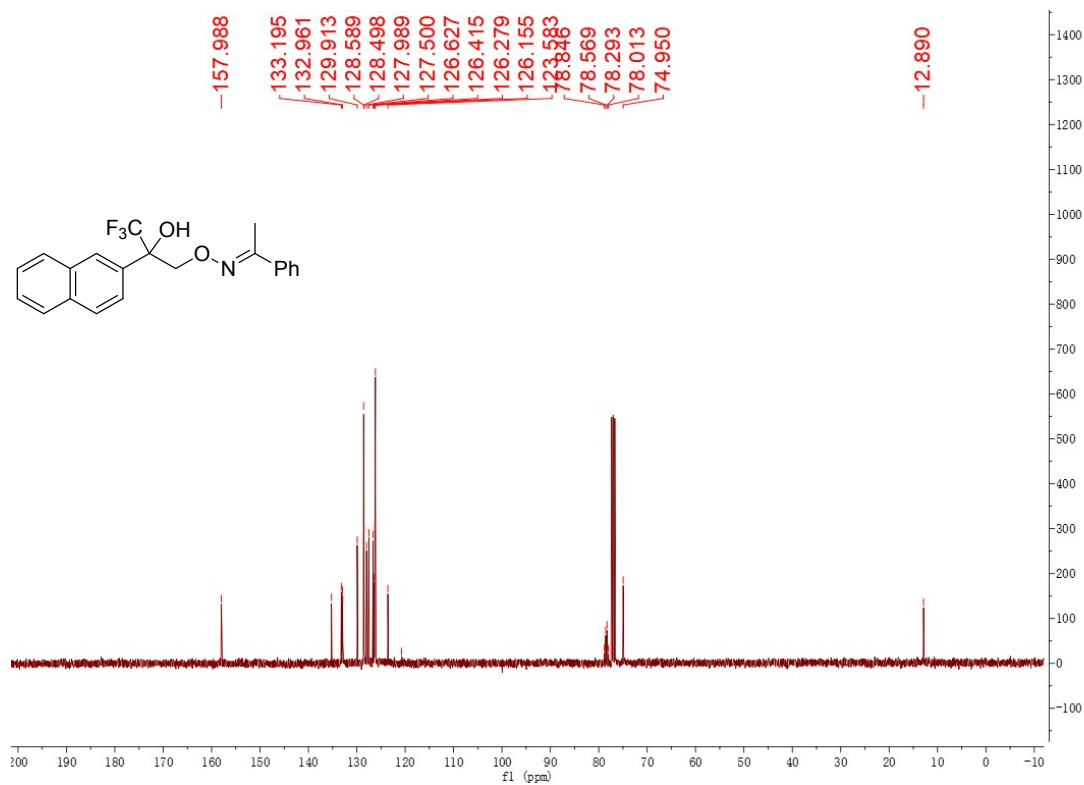
Chemical structure of 1-(2-(2-(2-oxo-2-phenylacetamido)ethyl)-2-(trifluoromethyl)-2-hydroxyethyl)-1,3-benzodioxole.

<sup>13</sup>C NMR spectrum (CDCl<sub>3</sub>) showing a single peak at -76.465 ppm, corresponding to the solvent (CDCl<sub>3</sub>).

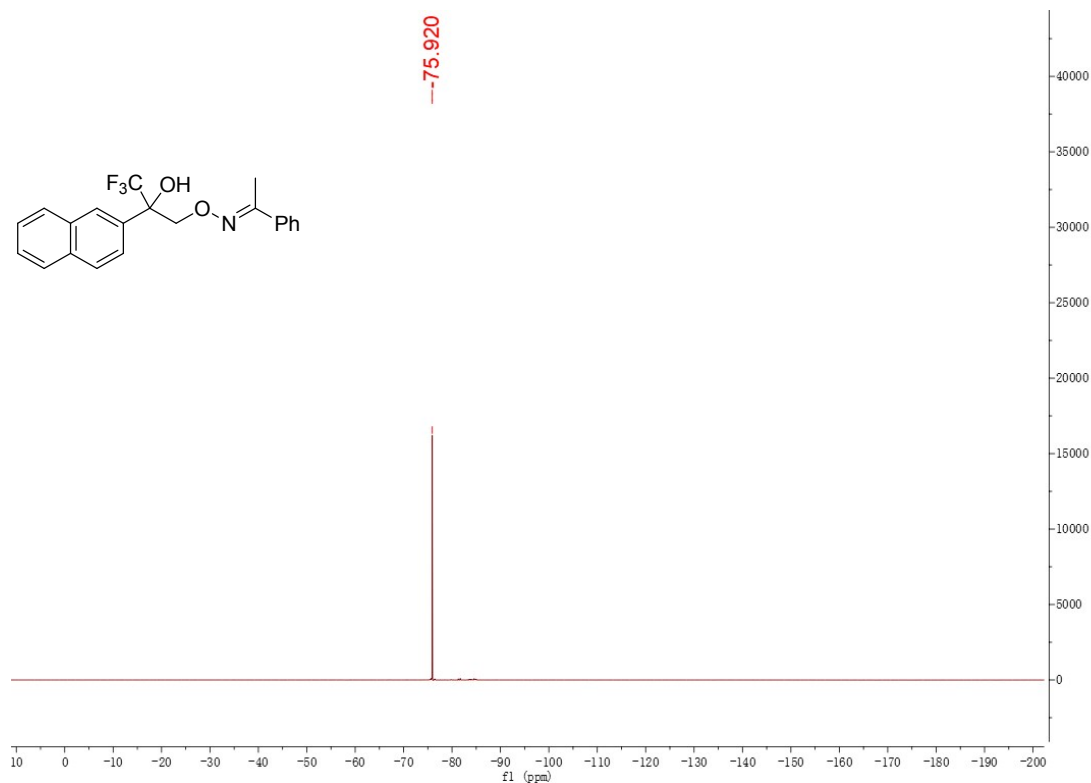
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3m**



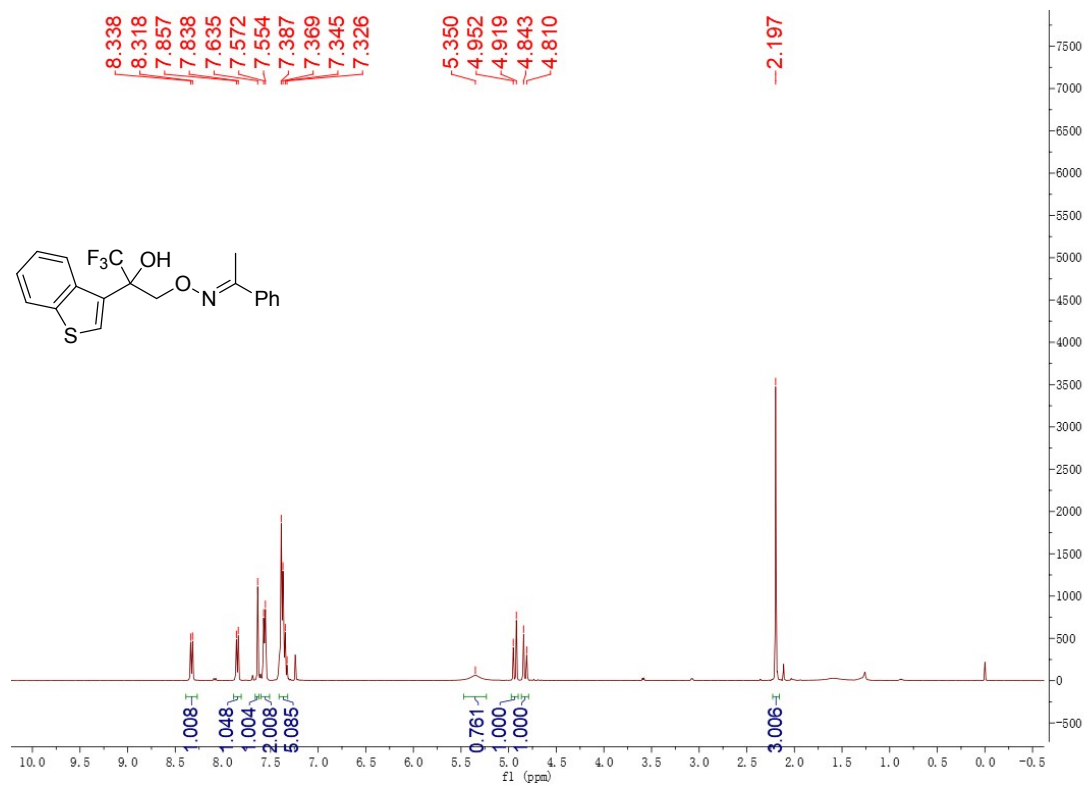
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3m**



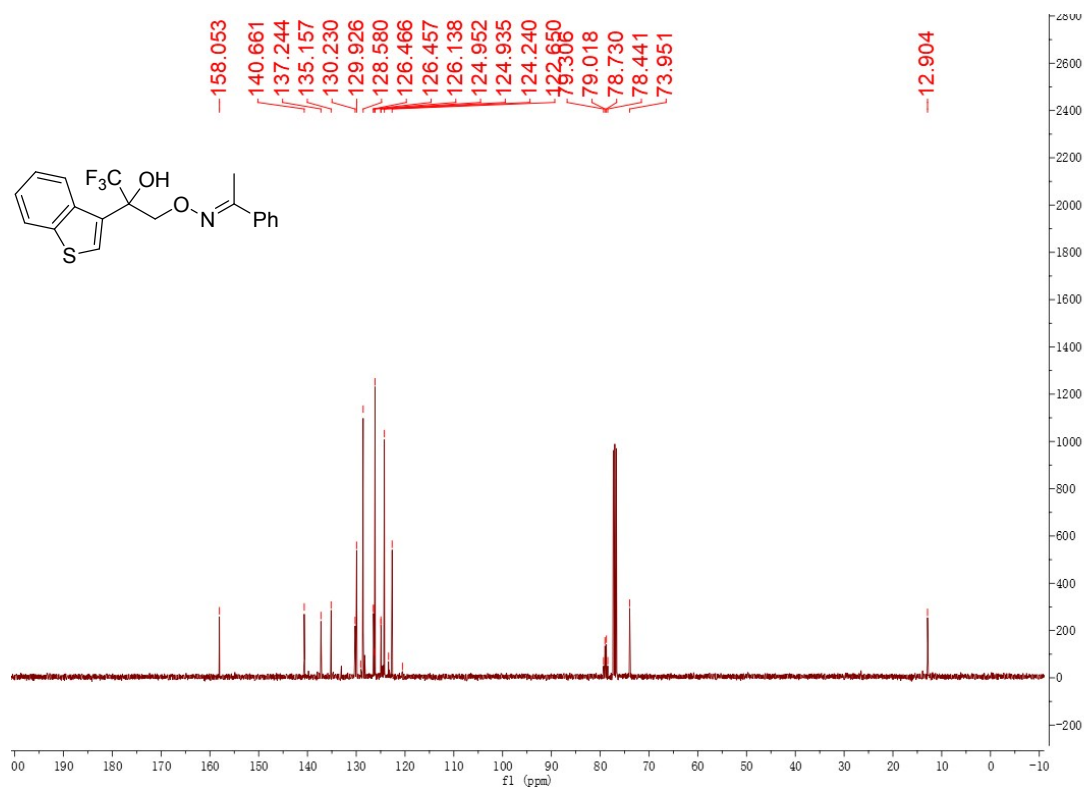
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3m**



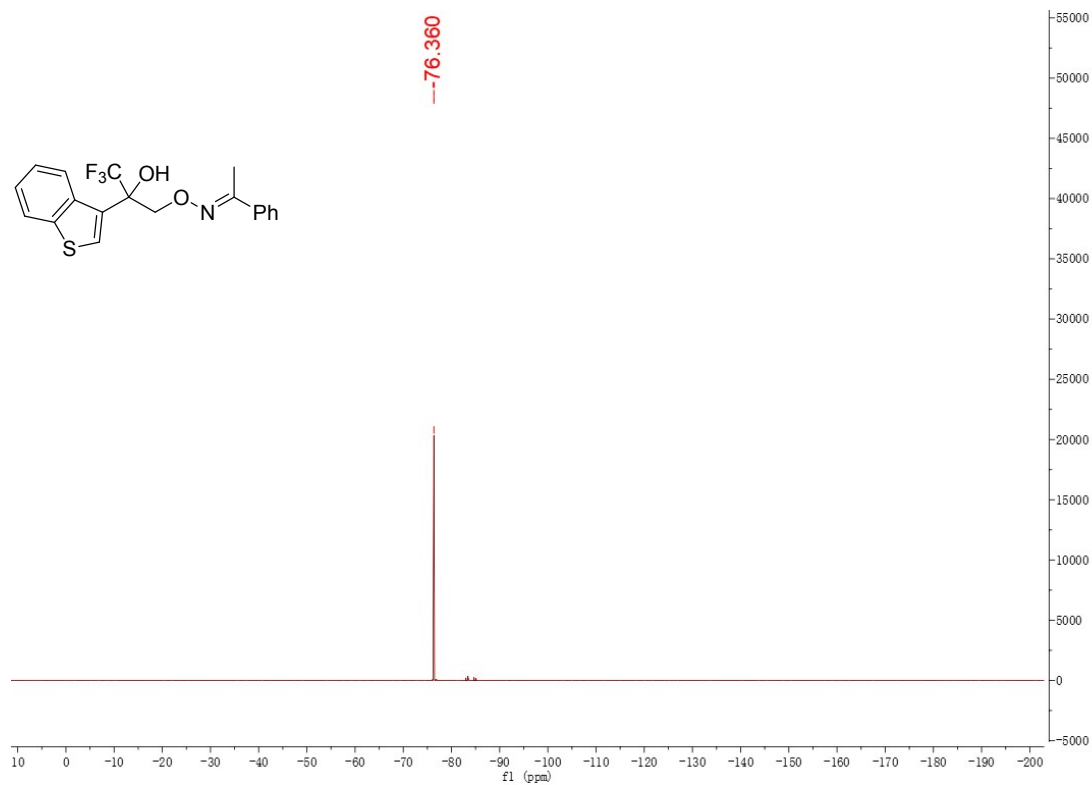
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3n**



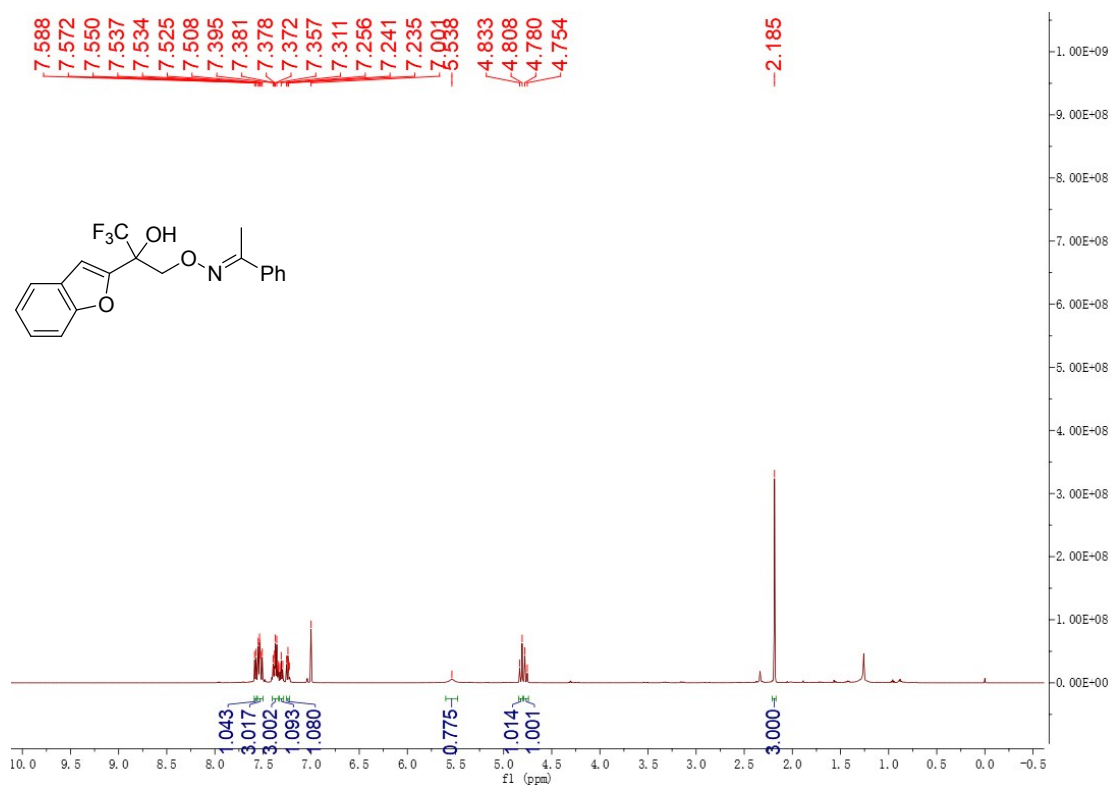
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3n**



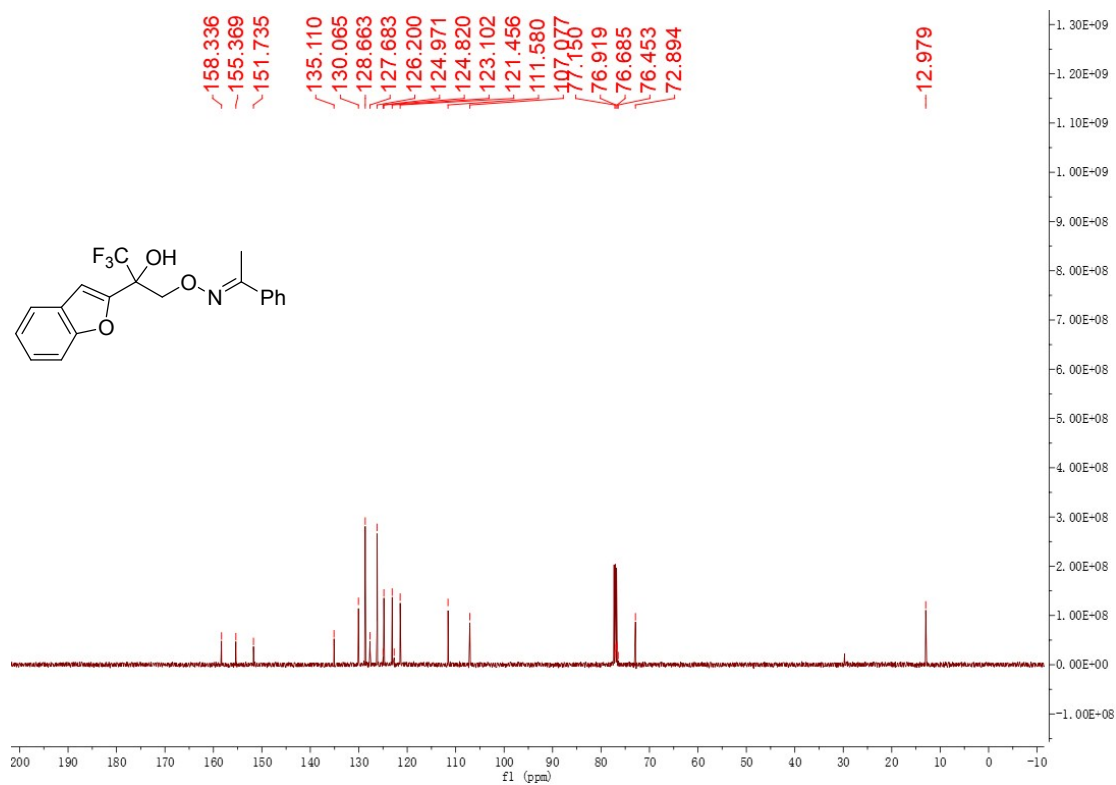
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3n**



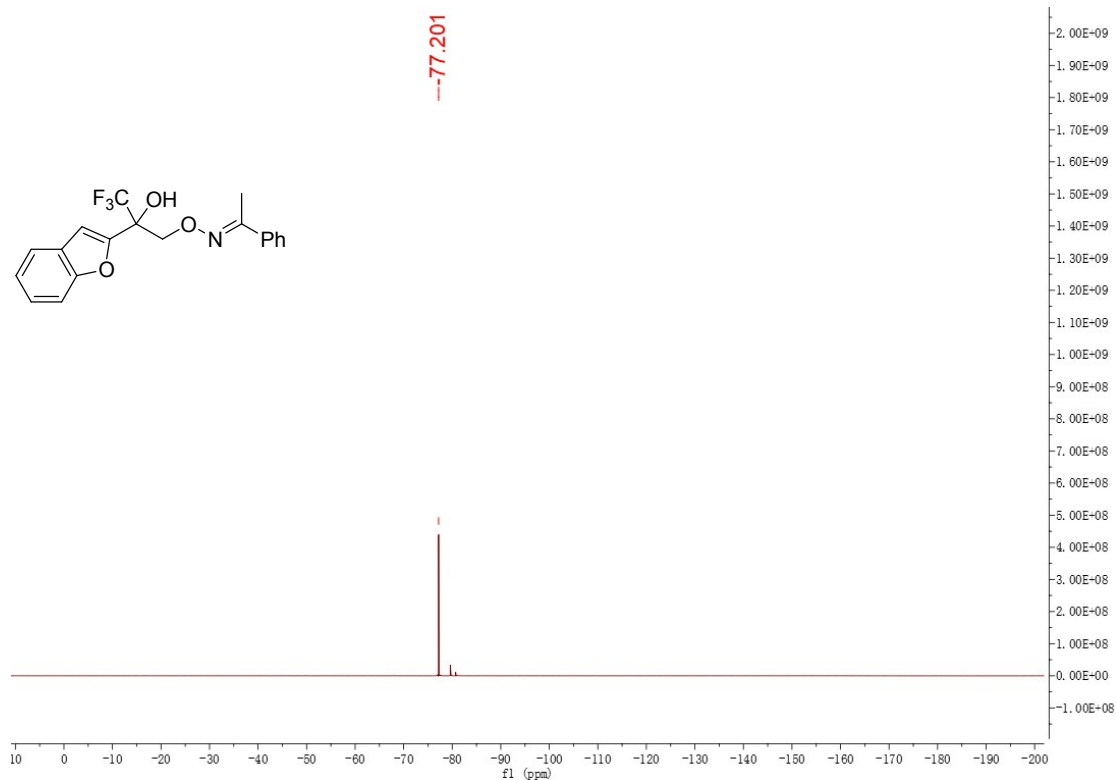
**<sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) spectrum for 3o**



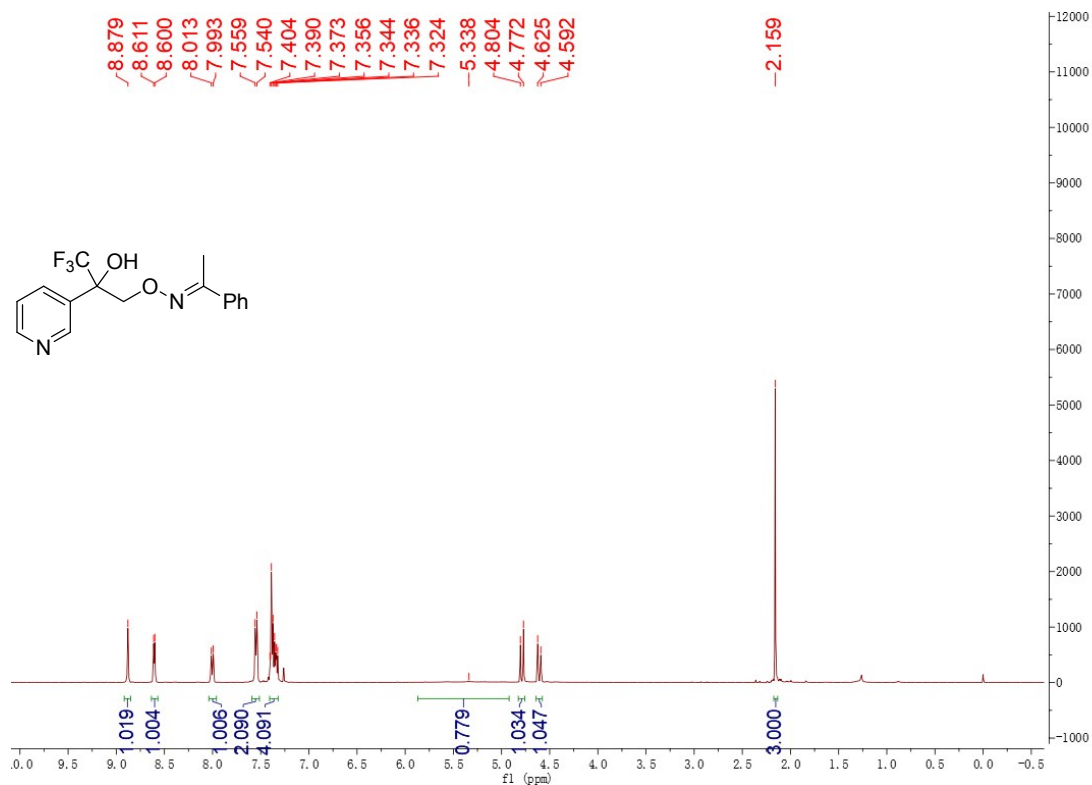
**<sup>13</sup>C NMR (125 MHz, CDCl<sub>3</sub>) spectrum for 3o**



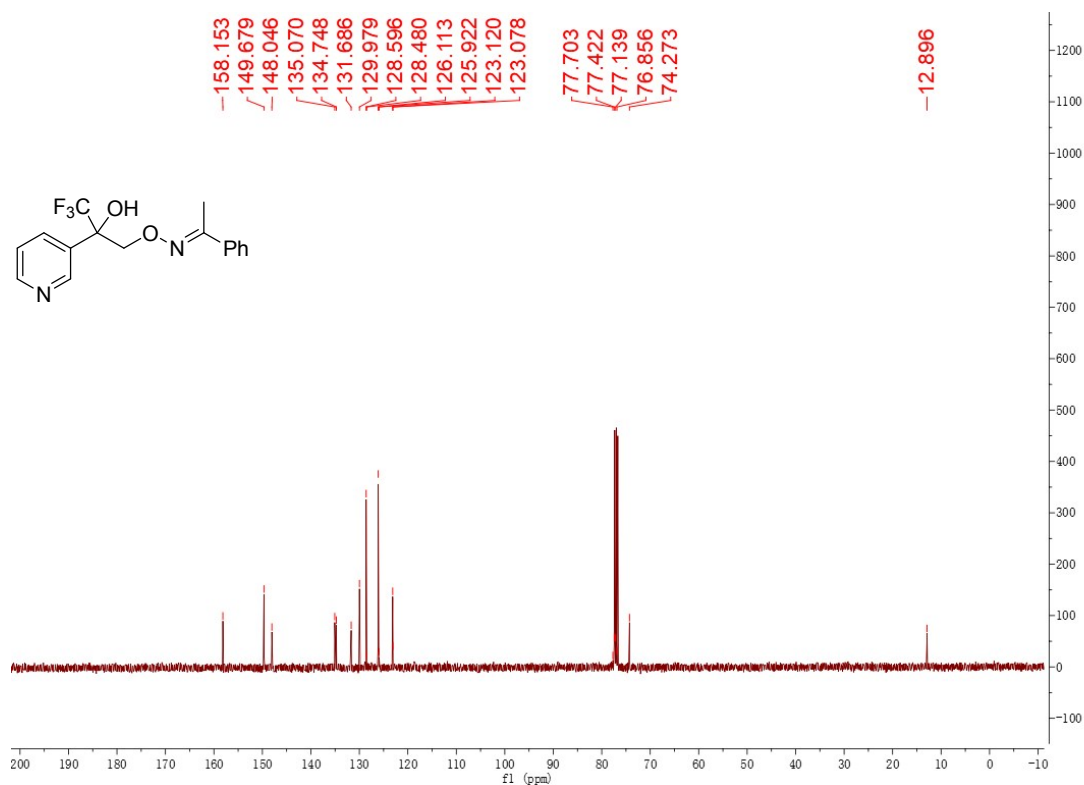
**$^{19}\text{F}$  NMR (470 MHz,  $\text{CDCl}_3$ ) spectrum for 3o**



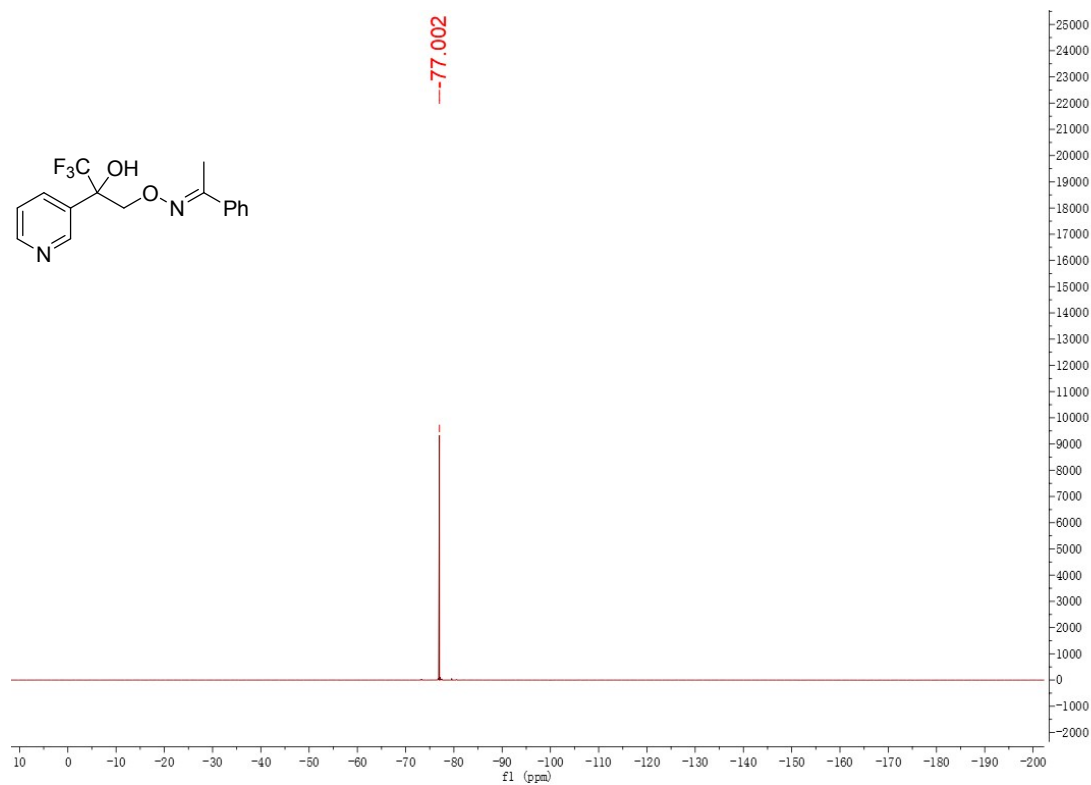
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3p**



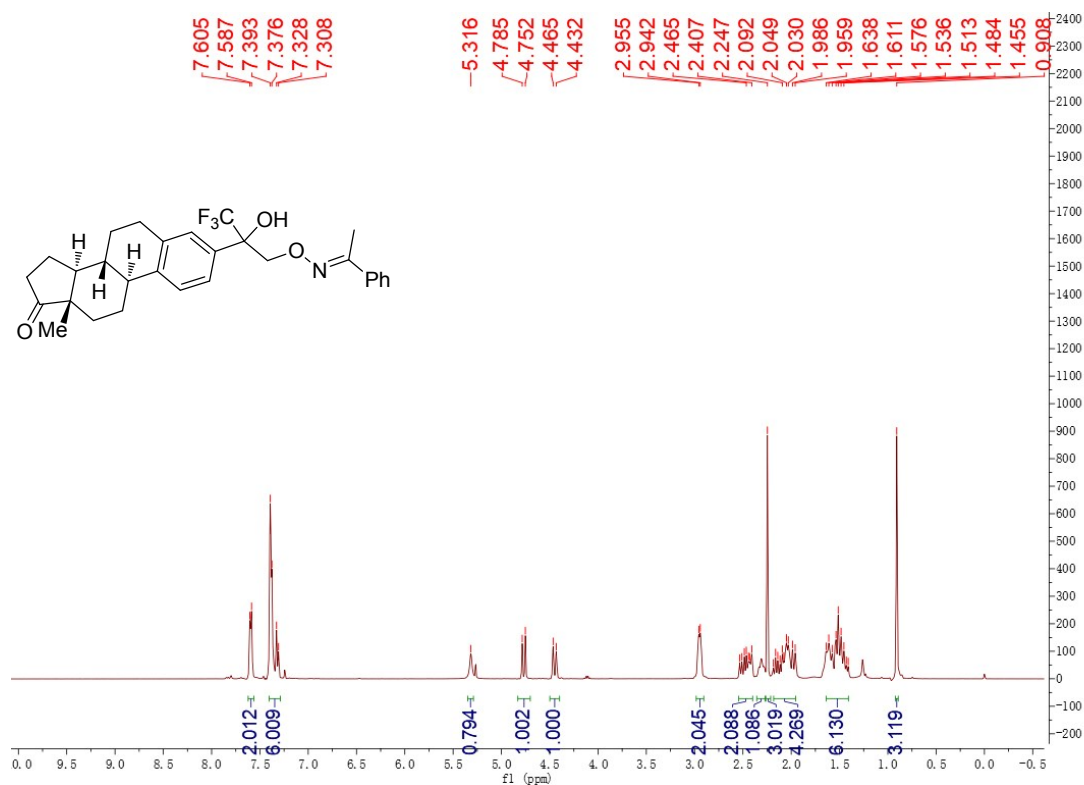
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3p**



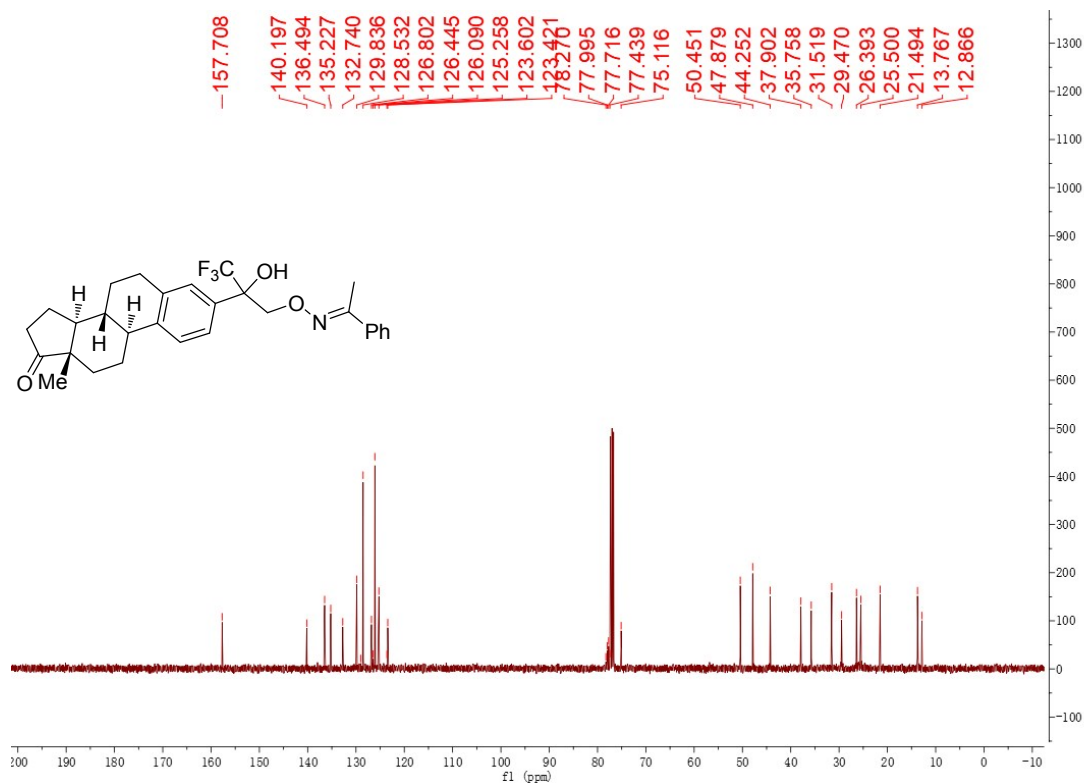
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3p**



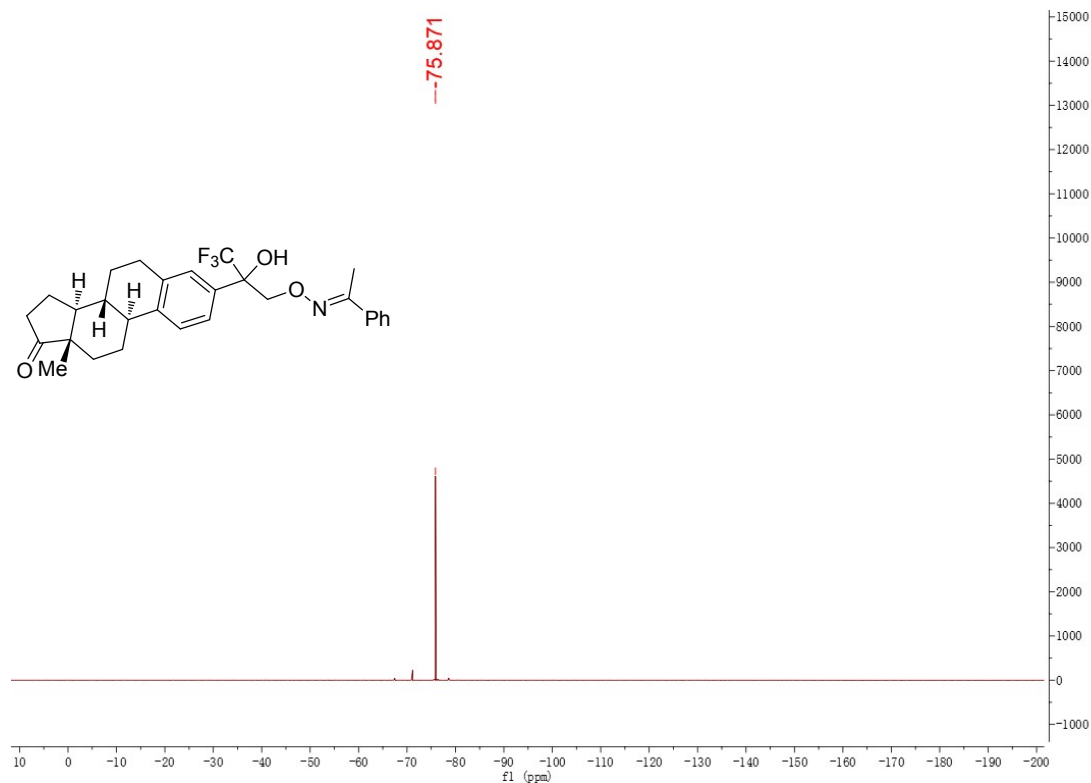
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3q**



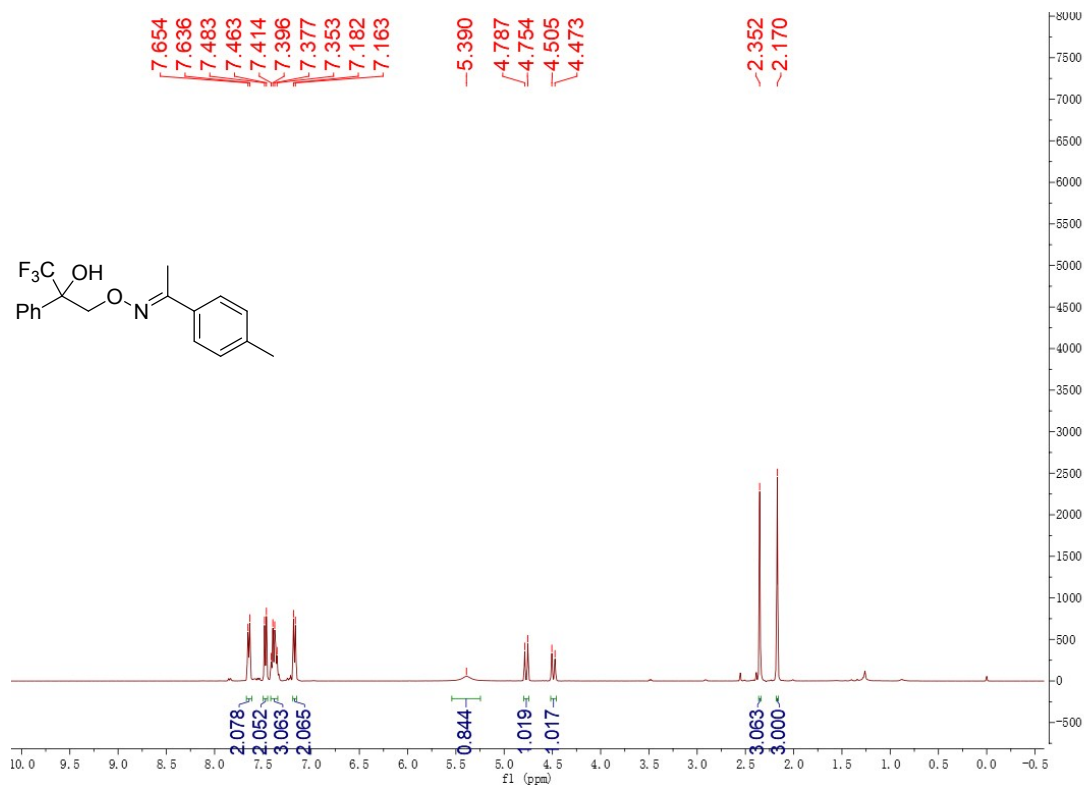
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3q**



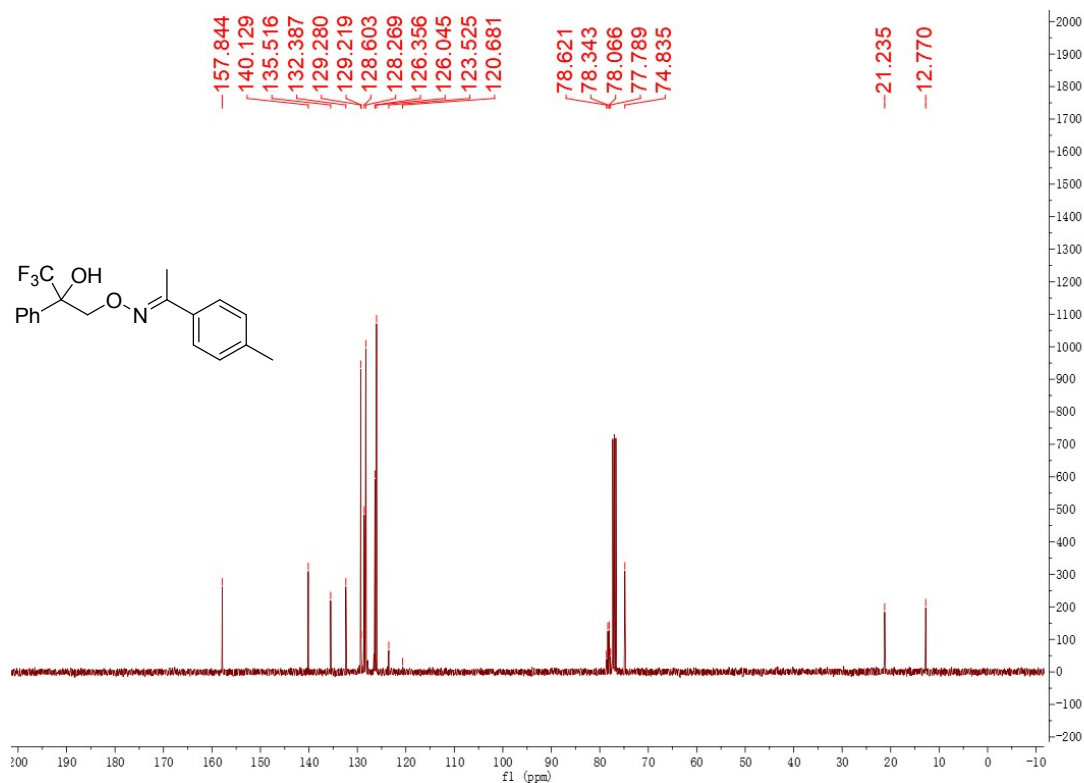
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3q**



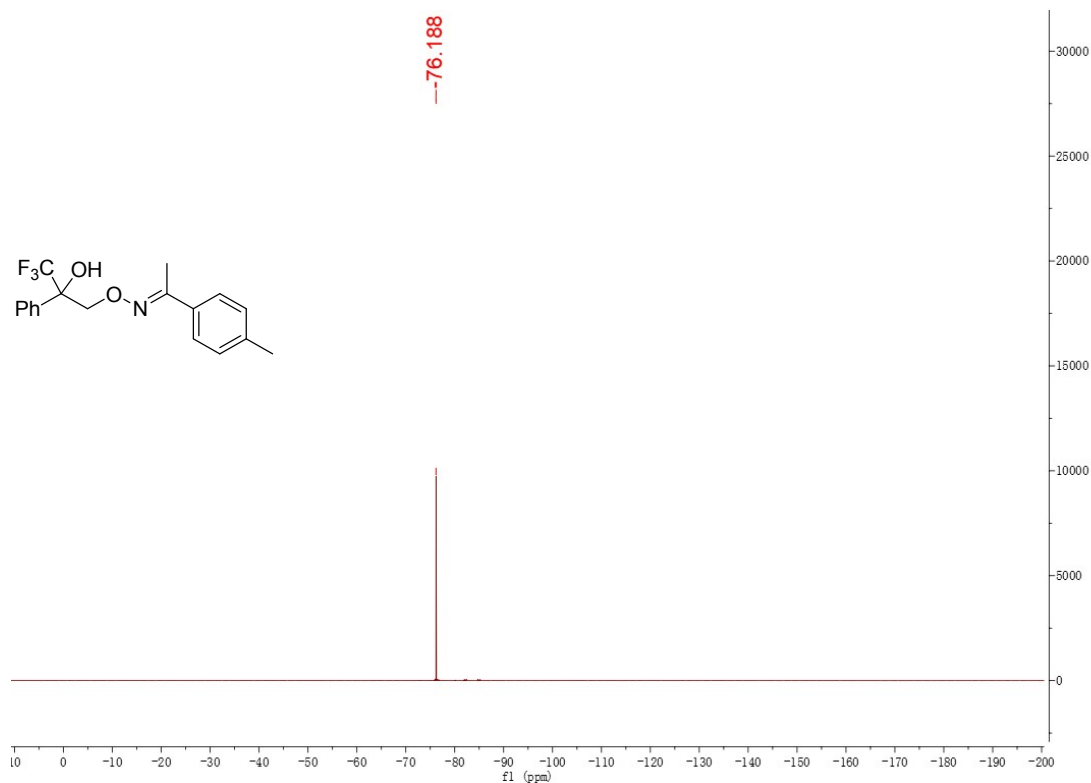
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3r**



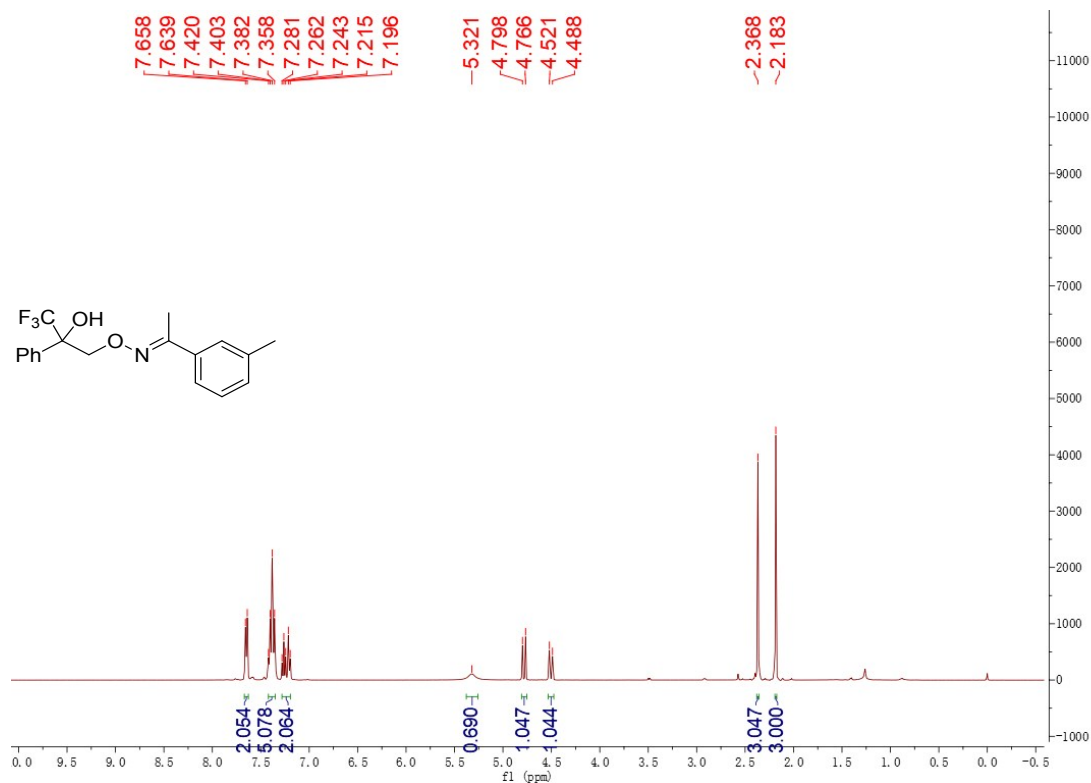
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3r**



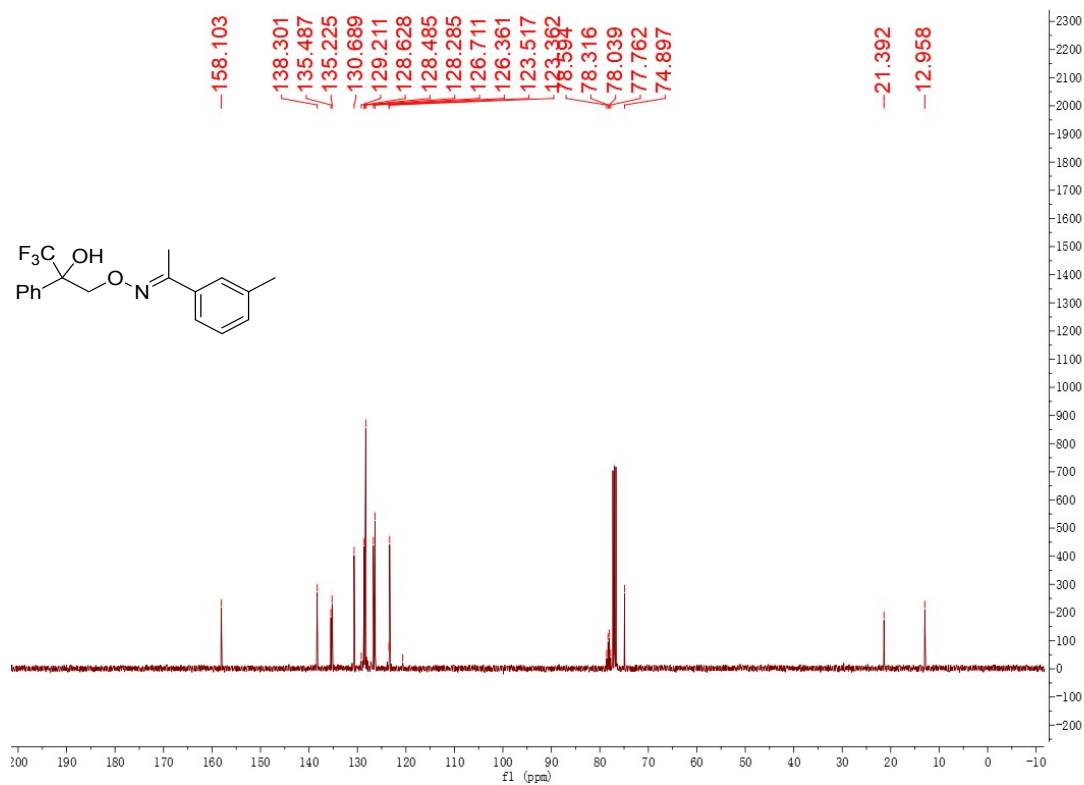
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3r**



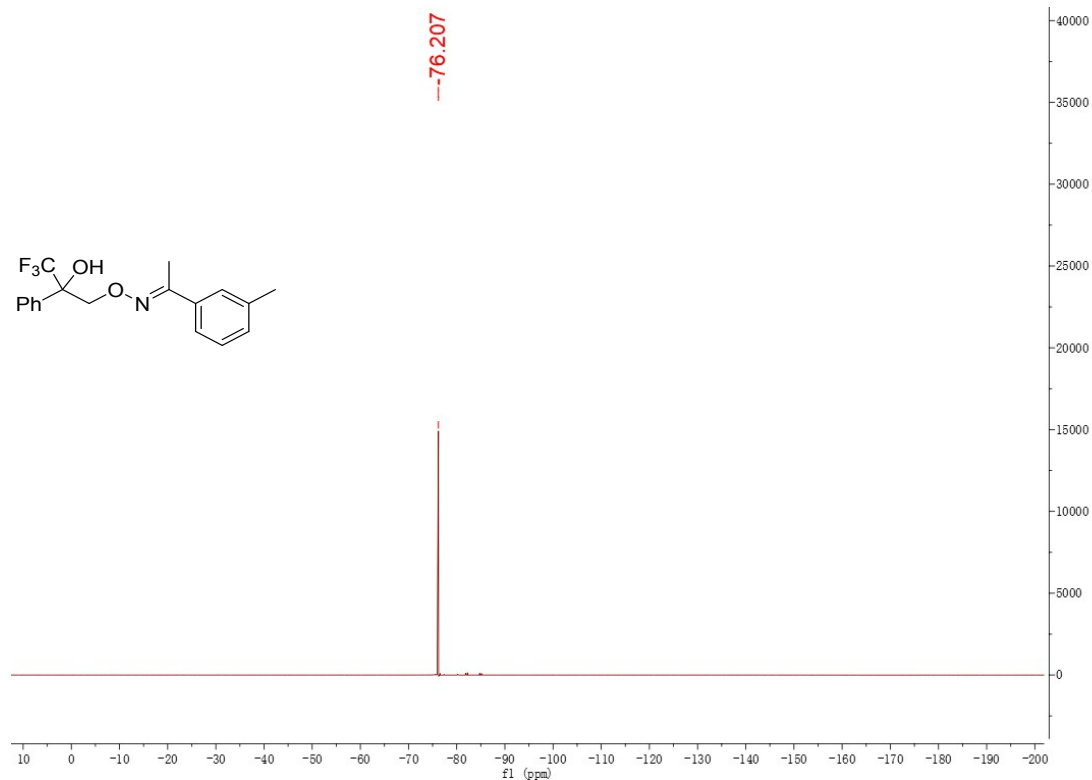
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3s**



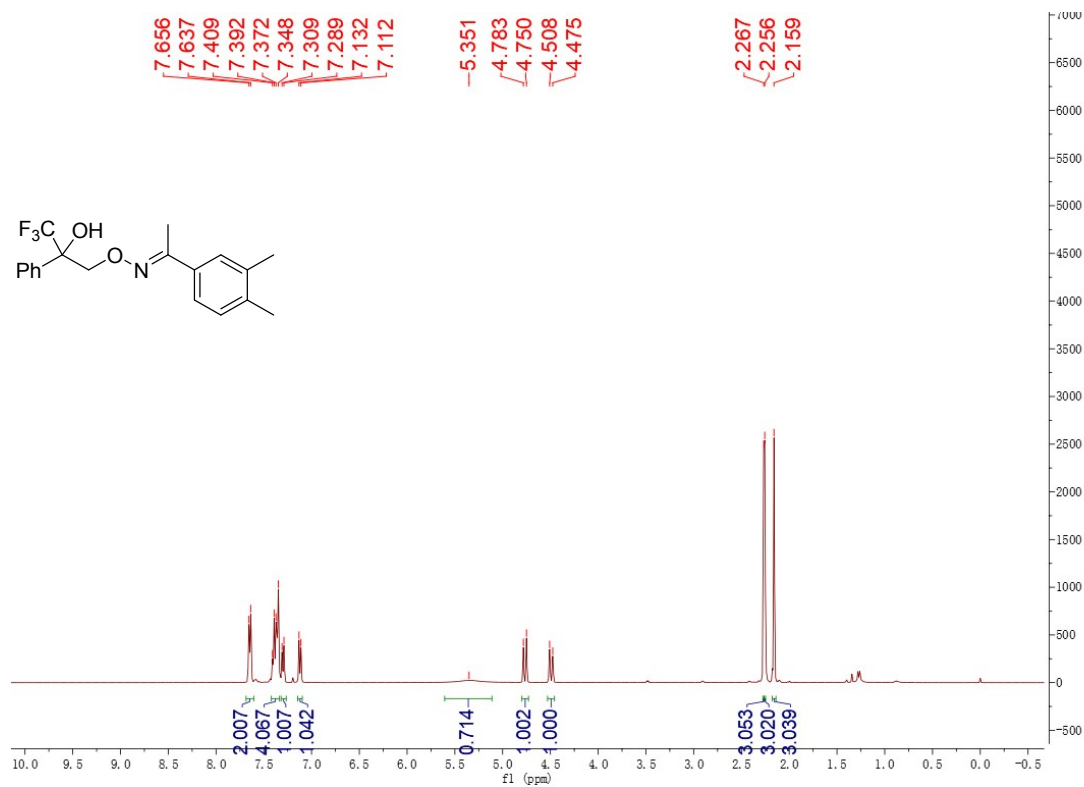
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3s**



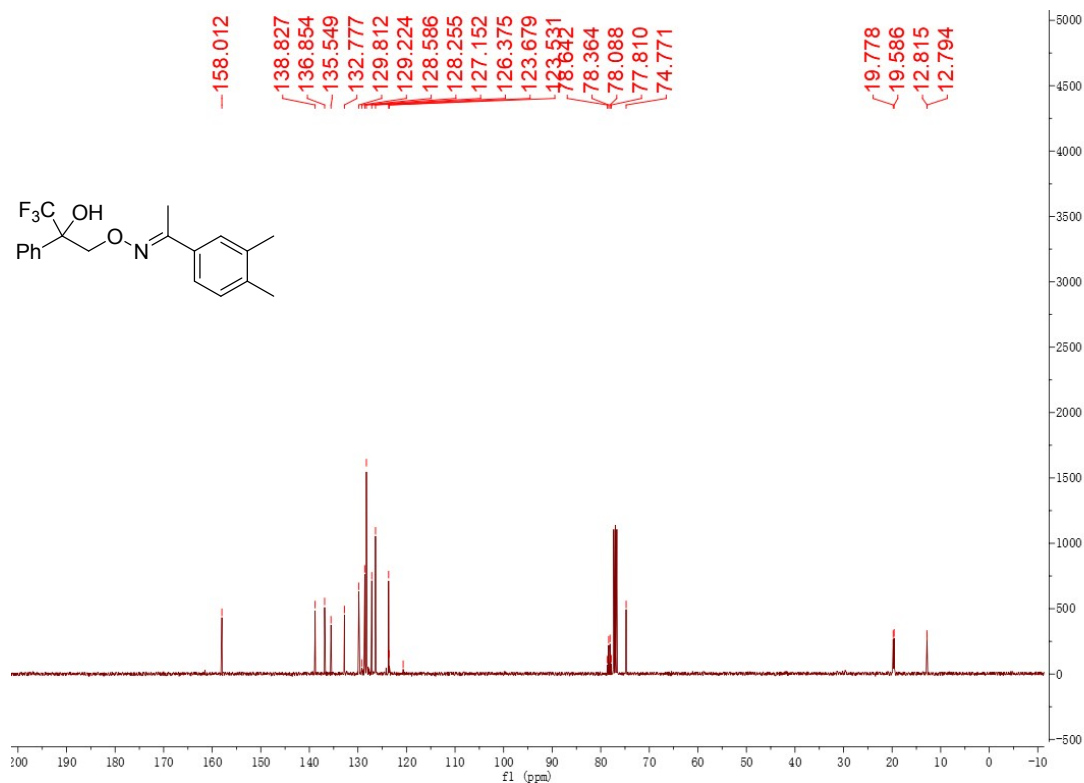
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3s**



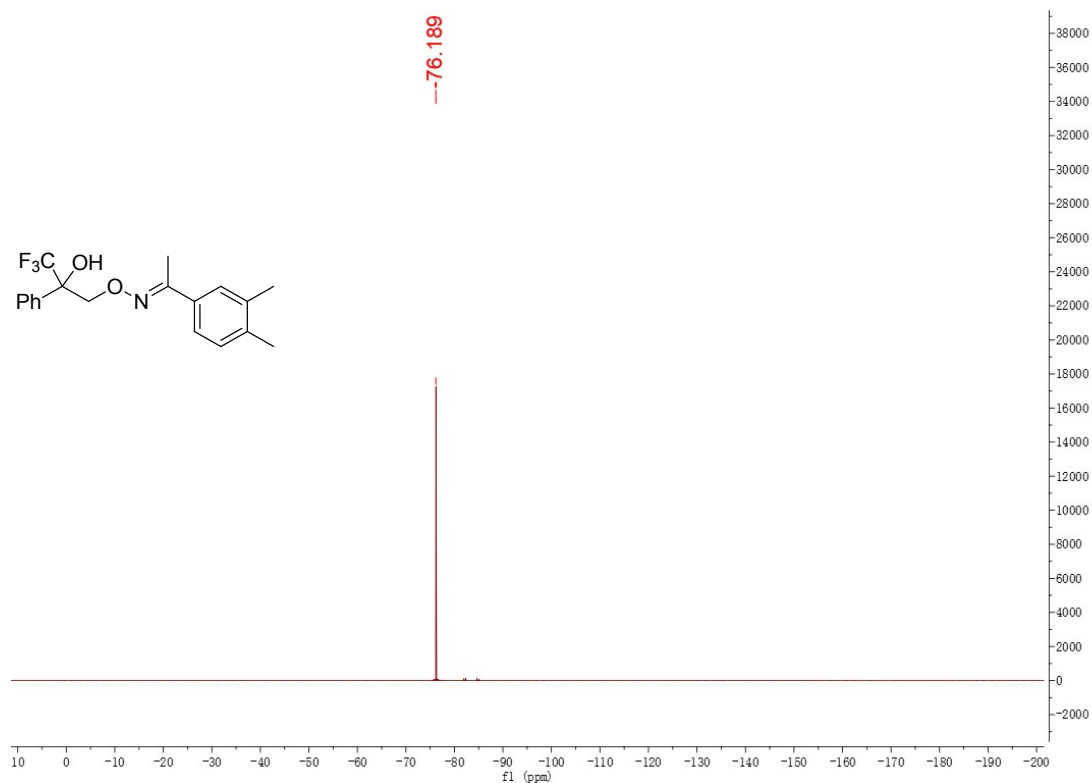
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3t**



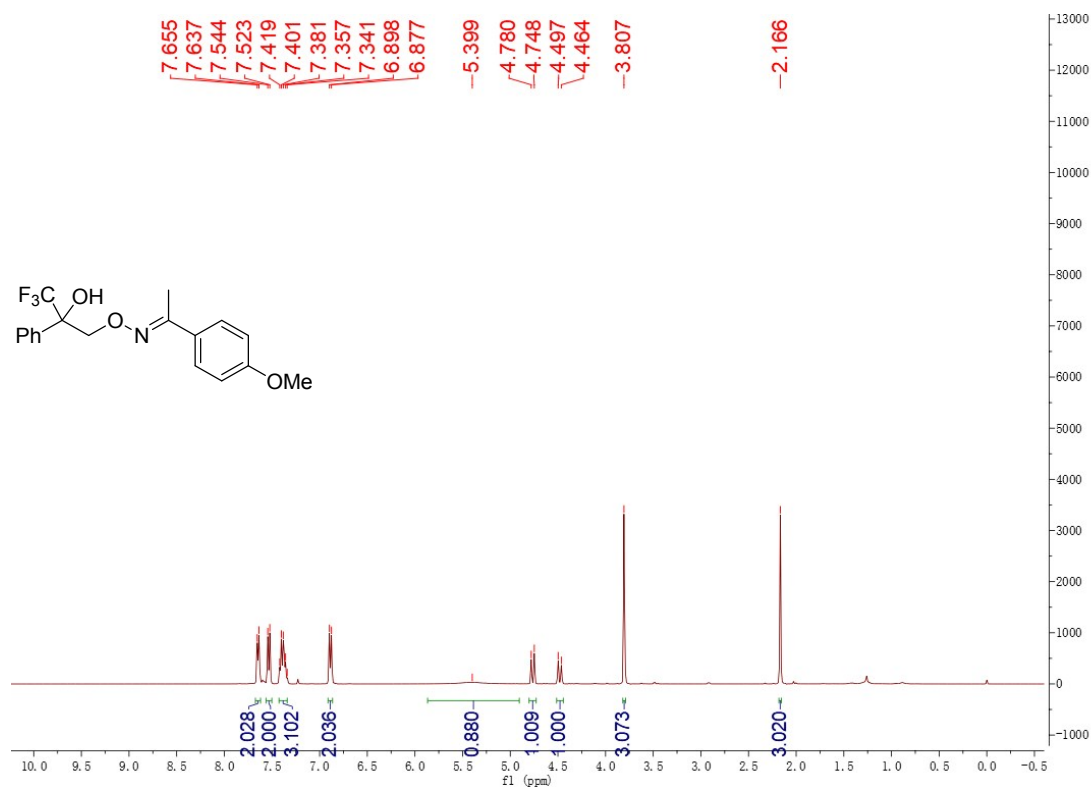
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3t**



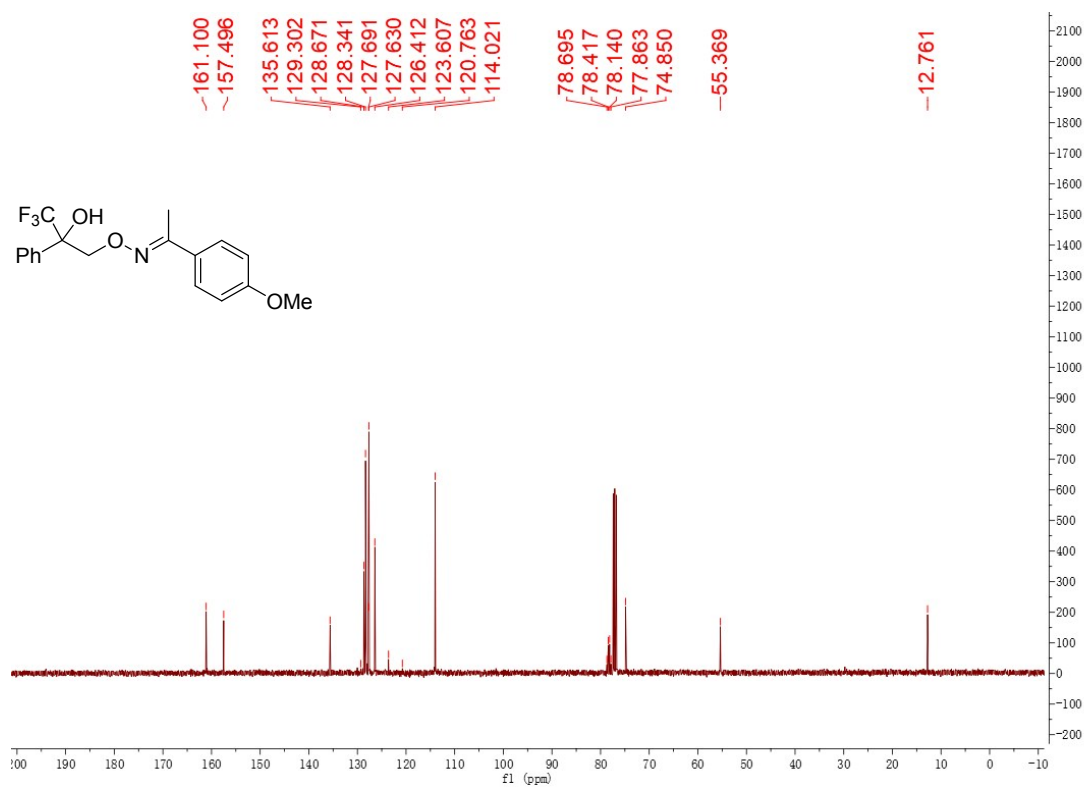
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3t**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3u**



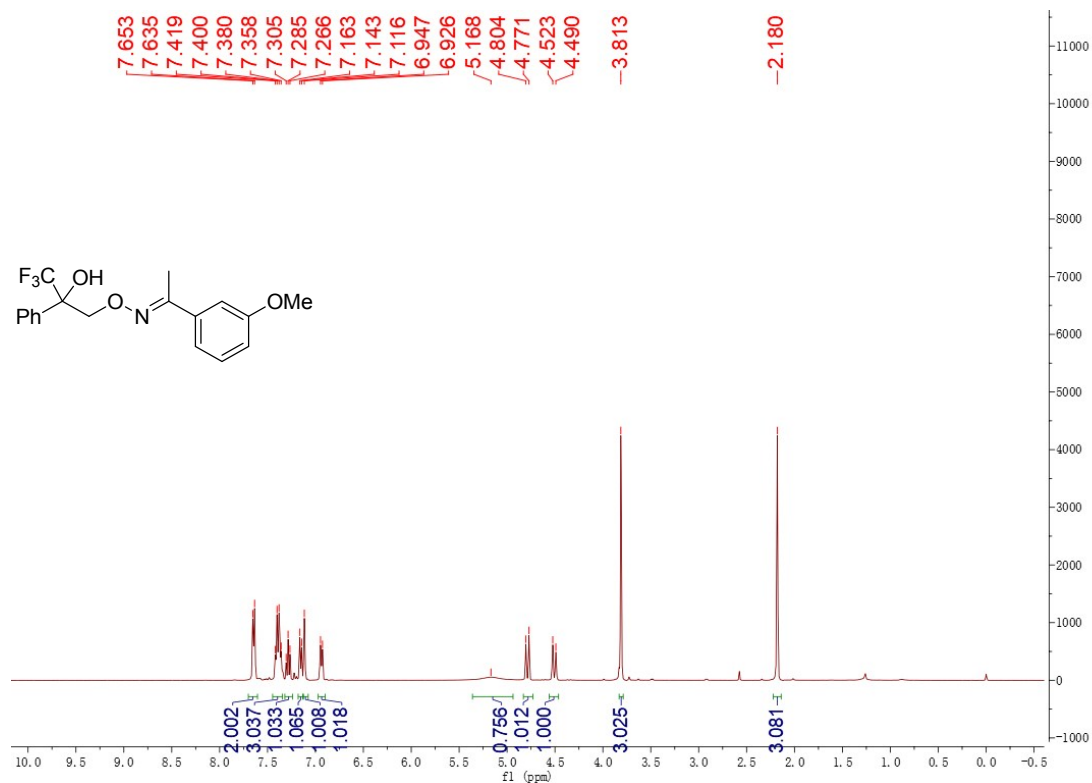
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3u**



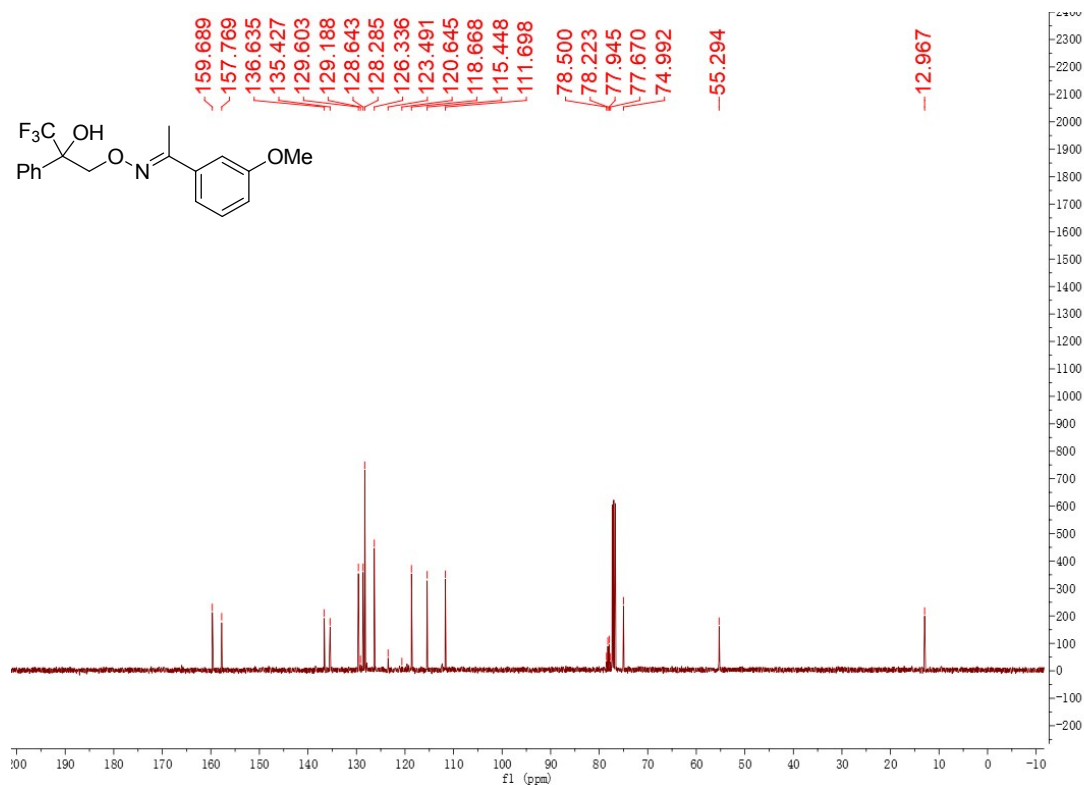
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3u**



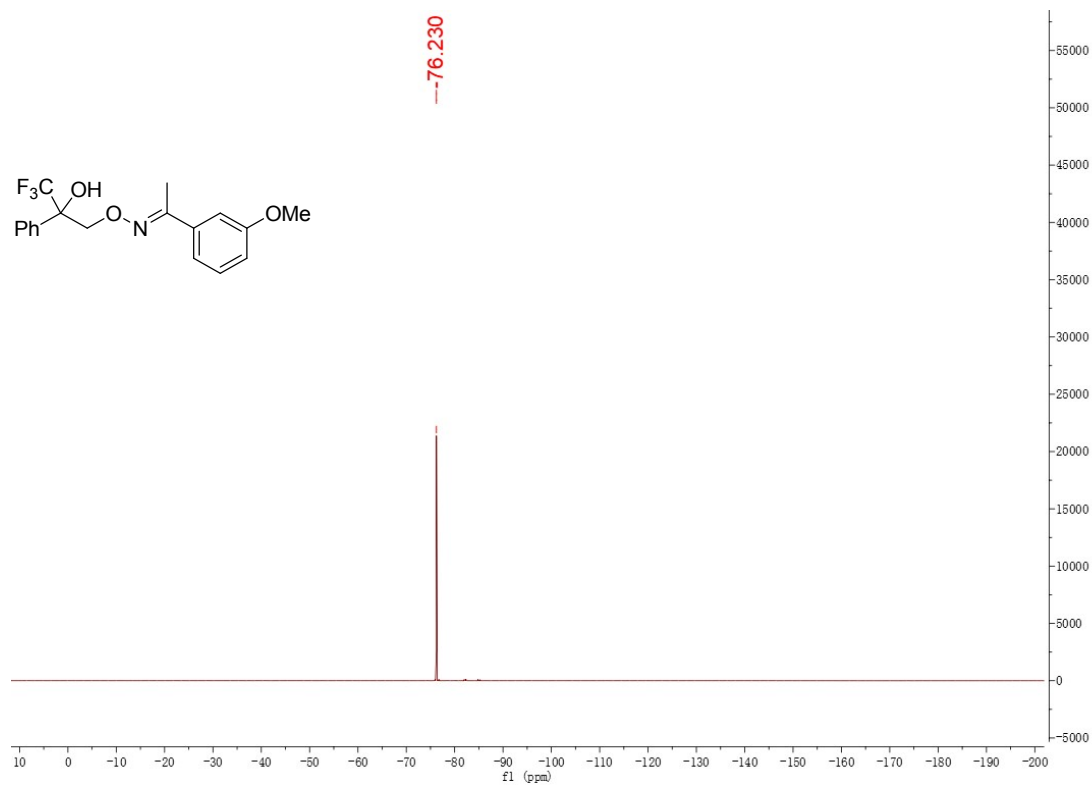
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3v**



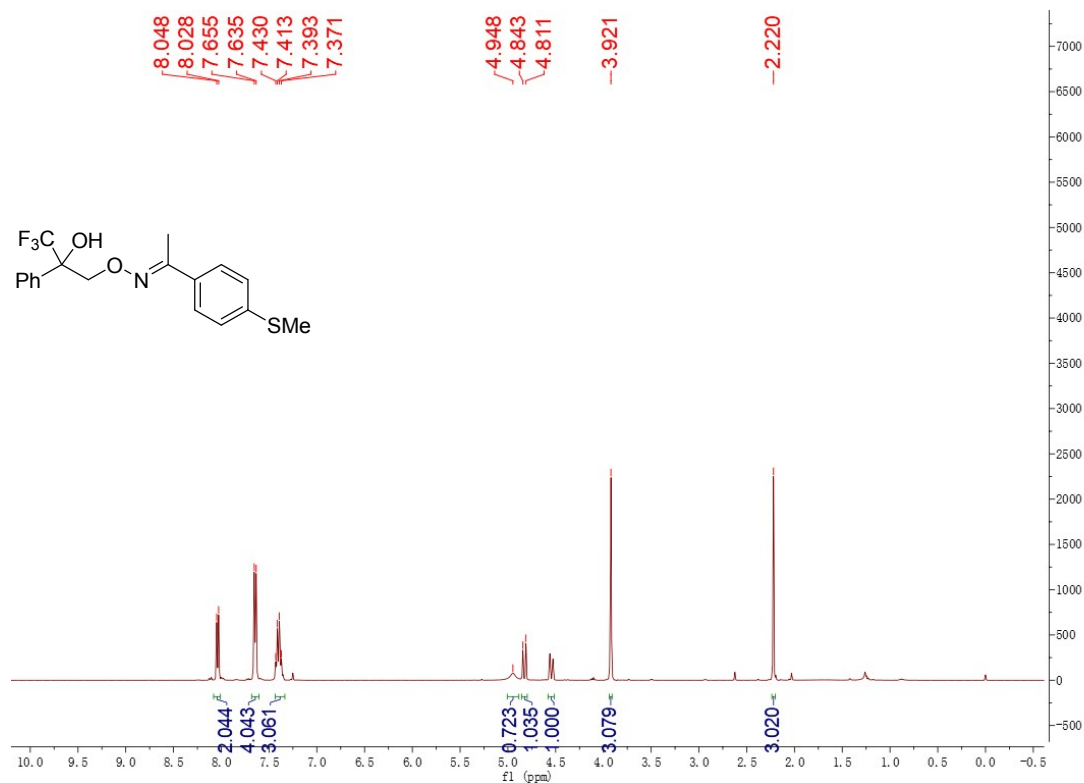
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3v**



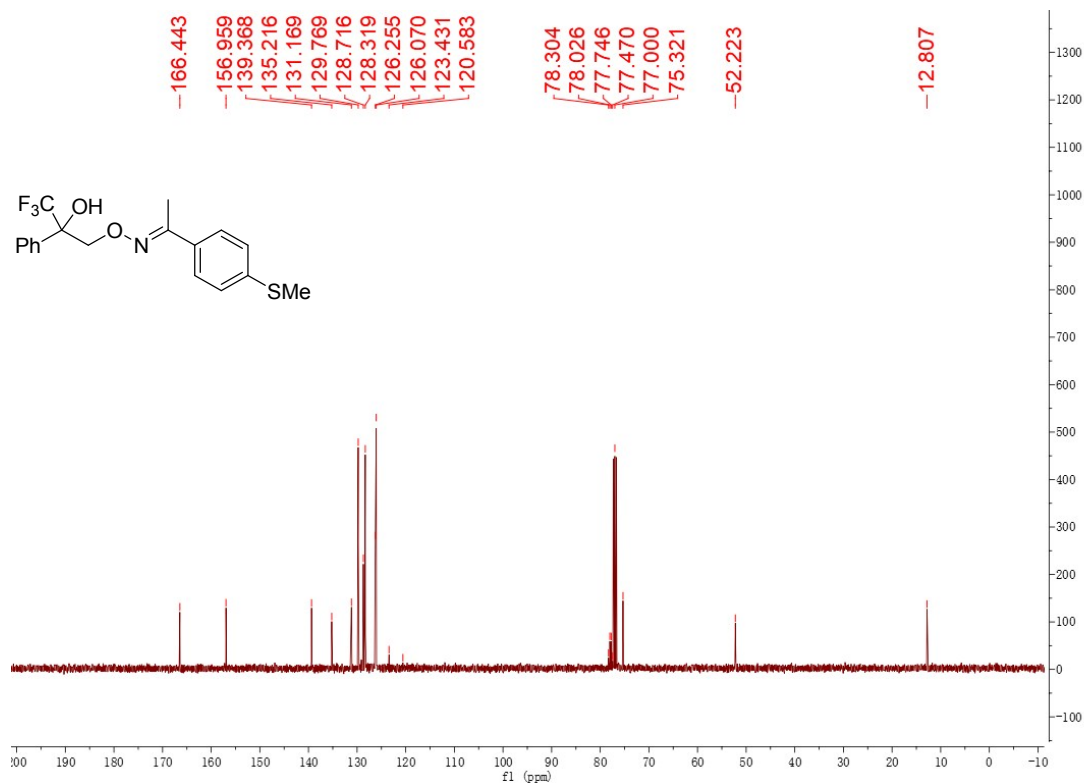
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3v**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3w**



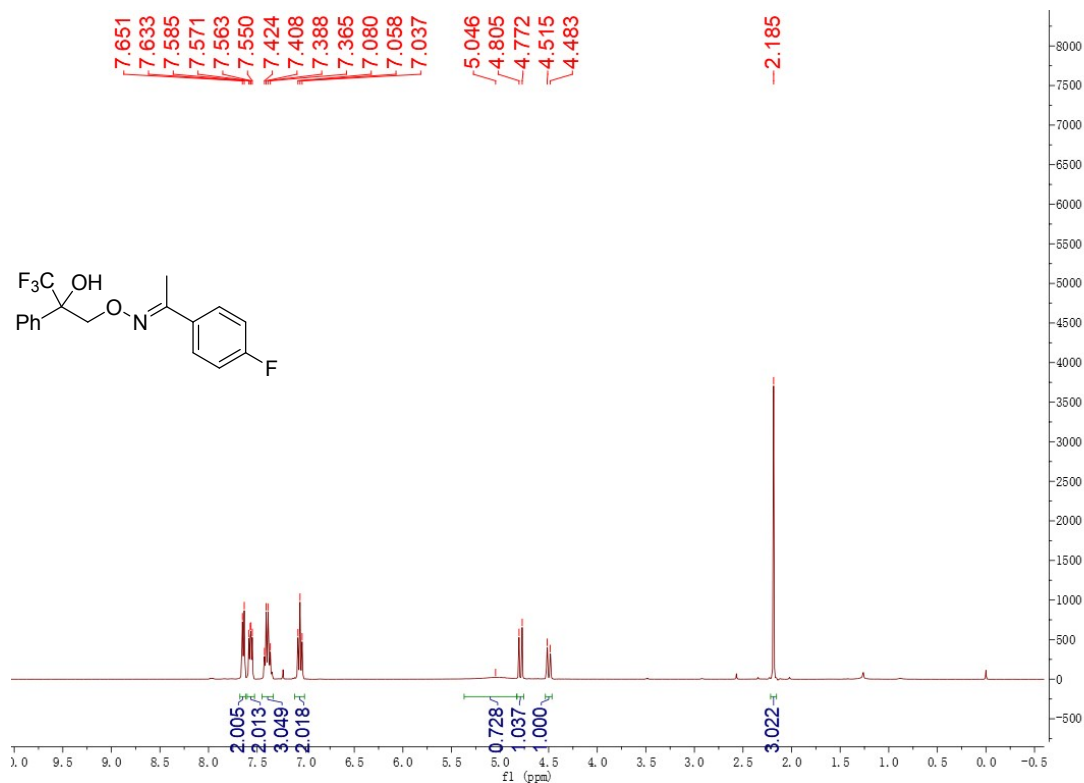
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3w**



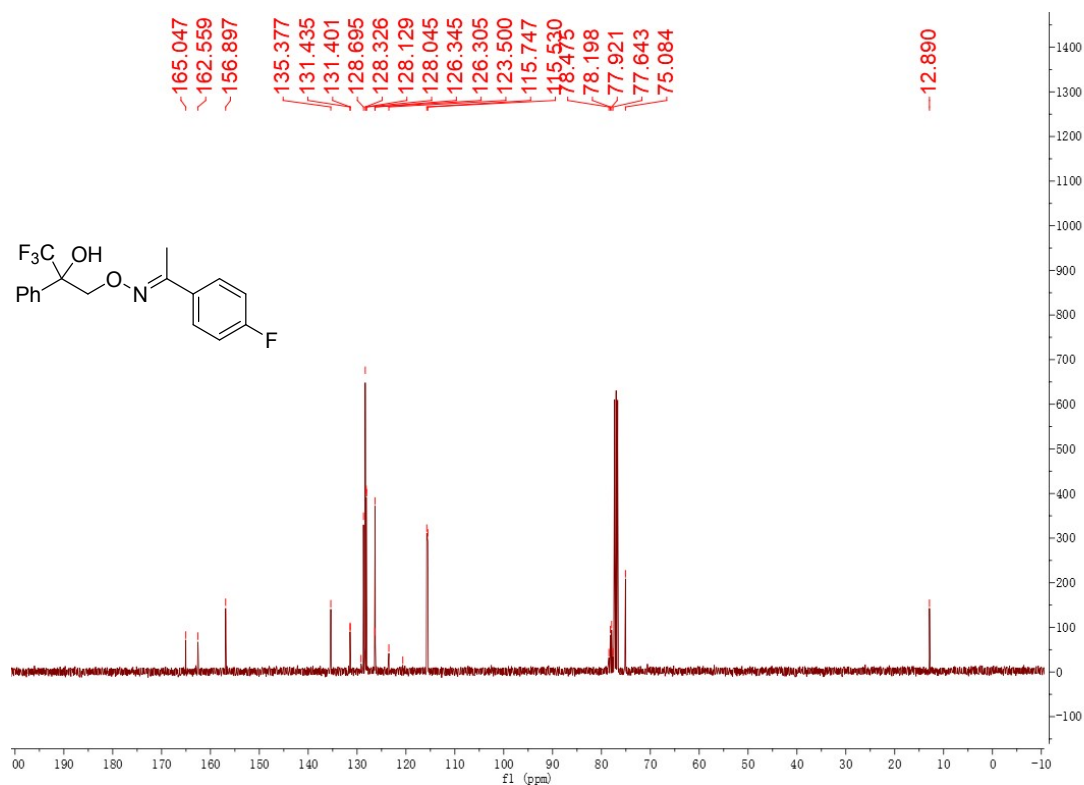
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3w**



**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3x**



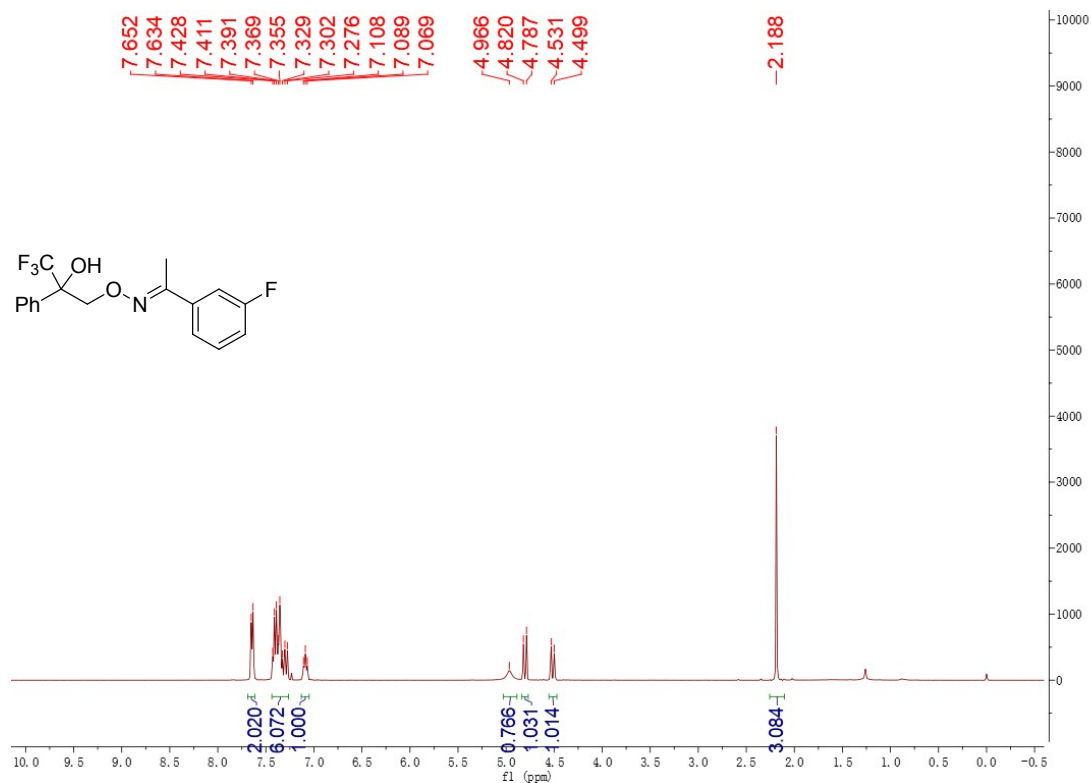
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3x**



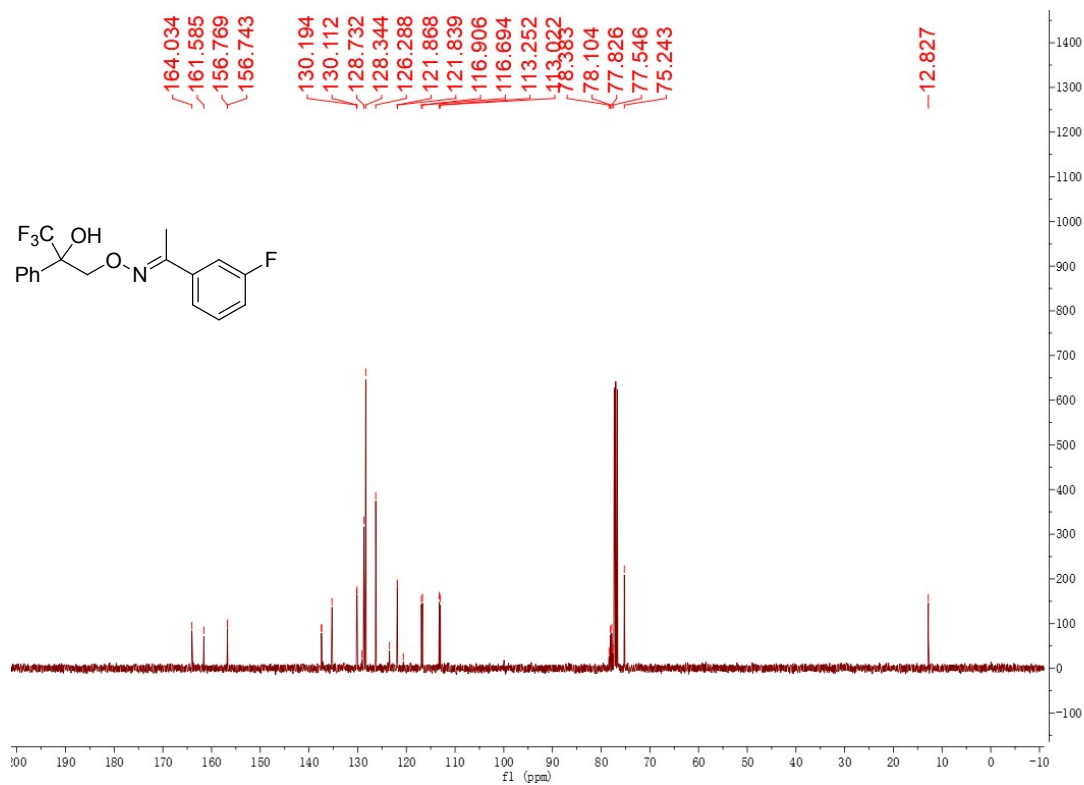
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3x**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3y**



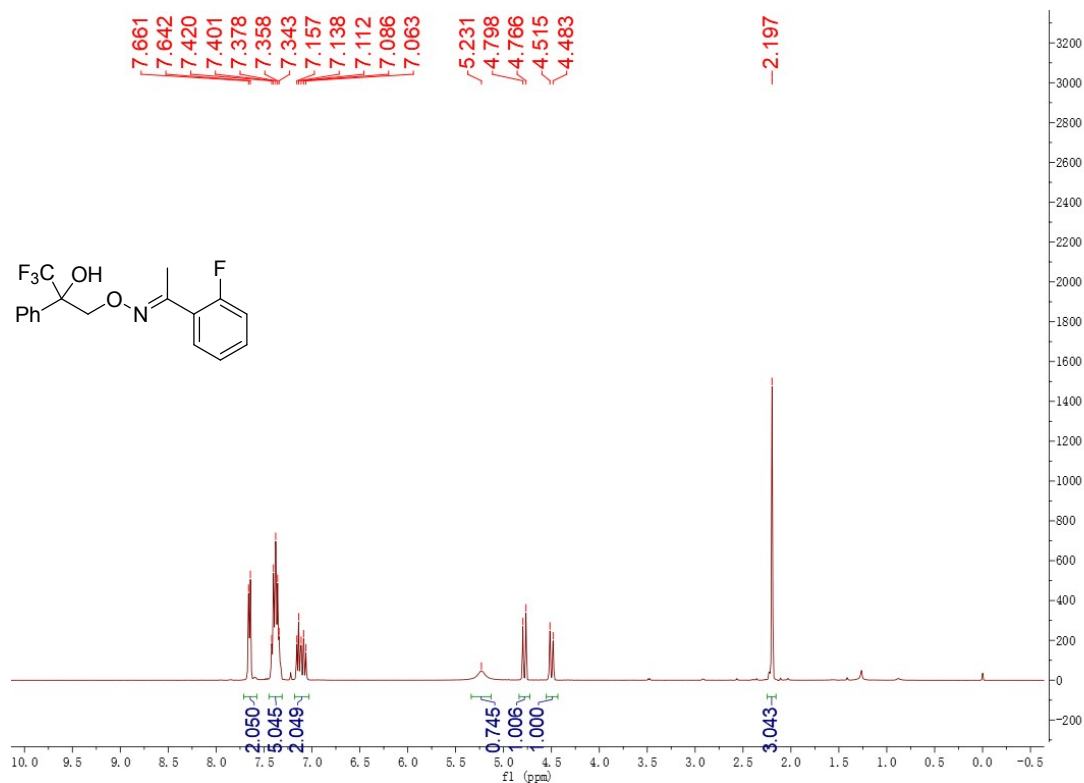
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3y**



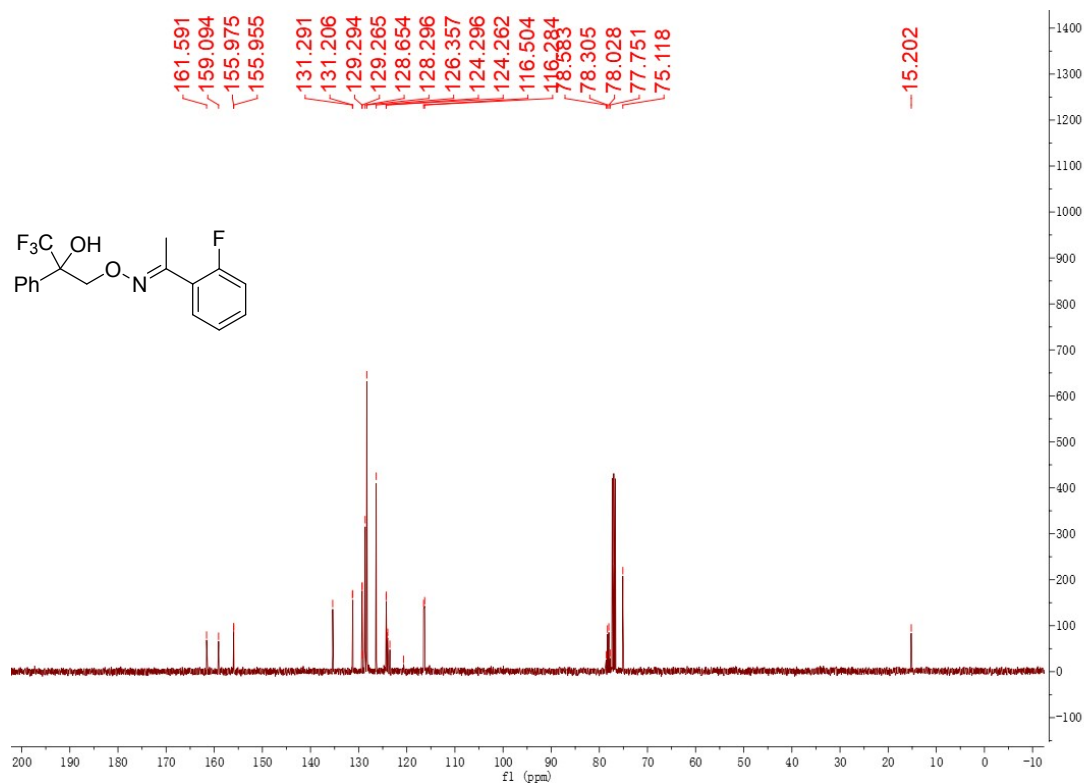
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3y**



**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3z**



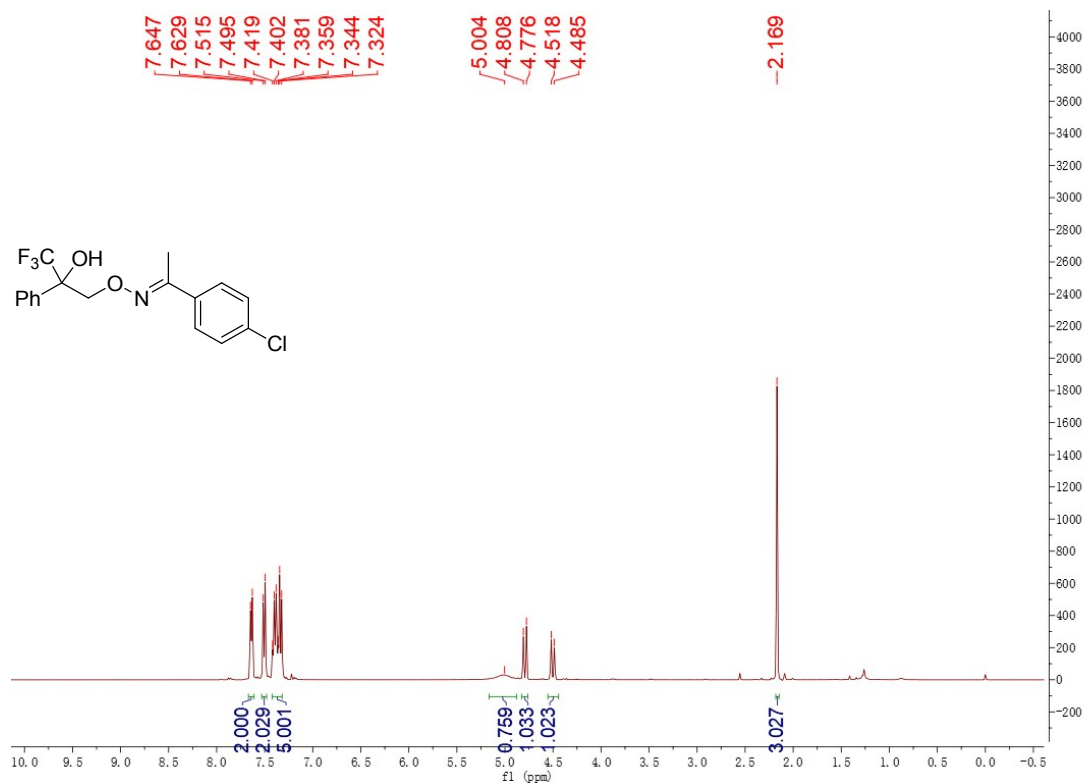
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3z**



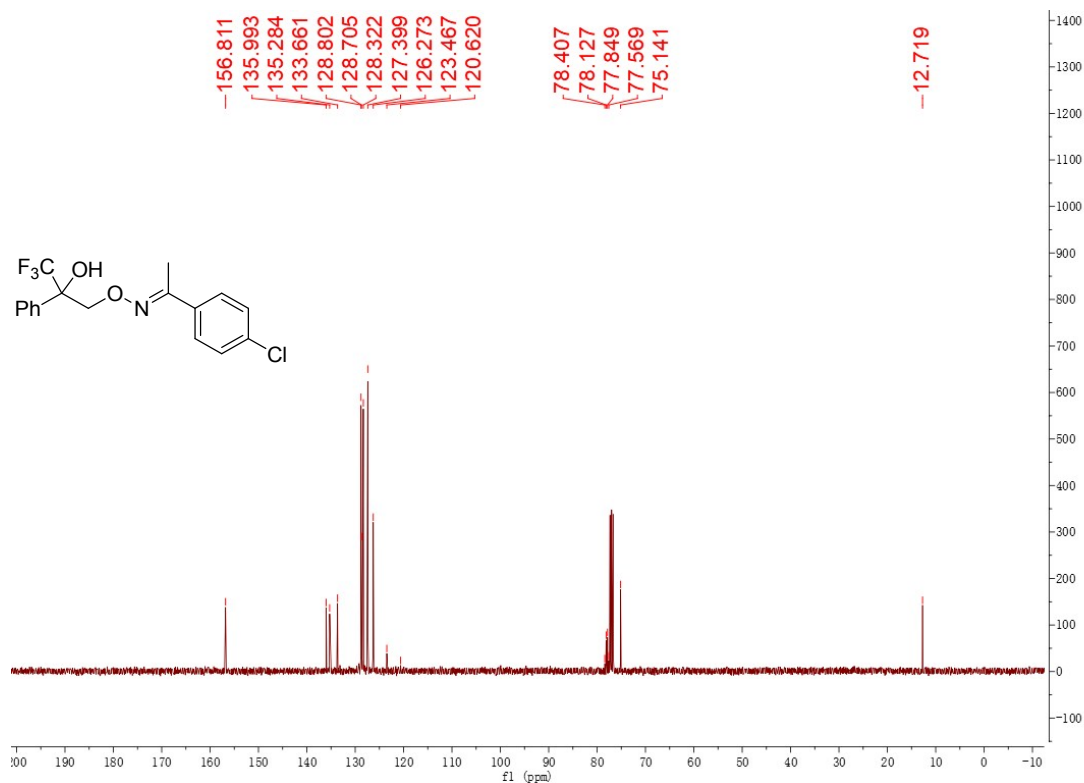
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3z**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3aa**



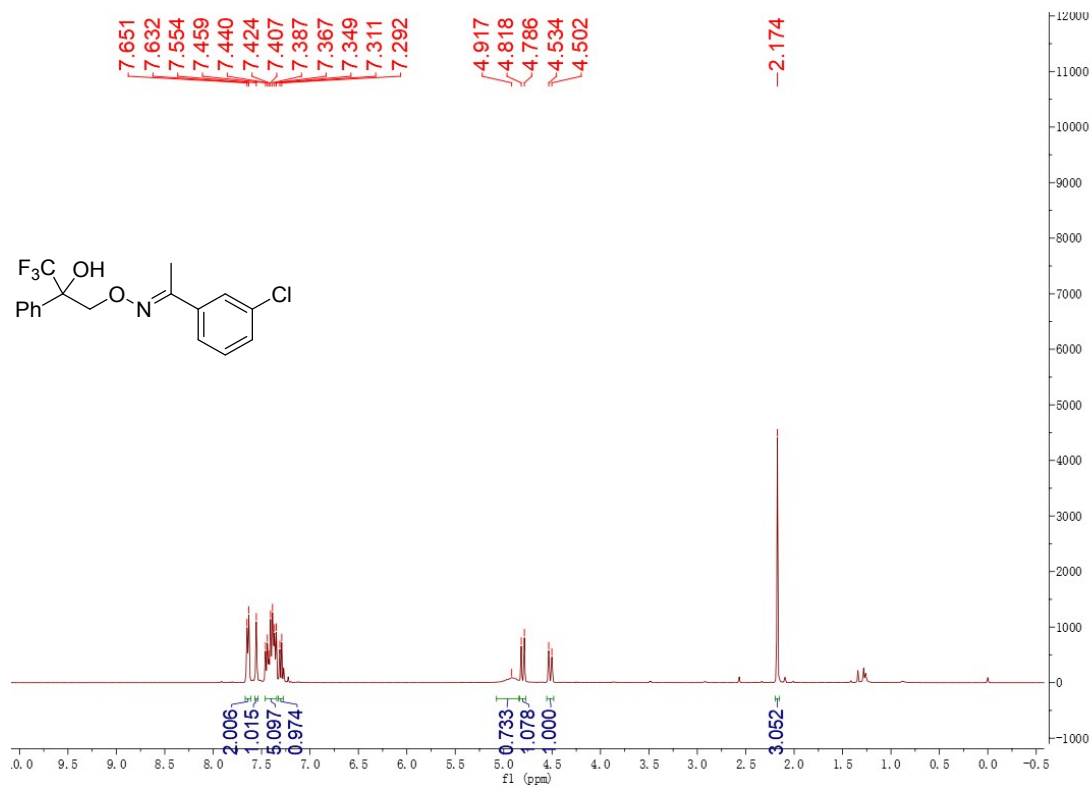
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3aa**



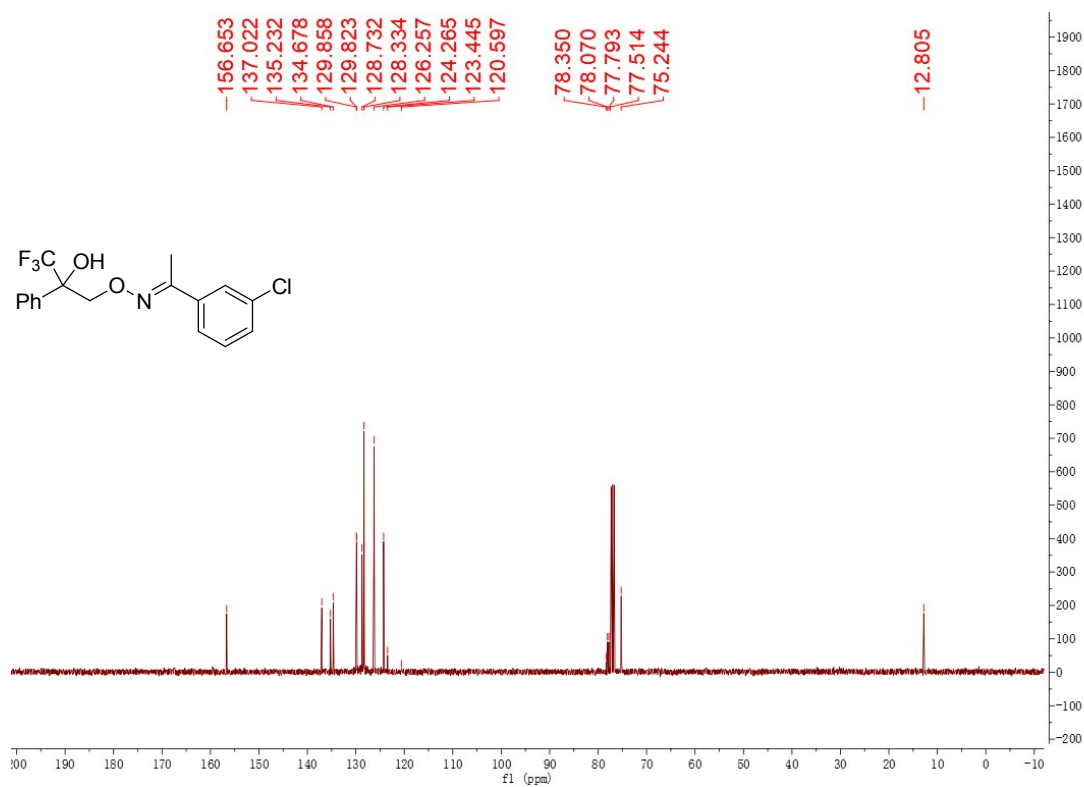
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3aa**



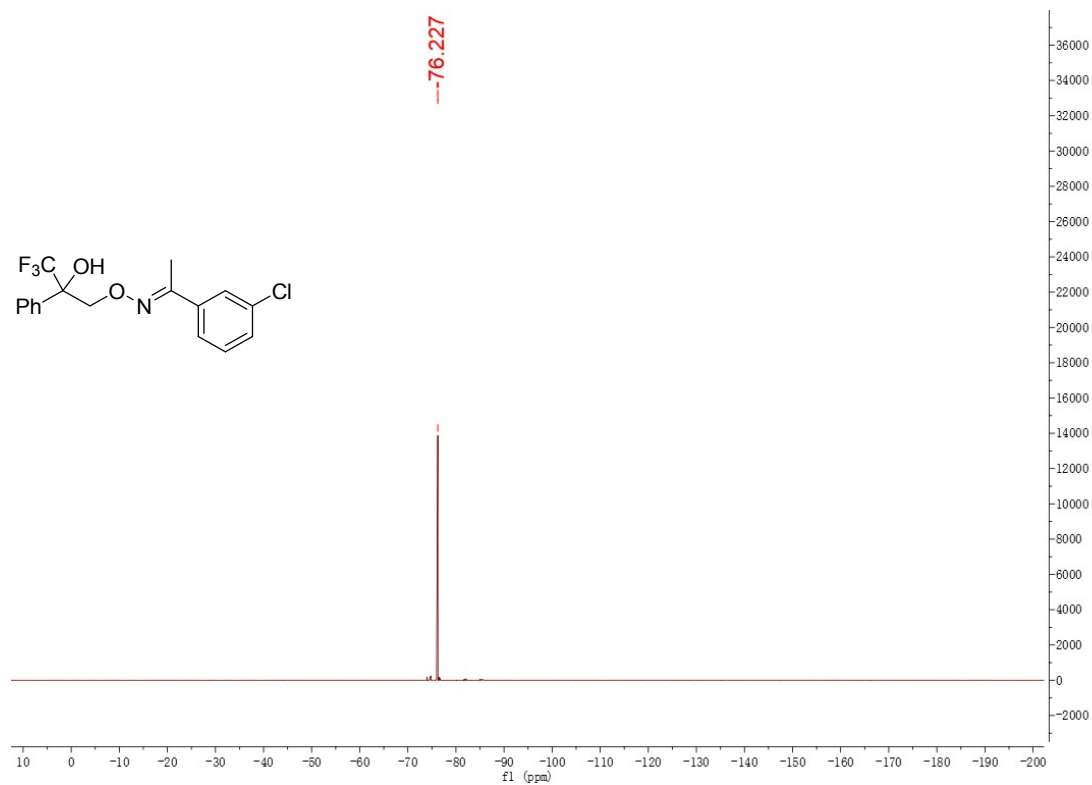
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3ab**



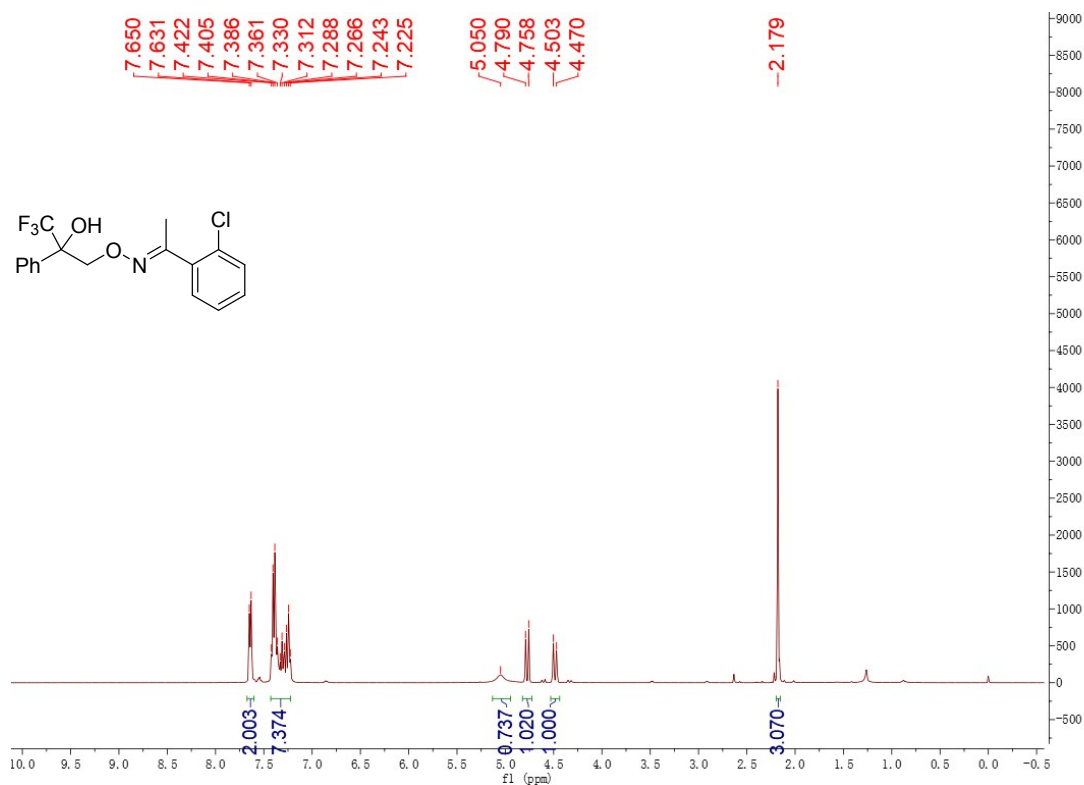
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3ab**



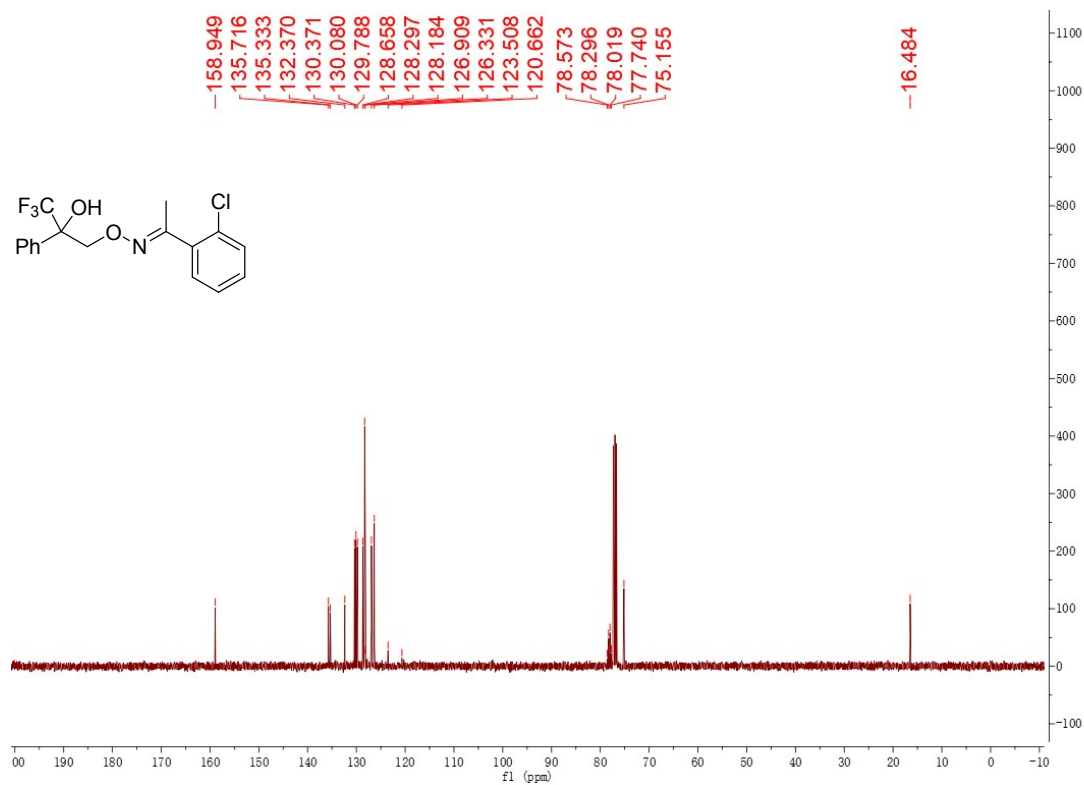
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ab**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3ac**



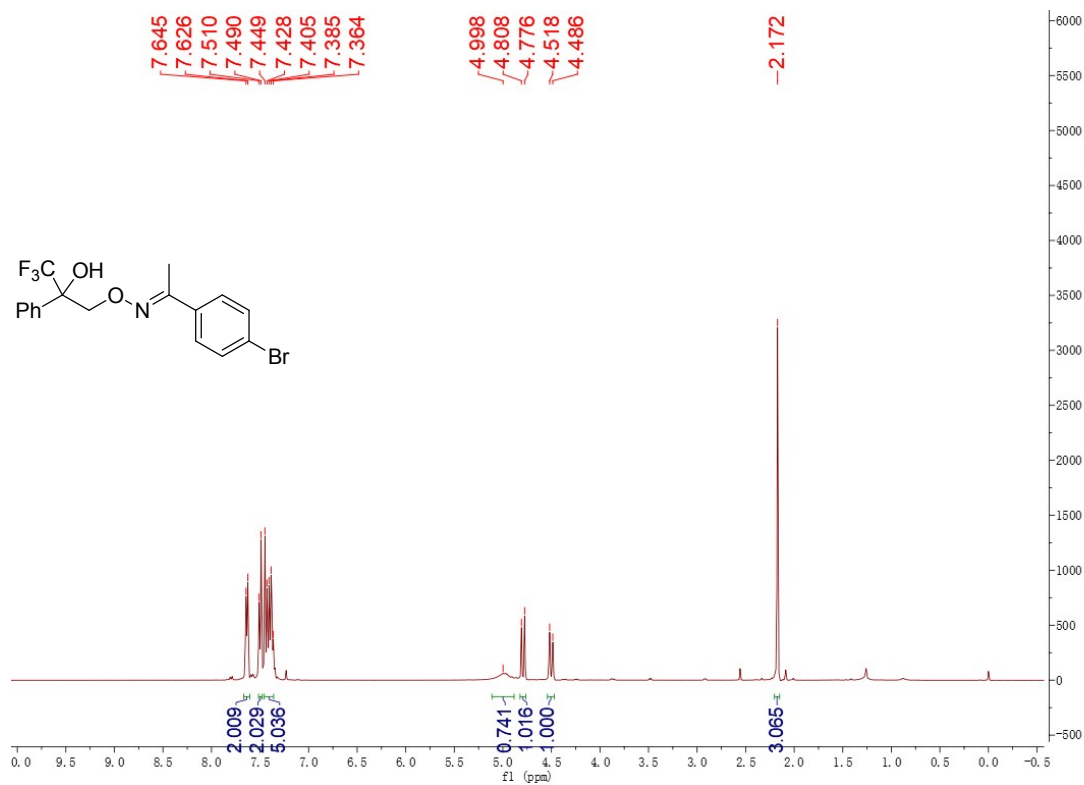
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3ac**



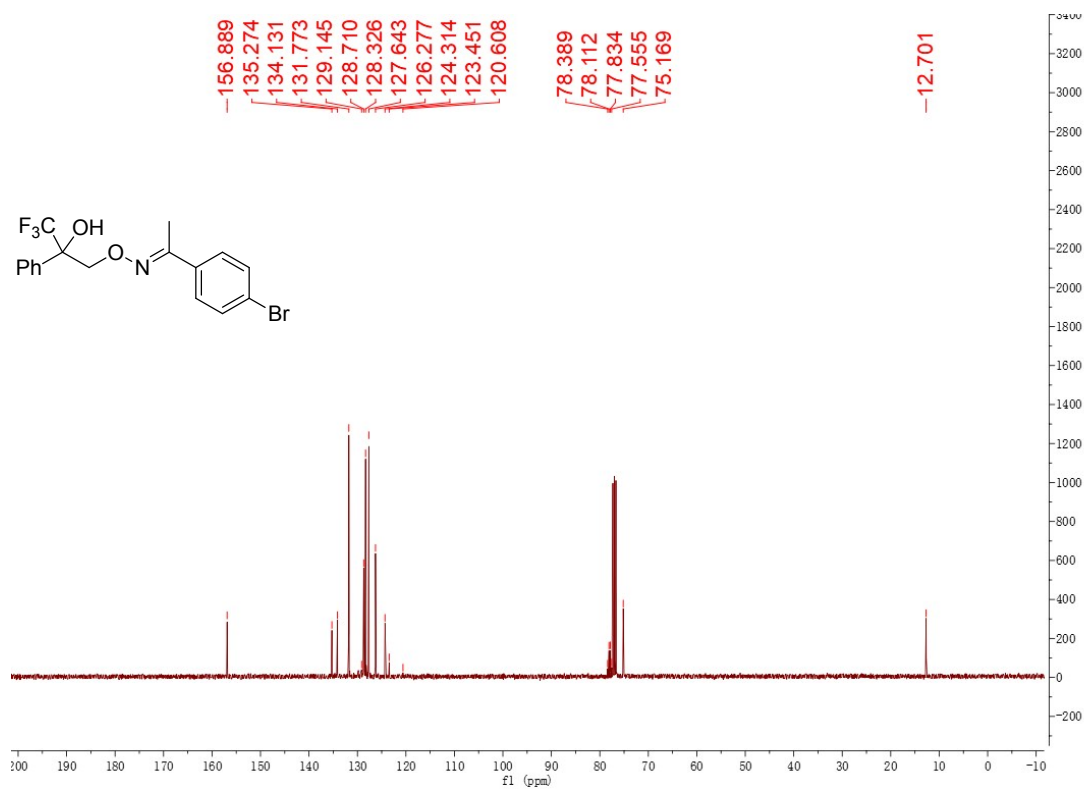
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ac**



**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3ad**



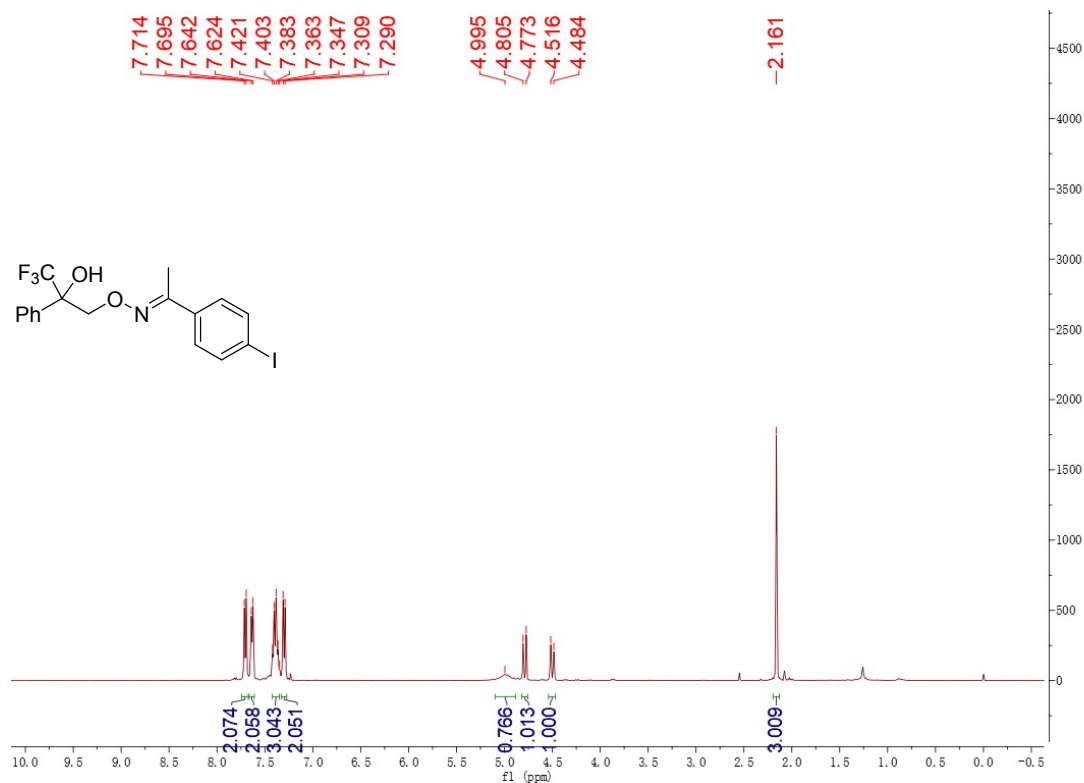
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3ad**



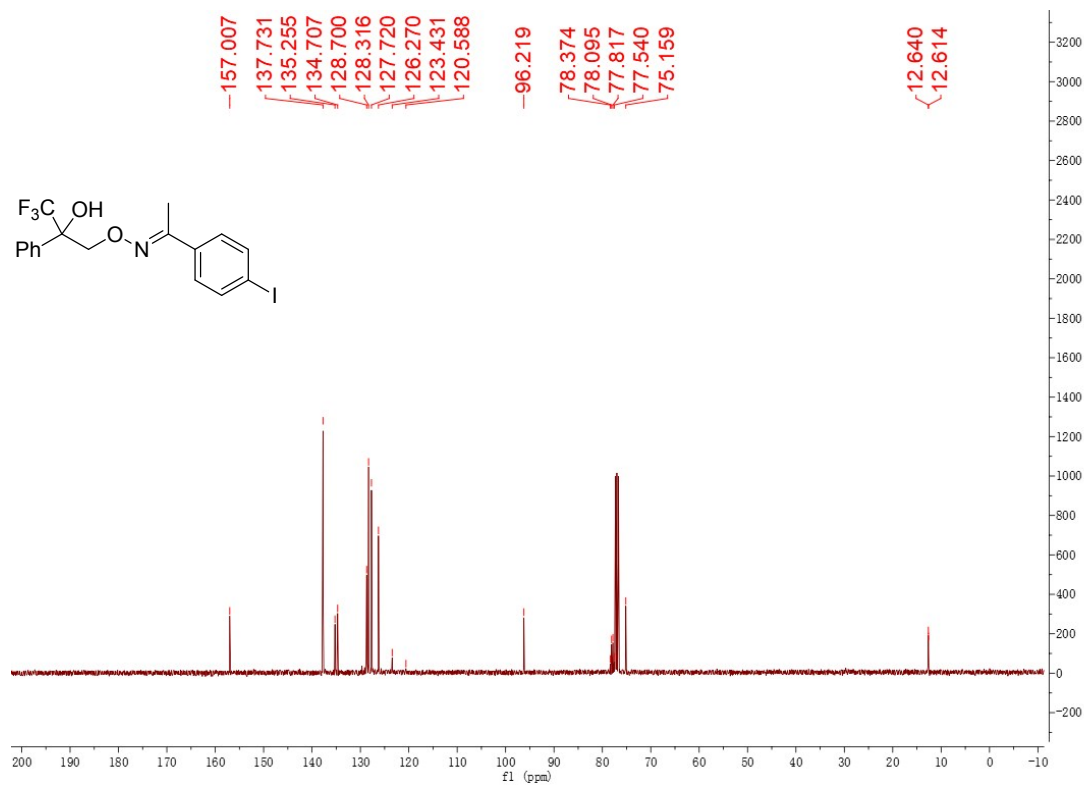
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ad**



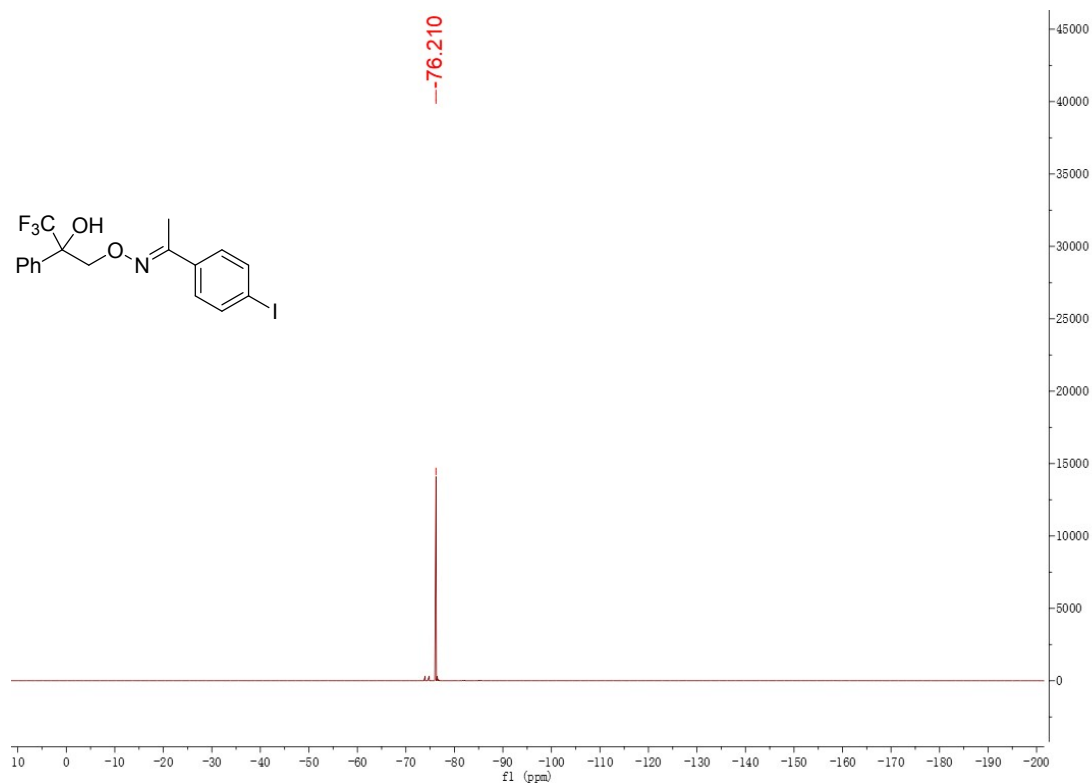
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3ae**



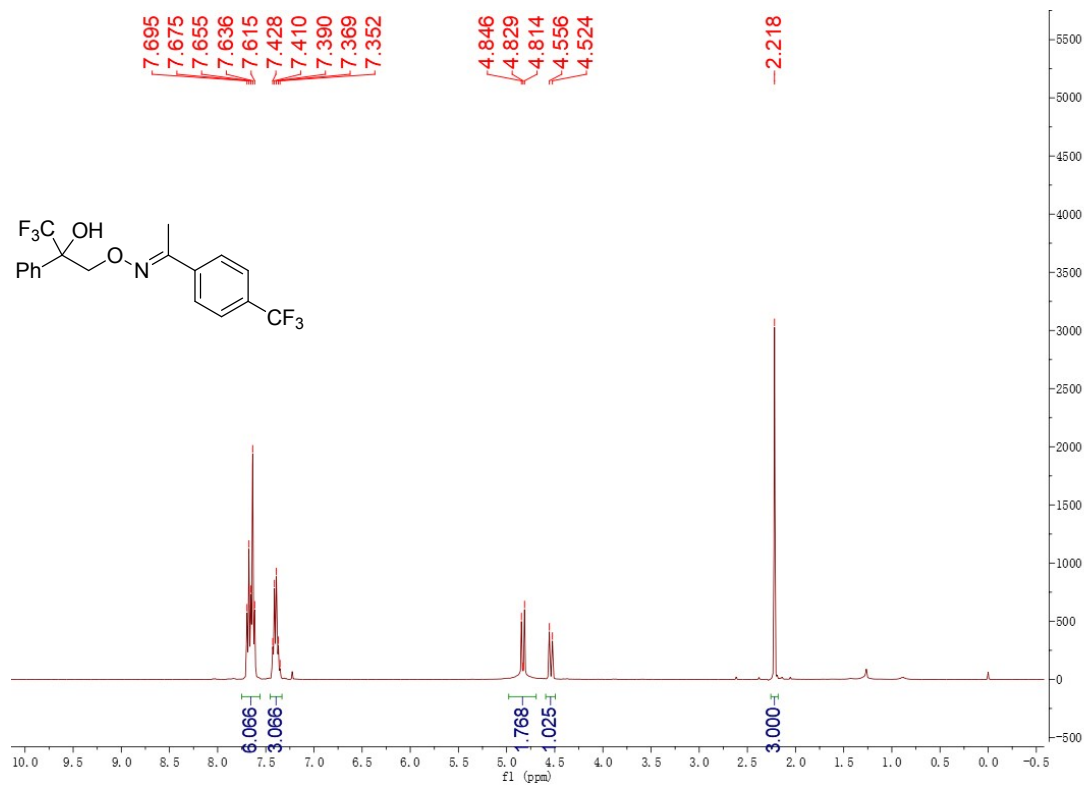
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3ae**



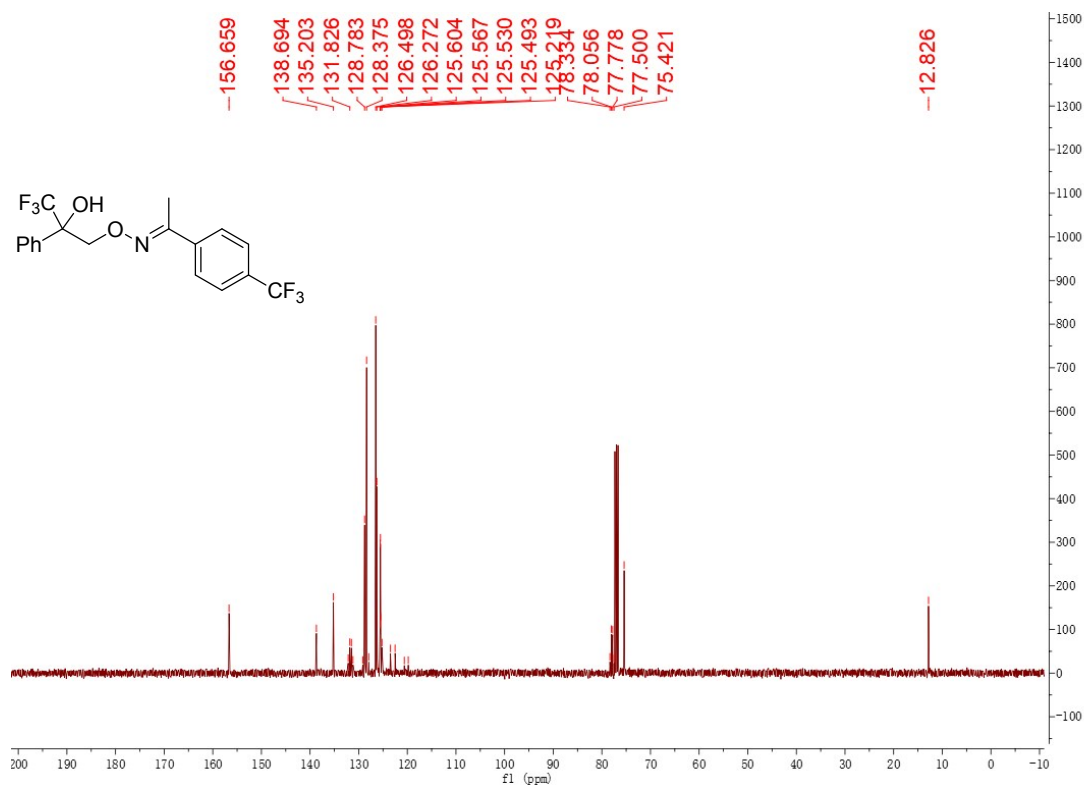
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ae**



**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3af**



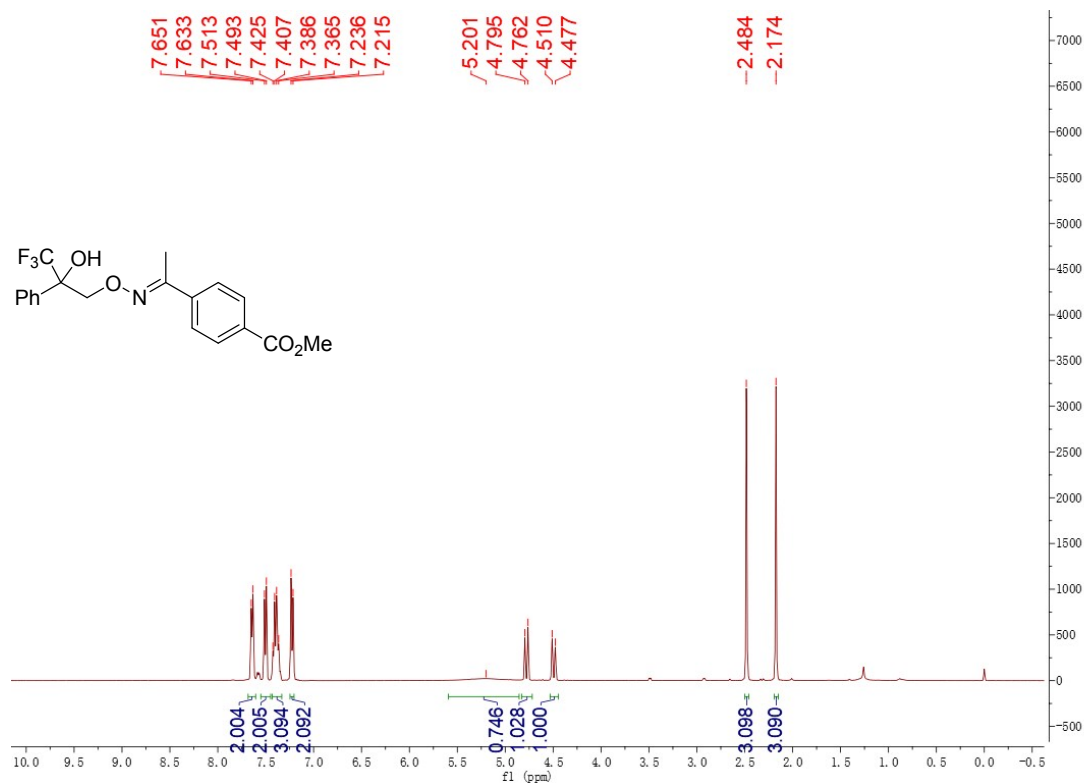
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3af**



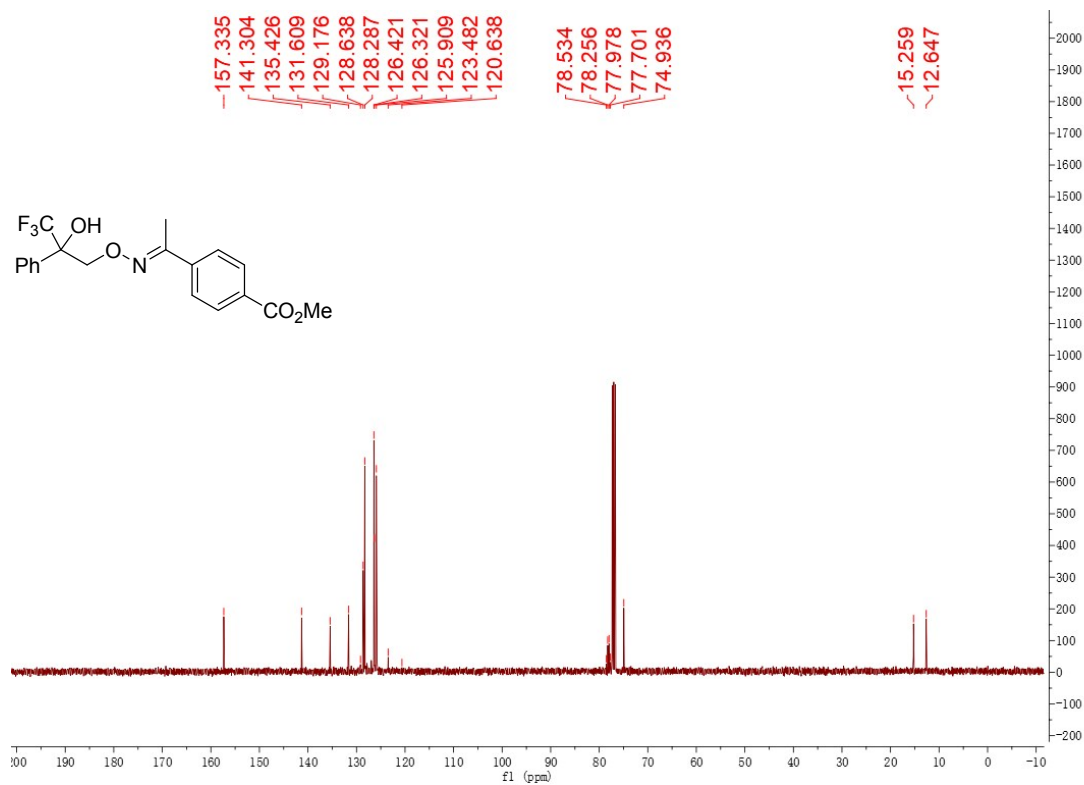
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3af**



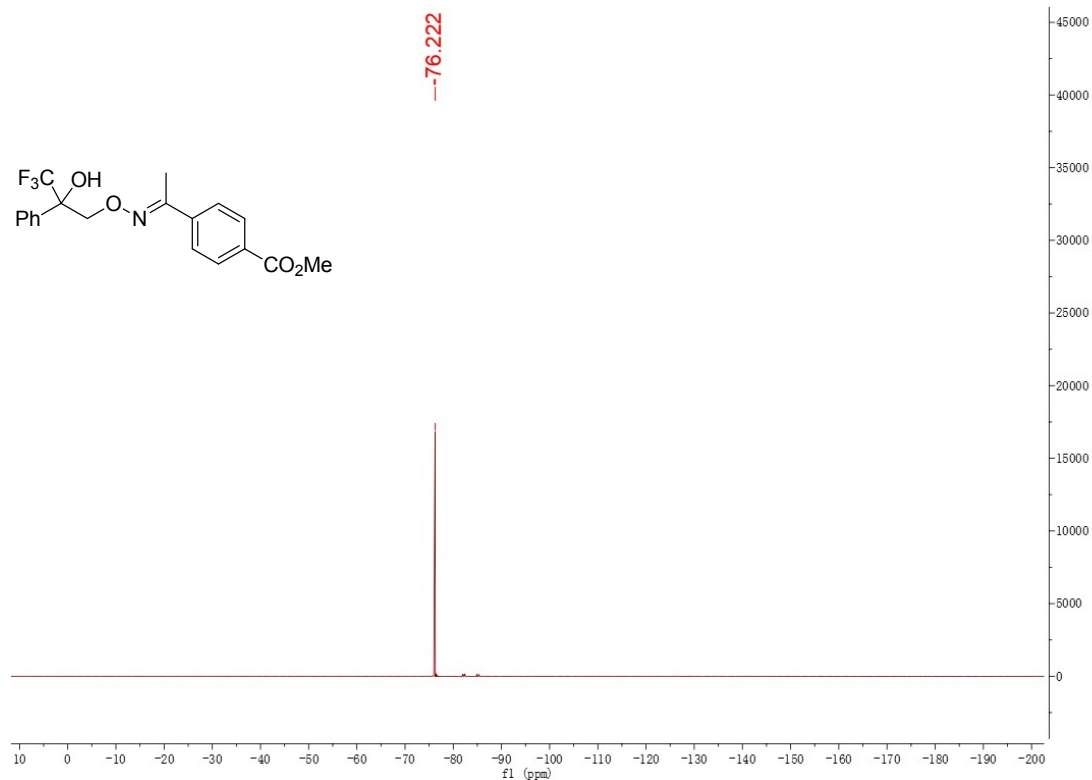
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3ag**



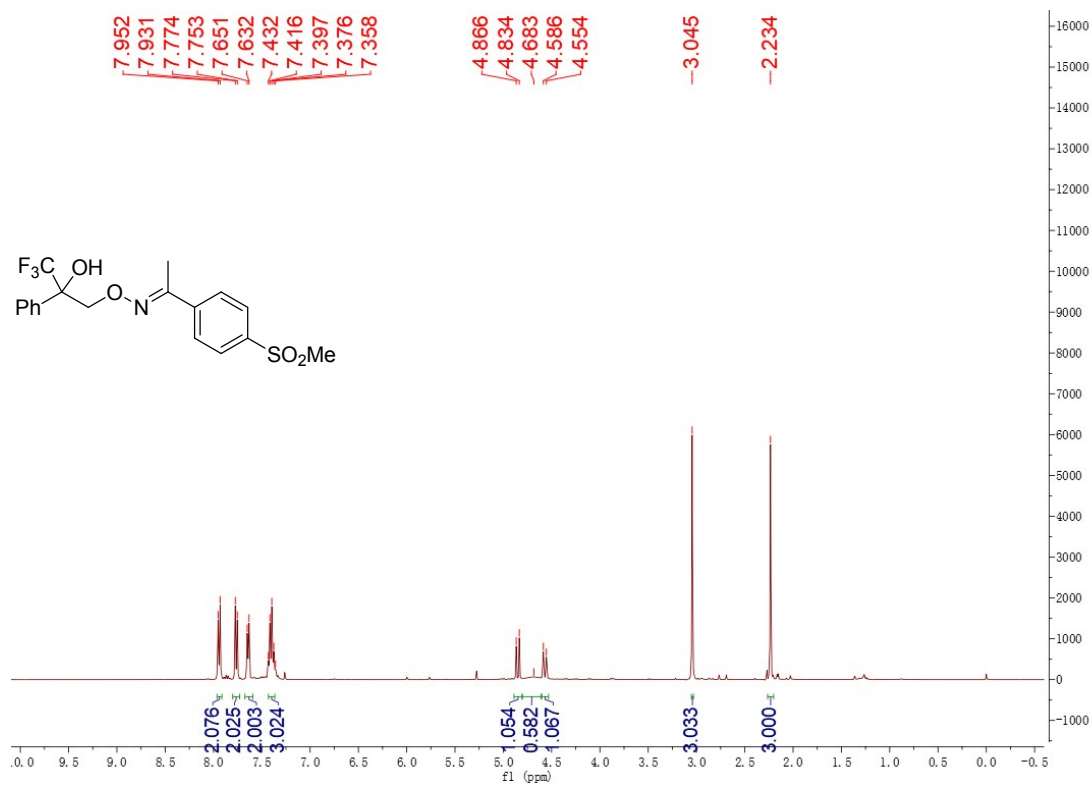
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3ag**



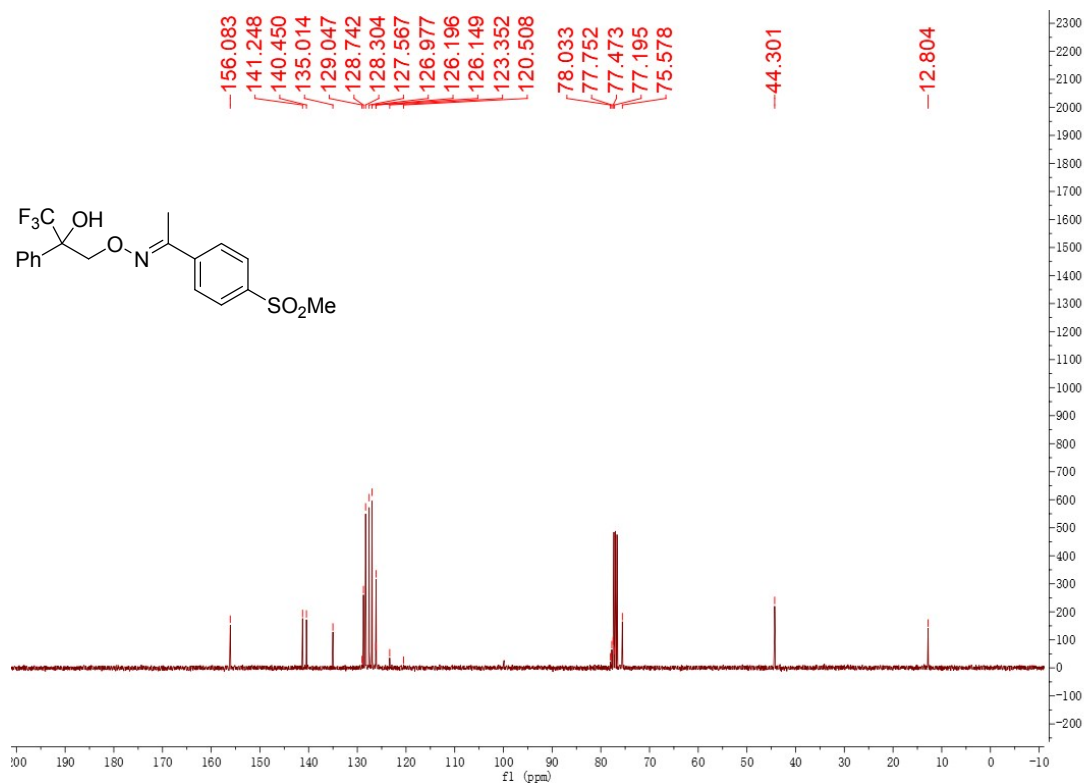
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ag**



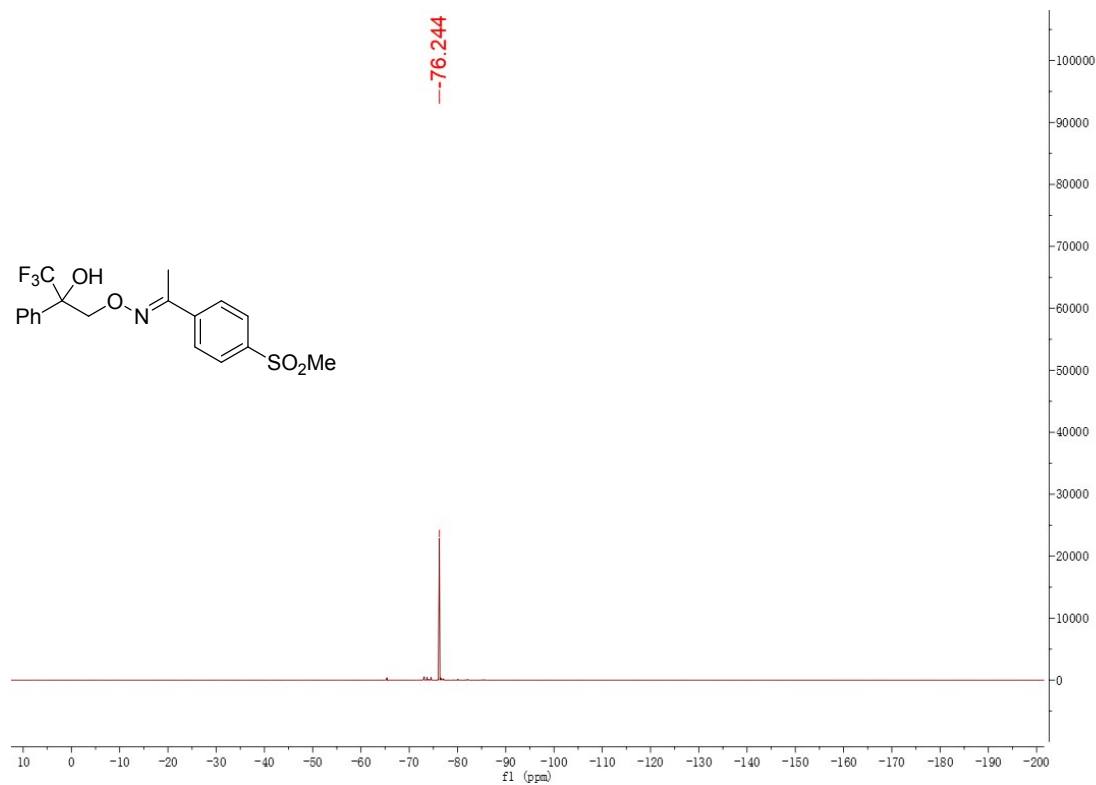
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3ah**



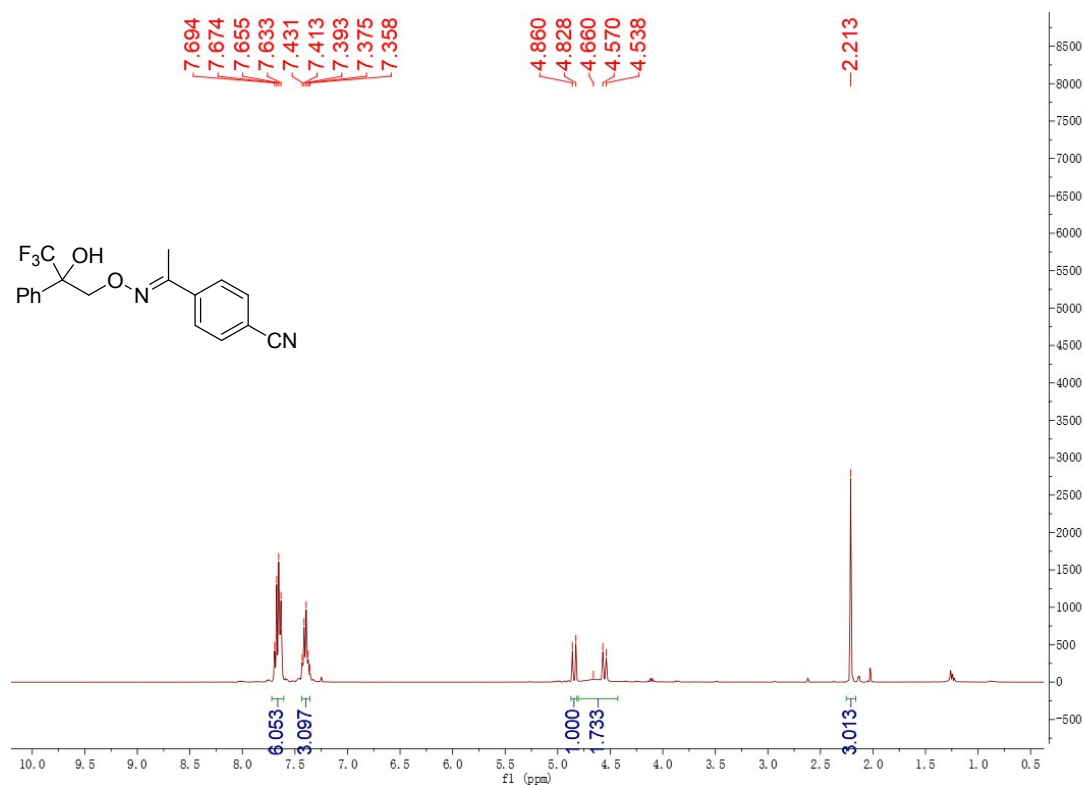
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3ah**



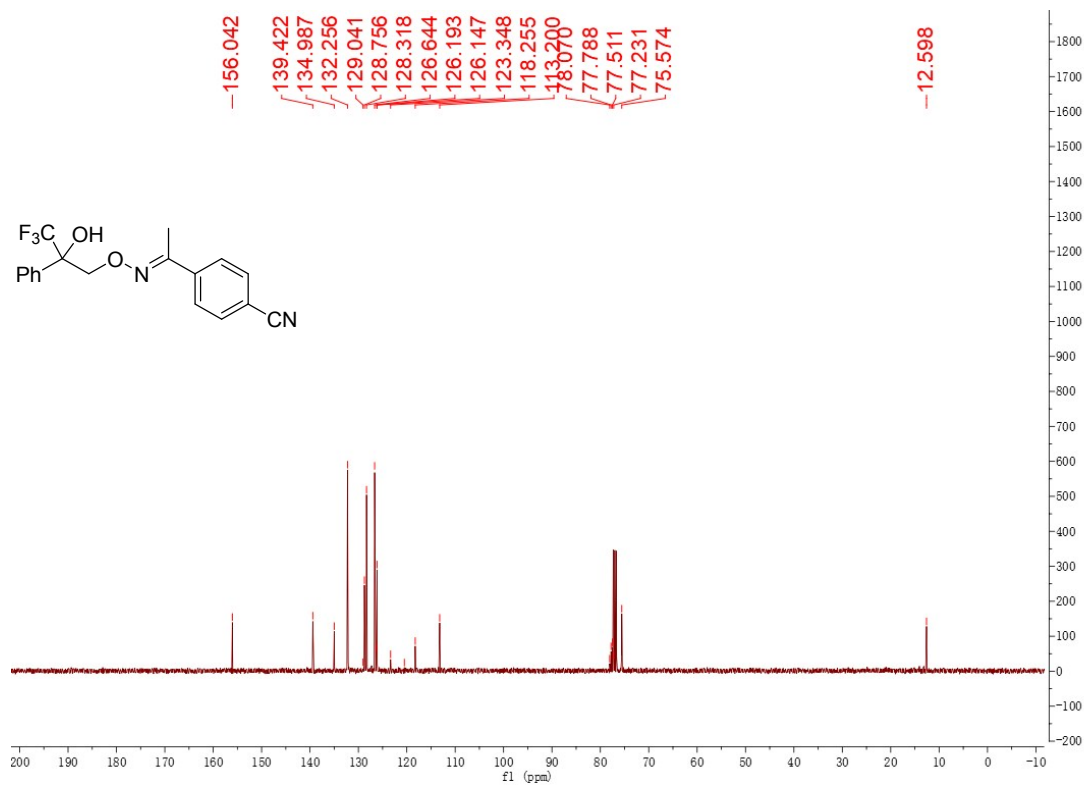
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ah**



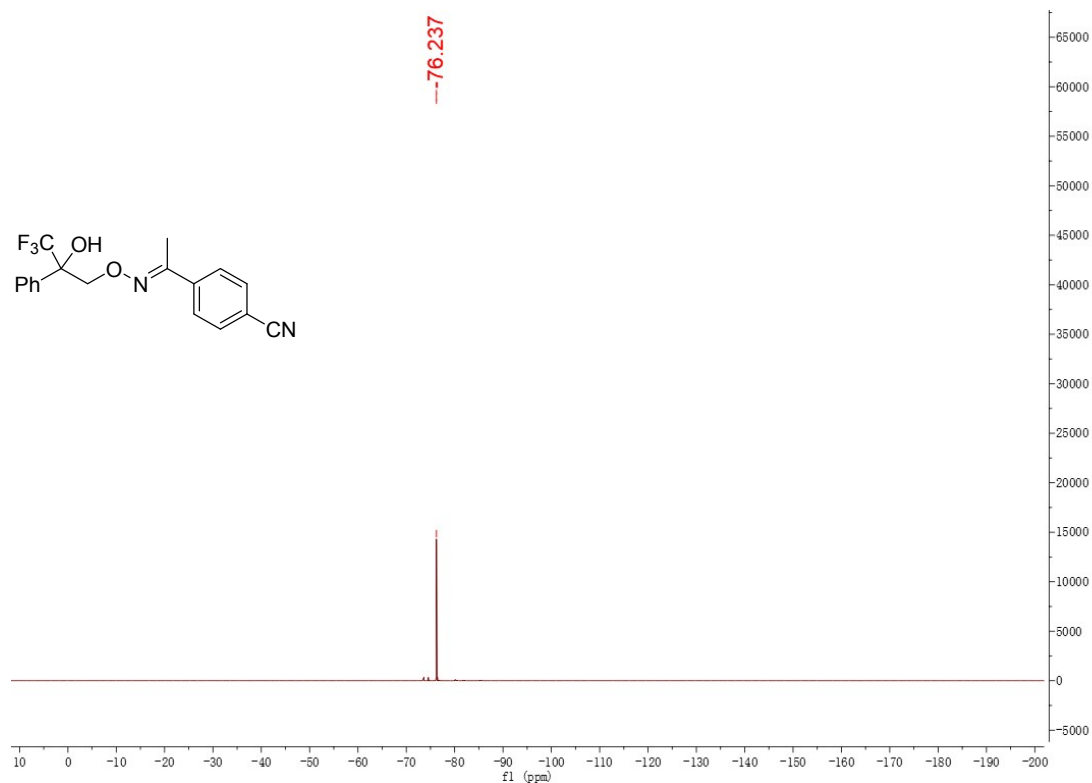
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3ai**



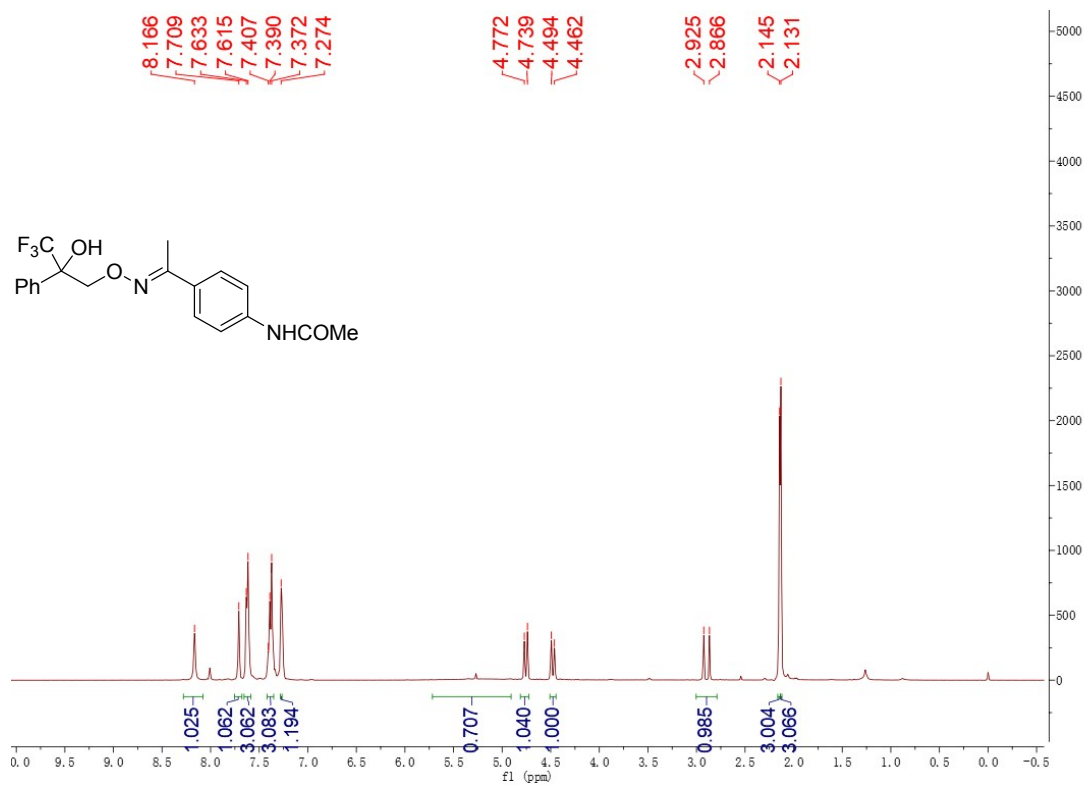
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3ai**



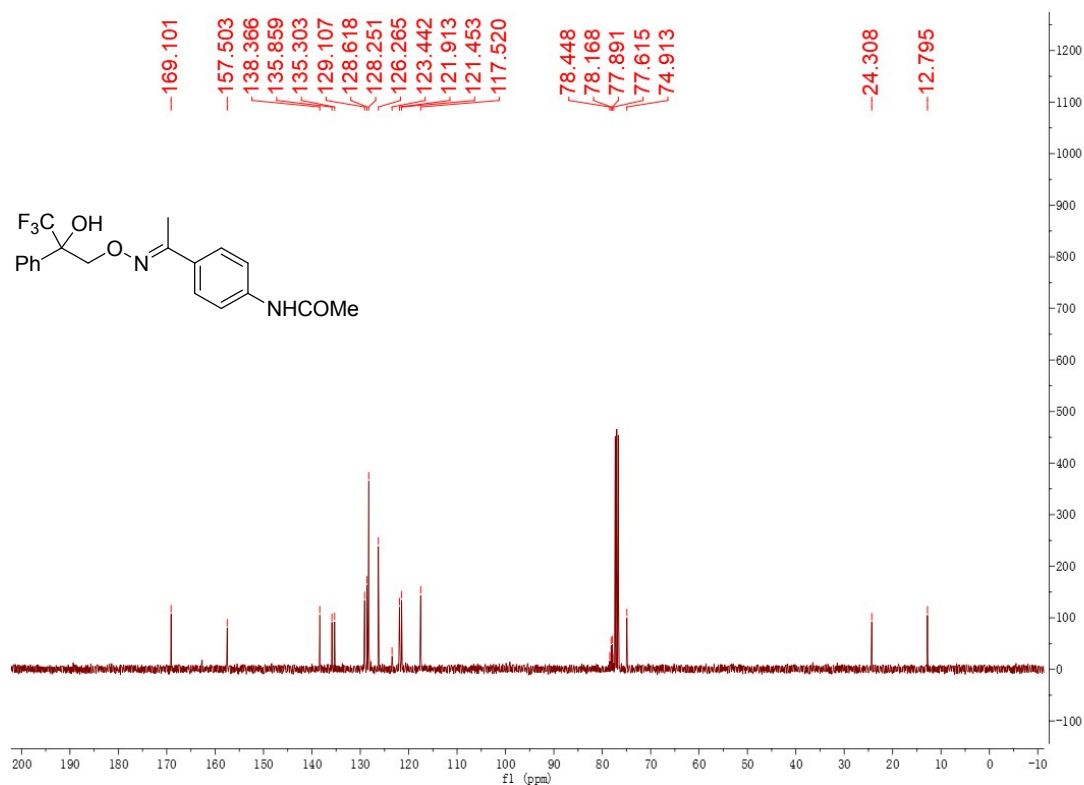
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ai**



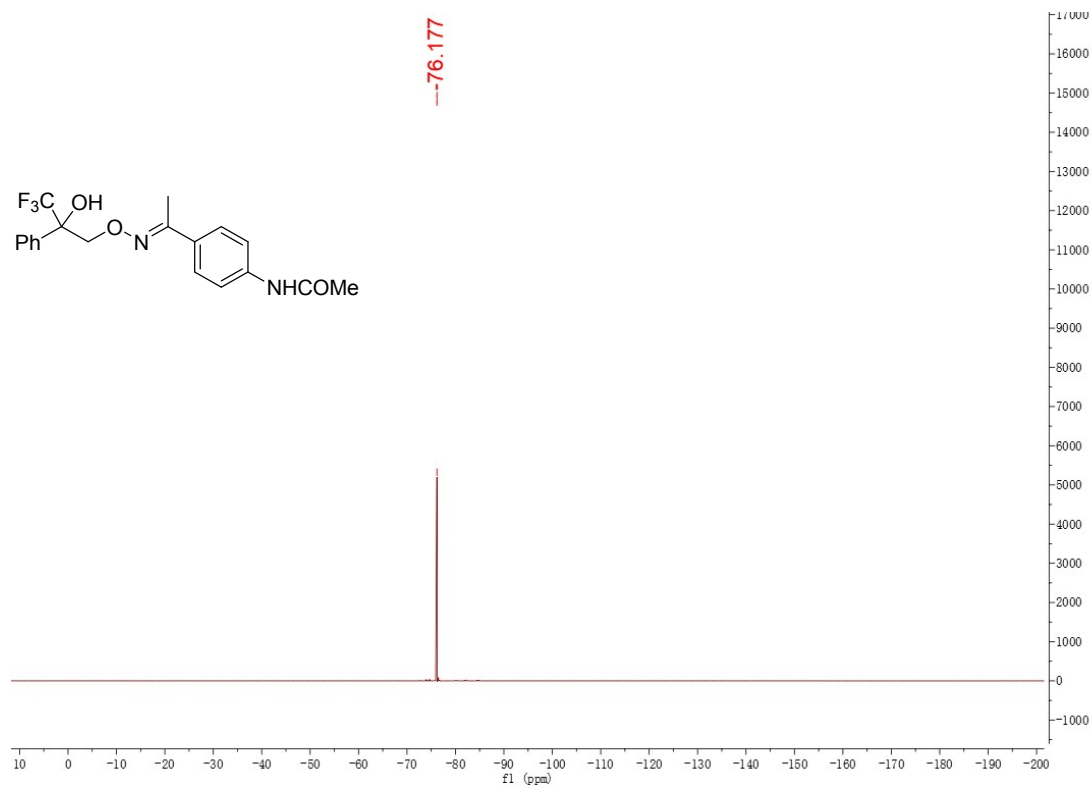
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3aj**



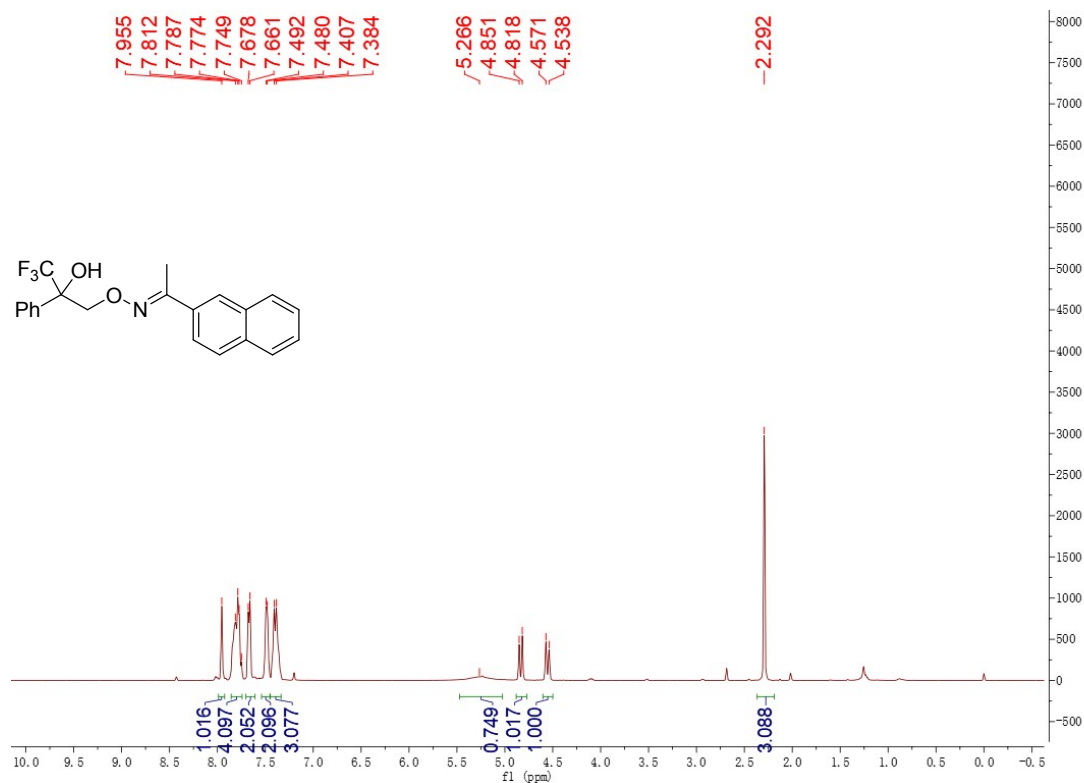
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3aj**



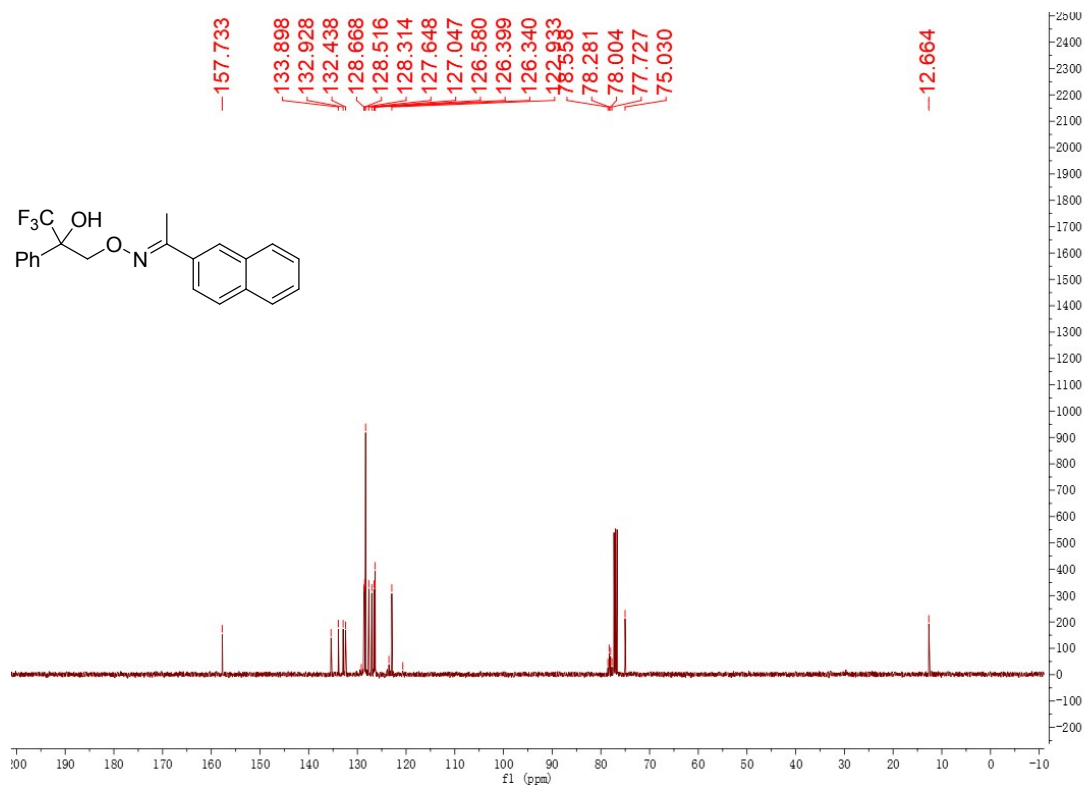
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3aj**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3ak**



**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3ak**



Chemical structure of the compound is shown above the spectrum:

CC(=NOC(C)(O)C1=CC=CC=C1)C2=CC=CC=C3C=CC=CC=C23

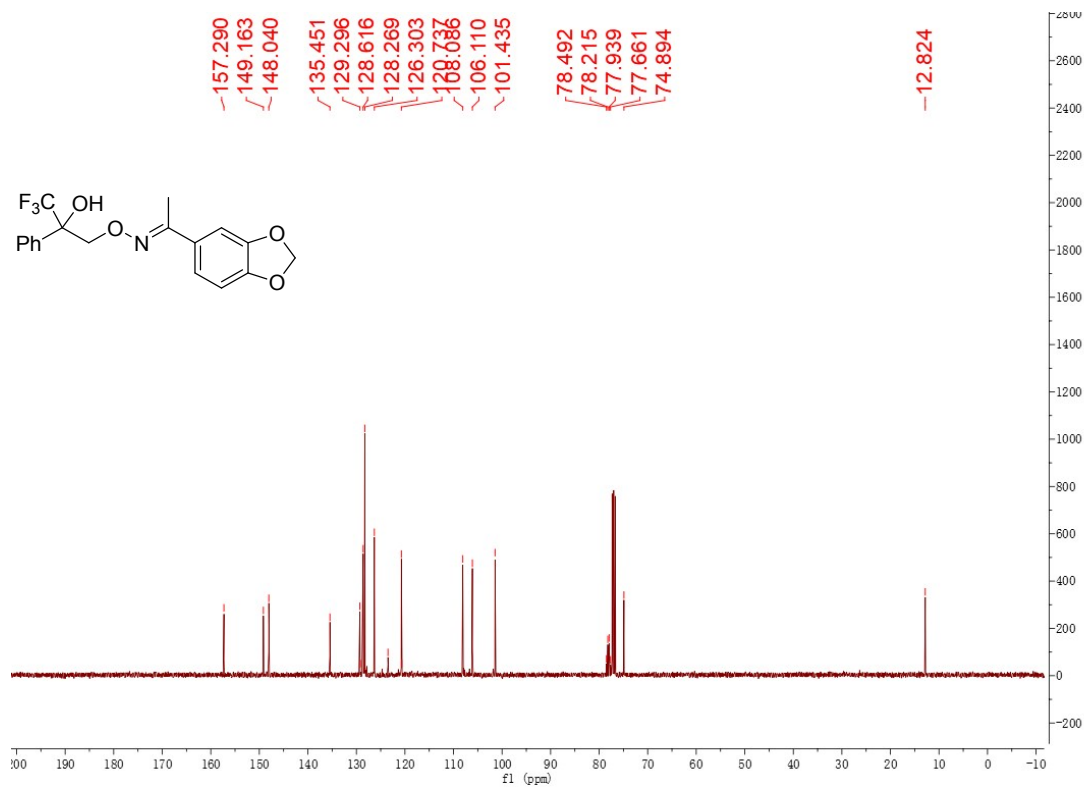
The spectrum displays a single sharp peak at  $\delta = -76.126$  ppm, corresponding to the solvent peak (DMSO- $d_6$ ).

Chemical structure: CC(=NOC(C)(O)Cc1ccccc1)C2=CC=C3OCOC3=C2

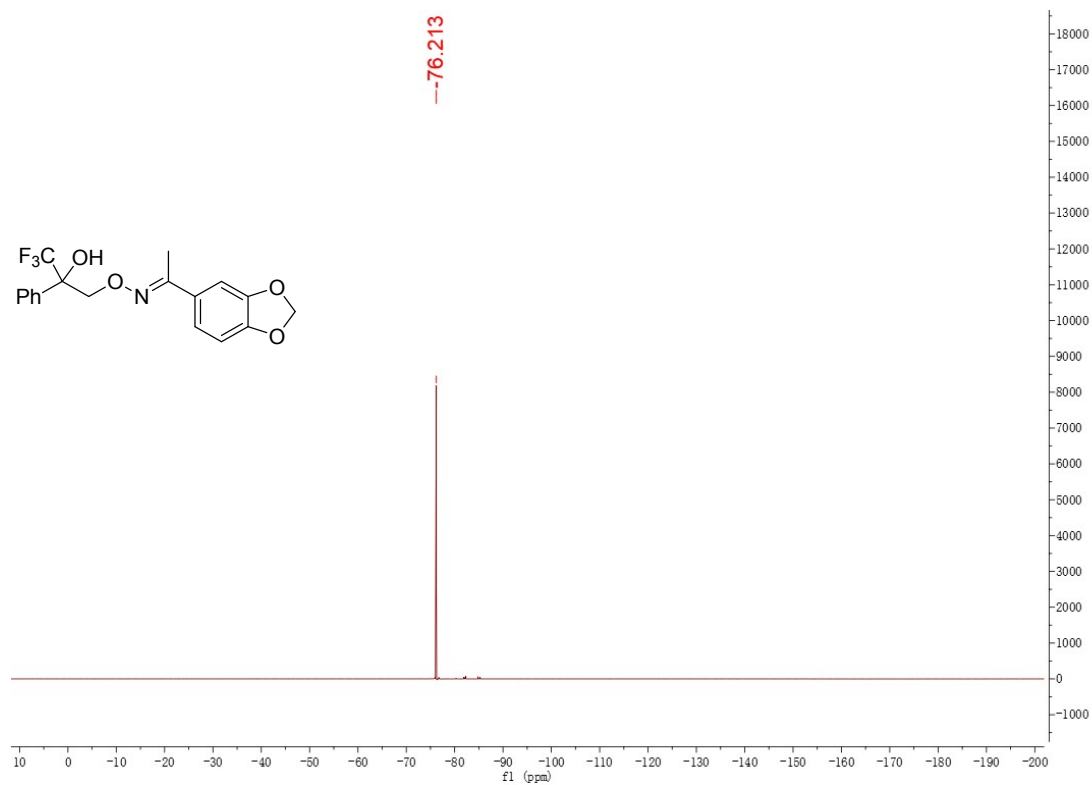
<sup>1</sup>H NMR spectrum (CDCl<sub>3</sub>) data:

| Chemical Shift (ppm)                                                                      | Integration                       |
|-------------------------------------------------------------------------------------------|-----------------------------------|
| 7.649, 7.630, 7.418, 7.400, 7.381, 7.357, 7.339, 7.104, 7.065, 7.045, 6.795, 6.774, 5.959 | 2.018, 3.039, 1.030, 1.000, 1.011 |
| 5.255, 4.778, 4.746, 4.492, 4.459                                                         | 2.096, 0.920, 1.006, 1.000        |
| 2.143                                                                                     | 3.074                             |

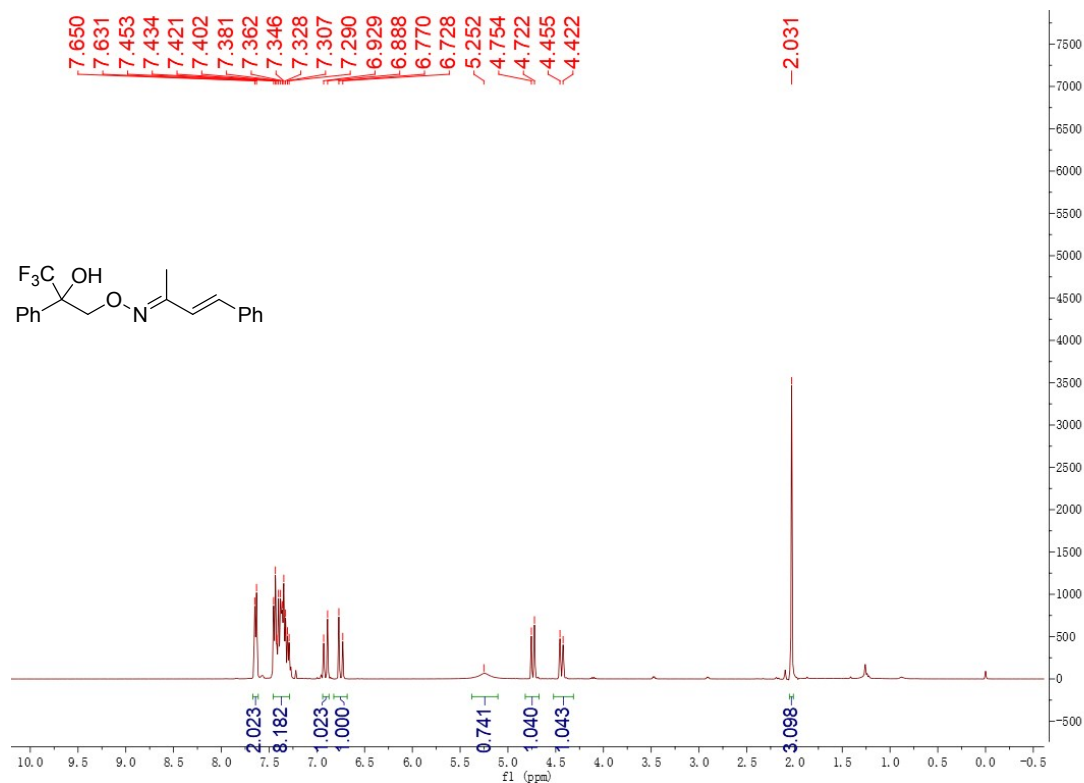
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3aI**



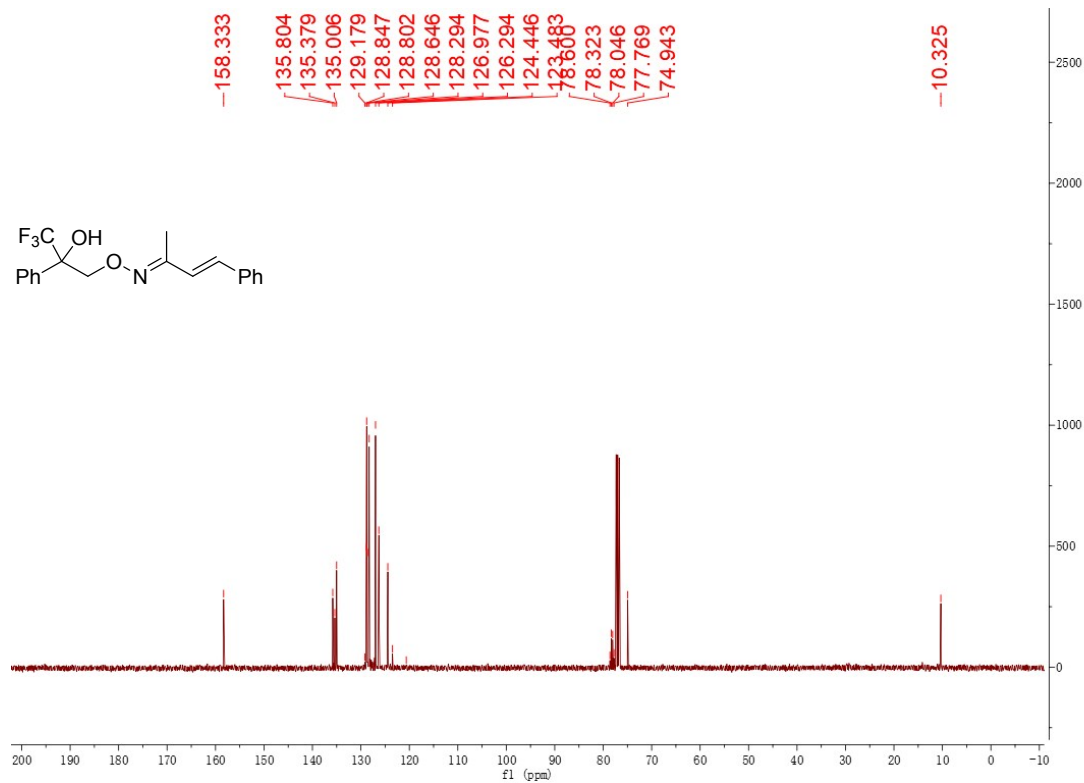
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3aI**



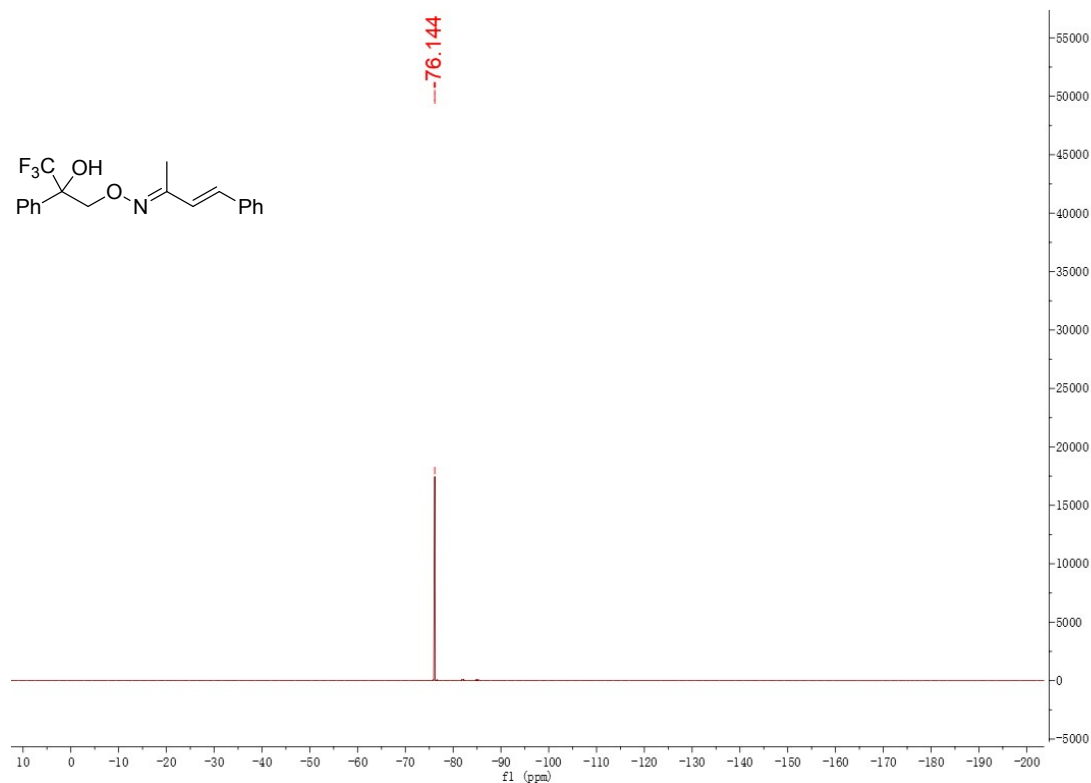
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3am**



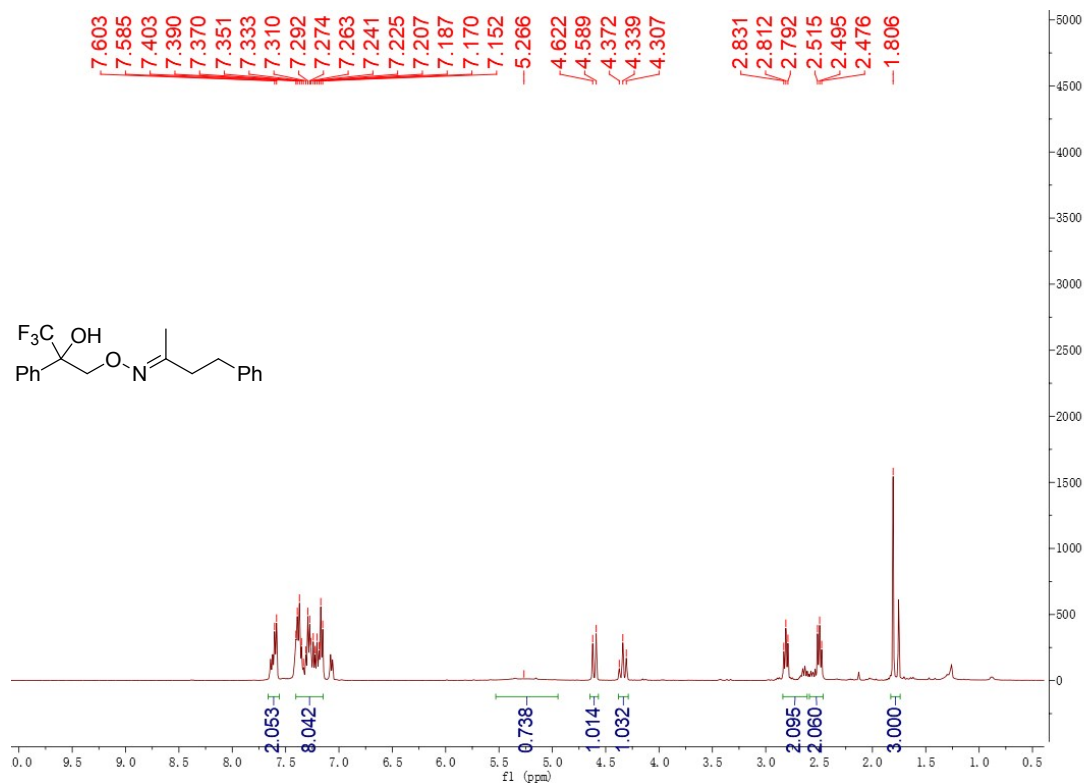
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3am**



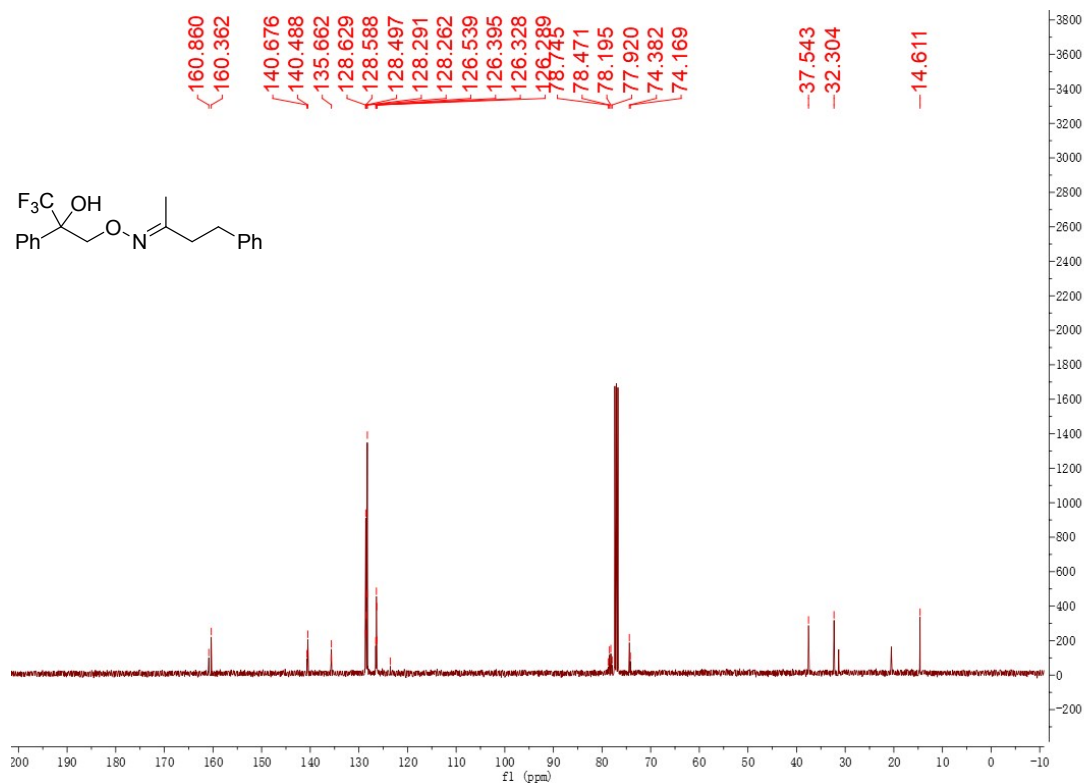
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3am**



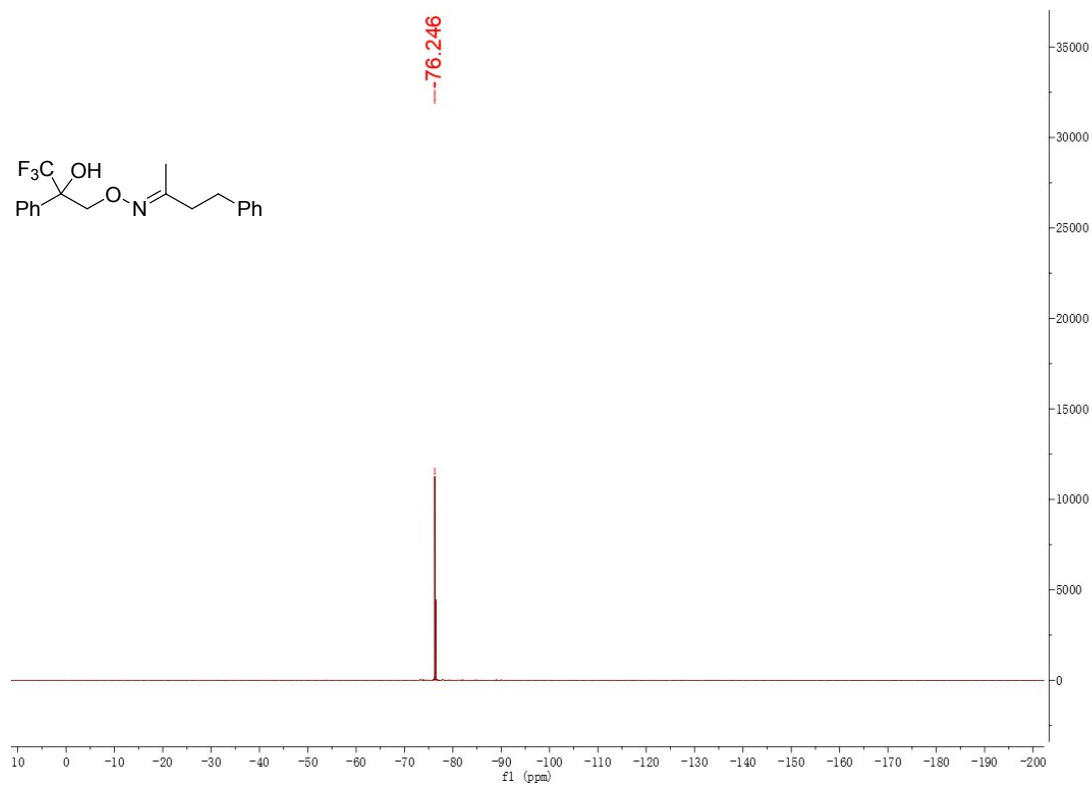
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3an**



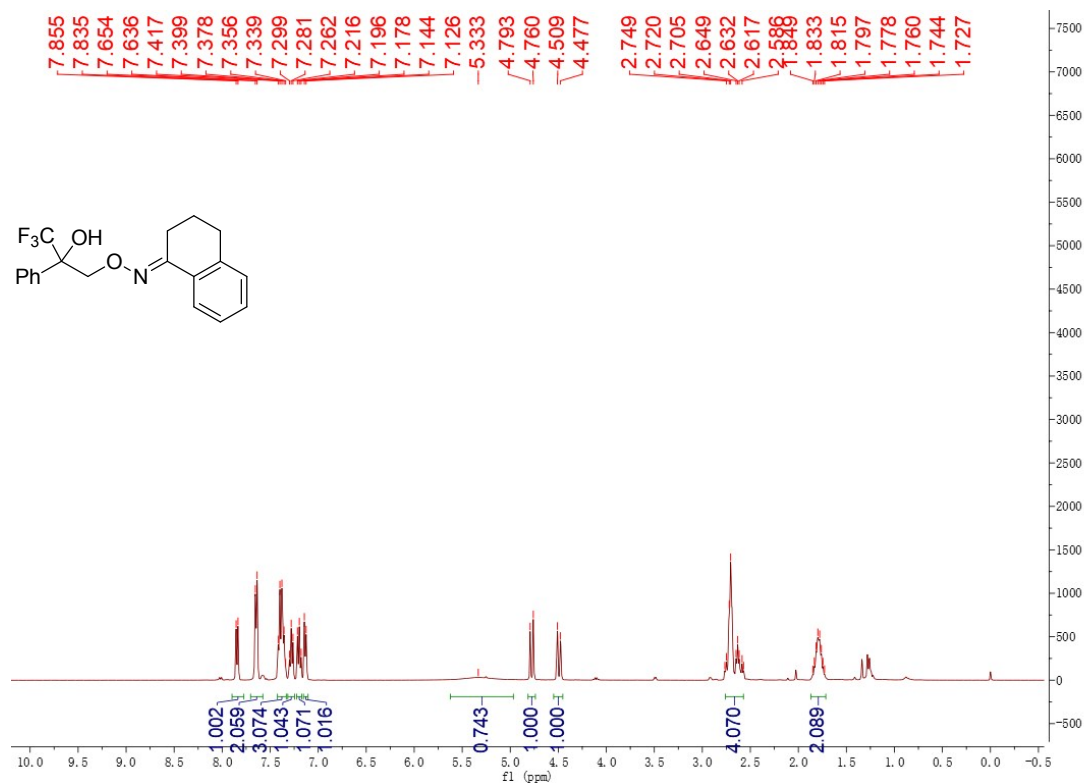
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3an**



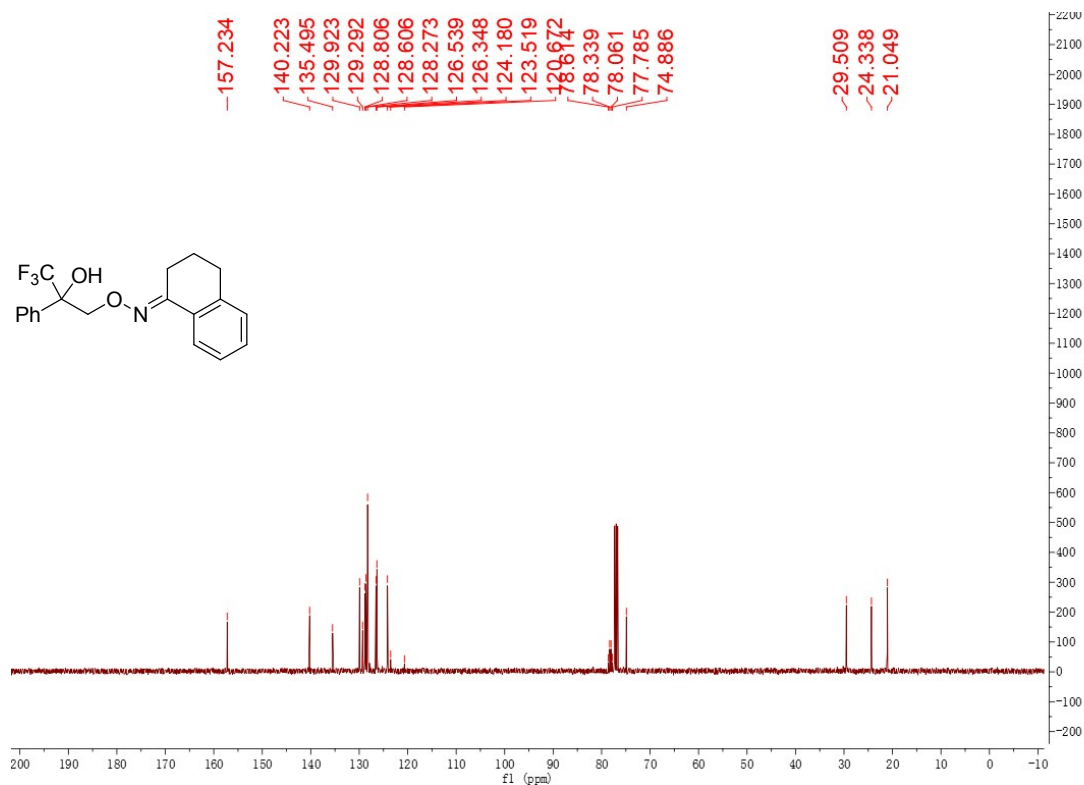
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3an**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3ao**



**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3ao**



Chemical structure of the compound is shown above the spectrum. The structure is 1-(2-(2-(2,2,2-trifluoro-1-phenylethan-1-yl)oxy)ethyl)pyrrolidine. The spectrum shows a single sharp peak at  $\delta = 76.180$  ppm, which is the solvent peak for CDCl<sub>3</sub>.

CC1(C(C1)O)C(=O)OCCOC(=O)N2C3=CC=CC=C3C4=CC=CC=C4C5=CC=CC=C5C6=CC=CC=C6C7=CC=CC=C7C8=CC=CC=C8C9=CC=CC=C9C10=CC=CC=C10C11=CC=CC=C11C12=CC=CC=C12C13=CC=CC=C13C14=CC=CC=C14C15=CC=CC=C15C16=CC=CC=C16C17=CC=CC=C17C18=CC=CC=C18C19=CC=CC=C19C20=CC=CC=C20C21=CC=CC=C21C22=CC=CC=C22C23=CC=CC=C23C24=CC=CC=C24C25=CC=CC=C25C26=CC=CC=C26C27=CC=CC=C27C28=CC=CC=C28C29=CC=CC=C29C30=CC=CC=C30C31=CC=CC=C31C32=CC=CC=C32C33=CC=CC=C33C34=CC=CC=C34C35=CC=CC=C35C36=CC=CC=C36C37=CC=CC=C37C38=CC=CC=C38C39=CC=CC=C39C40=CC=CC=C40C41=CC=CC=C41C42=CC=CC=C42C43=CC=CC=C43C44=CC=CC=C44C45=CC=CC=C45C46=CC=CC=C46C47=CC=CC=C47C48=CC=CC=C48C49=CC=CC=C49C50=CC=CC=C50C51=CC=CC=C51C52=CC=CC=C52C53=CC=CC=C53C54=CC=CC=C54C55=CC=CC=C55C56=CC=CC=C56C57=CC=CC=C57C58=CC=CC=C58C59=CC=CC=C59C60=CC=CC=C60C61=CC=CC=C61C62=CC=CC=C62C63=CC=CC=C63C64=CC=CC=C64C65=CC=CC=C65C66=CC=CC=C66C67=CC=CC=C67C68=CC=CC=C68C69=CC=CC=C69C70=CC=CC=C70C71=CC=CC=C71C72=CC=CC=C72C73=CC=CC=C73C74=CC=CC=C74C75=CC=CC=C75C76=CC=CC=C76C77=CC=CC=C77C78=CC=CC=C78C79=CC=CC=C79C80=CC=CC=C80C81=CC=CC=C81C82=CC=CC=C82C83=CC=CC=C83C84=CC=CC=C84C85=CC=CC=C85C86=CC=CC=C86C87=CC=CC=C87C88=CC=CC=C88C89=CC=CC=C89C90=CC=CC=C90C91=CC=CC=C91C92=CC=CC=C92C93=CC=CC=C93C94=CC=CC=C94C95=CC=CC=C95C96=CC=CC=C96C97=CC=CC=C97C98=CC=CC=C98C99=CC=CC=C99C100=CC=CC=C100C101=CC=CC=C101C102=CC=CC=C102C103=CC=CC=C103C104=CC=CC=C104C105=CC=CC=C105C106=CC=CC=C106C107=CC=CC=C107C108=CC=CC=C108C109=CC=CC=C109C110=CC=CC=C110C111=CC=CC=C111C112=CC=CC=C112C113=CC=CC=C113C114=CC=CC=C114C115=CC=CC=C115C116=CC=CC=C116C117=CC=CC=C117C118=CC=CC=C118C119=CC=CC=C119C120=CC=CC=C120C121=CC=CC=C121C122=CC=CC=C122C123=CC=CC=C123C124=CC=CC=C124C125=CC=CC=C125C126=CC=CC=C126C127=CC=CC=C127C128=CC=CC=C128C129=CC=CC=C129C130=CC=CC=C130C131=CC=CC=C131C132=CC=CC=C132C133=CC=CC=C133C134=CC=CC=C134C135=CC=CC=C135C136=CC=CC=C136C137=CC=CC=C137C138=CC=CC=C138C139=CC=CC=C139C140=CC=CC=C140C141=CC=CC=C141C142=CC=CC=C142C143=CC=CC=C143C144=CC=CC=C144C145=CC=CC=C145C146=CC=CC=C146C147=CC=CC=C147C148=CC=CC=C148C149=CC=CC=C149C150=CC=CC=C150C151=CC=CC=C151C152=CC=CC=C152C153=CC=CC=C153C154=CC=CC=C154C155=CC=CC=C155C156=CC=CC=C156C157=CC=CC=C157C158=CC=CC=C158C159=CC=CC=C159C160=CC=CC=C160C161=CC=CC=C161C162=CC=CC=C162C163=CC=CC=C163C164=CC=CC=C164C165=CC=CC=C165C166=CC=CC=C166C167=CC=CC=C167C168=CC=CC=C168C169=CC=CC=C169C170=CC=CC=C170C171=CC=CC=C171C172=CC=CC=C172C173=CC=CC=C173C174=CC=CC=C174C175=CC=CC=C175C176=CC=CC=C176C177=CC=CC=C177C178=CC=CC=C178C179=CC=CC=C179C180=CC=CC=C180C181=CC=CC=C181C182=CC=CC=C182C183=CC=CC=C183C184=CC=CC=C184C185=CC=CC=C185C186=CC=CC=C186C187=CC=CC=C187C188=CC=CC=C188C189=CC=CC=C189C190=CC=CC=C190C191=CC=CC=C191C192=CC=CC=C192C193=CC=CC=C193C194=CC=CC=C194C195=CC=CC=C195C196=CC=CC=C196C197=CC=CC=C197C198=CC=CC=C198C199=CC=CC=C199C200=CC=CC=C200C201=CC=CC=C201C202=CC=CC=C202C203=CC=CC=C203C204=CC=CC=C204C205=CC=CC=C205C206=CC=CC=C206C207=CC=CC=C207C208=CC=CC=C208C209=CC=CC=C209C210=CC=CC=C210C211=CC=CC=C211C212=CC=CC=C212C213=CC=CC=C213C214=CC=CC=C214C215=CC=CC=C215C216=CC=CC=C216C217=CC=CC=C217C218=CC=CC=C218C219=CC=CC=C219C220=CC=CC=C220C221=CC=CC=C221C222=CC=CC=C222C223=CC=CC=C223C224=CC=CC=C224C225=CC=CC=C225C226=CC=CC=C226C227=CC=CC=C227C228=CC=CC=C228C229=CC=CC=C229C230=CC=CC=C230C231=CC=CC=C231C232=CC=CC=C232C233=CC=CC=C233C234=CC=CC=C234C235=CC=CC=C235C236=CC=CC=C236C237=CC=CC=C237C238=CC=CC=C238C239=CC=CC=C239C240=CC=CC=C240C241=CC=CC=C241C242=CC=CC=C242C243=CC=CC=C243C244=CC=CC=C244C245=CC=CC=C245C246=CC=CC=C246C247=CC=CC=C247C248=CC=CC=C248C249=CC=CC=C249C250=CC=CC=C250C251=CC=CC=C251C252=CC=CC=C252C253=CC=CC=C253C254=CC=CC=C254C255=CC=CC=C255C256=CC=CC=C256C257=CC=CC=C257C258=CC=CC=C258C259=CC=CC=C259C260=CC=CC=C260C261=CC=CC=C261C262=CC=CC=C262C263=CC=CC=C263C264=CC=CC=C264C265=CC=CC=C265C266=CC=CC=C266C267=CC=CC=C267C268=CC=CC=C268C269=CC=CC=C269C270=CC=CC=C270C271=CC=CC=C271C272=CC=CC=C272C273=CC=CC=C273C274=CC=CC=C274C275=CC=CC=C275C276=CC=CC=C276C277=CC=CC=C277C278=CC=CC=C278C279=CC=CC=C279C280=CC=CC=C280C281=CC=CC=C281C282=CC=CC=C282C283=CC=CC=C283C284=CC=CC=C284C285=CC=CC=C285C286=CC=CC=C286C287=CC=CC=C287C288=CC=CC=C288C289=CC=CC=C289C290=CC=CC=C290C291=CC=CC=C291C292=CC=CC=C292C293=CC=CC=C293C294=CC=CC=C294C295=CC=CC=C295C296=CC=CC=C296C297=CC=CC=C297C298=CC=CC=C298C299=CC=CC=C299C300=CC=CC=C300C301=CC=CC=C301C302=CC=CC=C302C303=CC=CC=C303C304=CC=CC=C304C305=CC=CC=C305C306=CC=CC=C306C307=CC=CC=C307C308=CC=CC=C308C309=CC=CC=C309C310=CC=CC=C310C311=CC=CC=C311C312=CC=CC=C312C313=CC=CC=C313C314=CC=CC=C314C315=CC=CC=C315C316=CC=CC=C316C317=CC=CC=C317C318=CC=CC=C318C319=CC=CC=C319C320=CC=CC=C320C321=CC=CC=C321C322=CC=CC=C322C323=CC=CC=C323C324=CC=CC=C324C325=CC=CC=C325C326=CC=CC=C326C327=CC=CC=C327C328=CC=CC=C328C329=CC=CC=C329C330=CC=CC=C330C331=CC=CC=C331C332=CC=CC=C332C333=CC=CC=C333C334=CC=CC=C334C335=CC=CC=C335C336=CC=CC=C336C337=CC=CC=C337C338=CC=CC=C338C339=CC=CC=C339C340=CC=CC=C340C341=CC=CC=C341C342=CC=CC=C342C343=CC=CC=C343C344=CC=CC=C344C345=CC=CC=C345C346=CC=CC=C346C347=CC=CC=C347C348=CC=CC=C348C349=CC=CC=C349C350=CC=CC=C350C351=CC=CC=C351C352=CC=CC=C352C353=CC=CC=C353C354=CC=CC=C354C355=CC=CC=C355C356=CC=CC=C356C357=CC=CC=C357C358=CC=CC=C358C359=CC=

Chemical structure of the compound is shown above the spectrum:

FC(F)(F)C(O)(c1ccccc1)CO/N=C2C=CC=CC=C2

The spectrum displays the following chemical shifts (ppm):

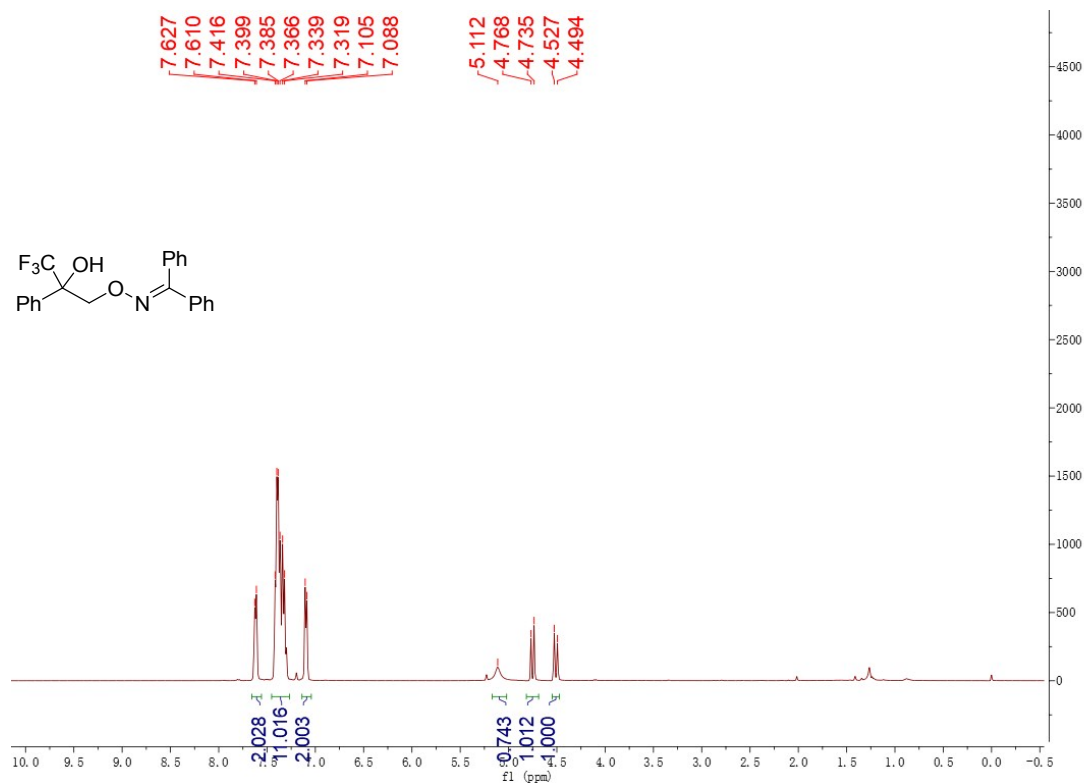
| Chemical Shift (ppm) |
|----------------------|
| 165.076              |
| 139.554              |
| 135.543              |
| 134.997              |
| 129.793              |
| 129.222              |
| 128.965              |
| 128.575              |
| 128.250              |
| 127.350              |
| 126.533              |
| 126.416              |
| 123.533              |
| 120.685              |
| 78.794               |
| 78.516               |
| 78.240               |
| 77.962               |
| 74.793               |
| 31.746               |
| 26.570               |
| 25.789               |
| 21.437               |

Chemical structure of the compound is shown above the spectrum:

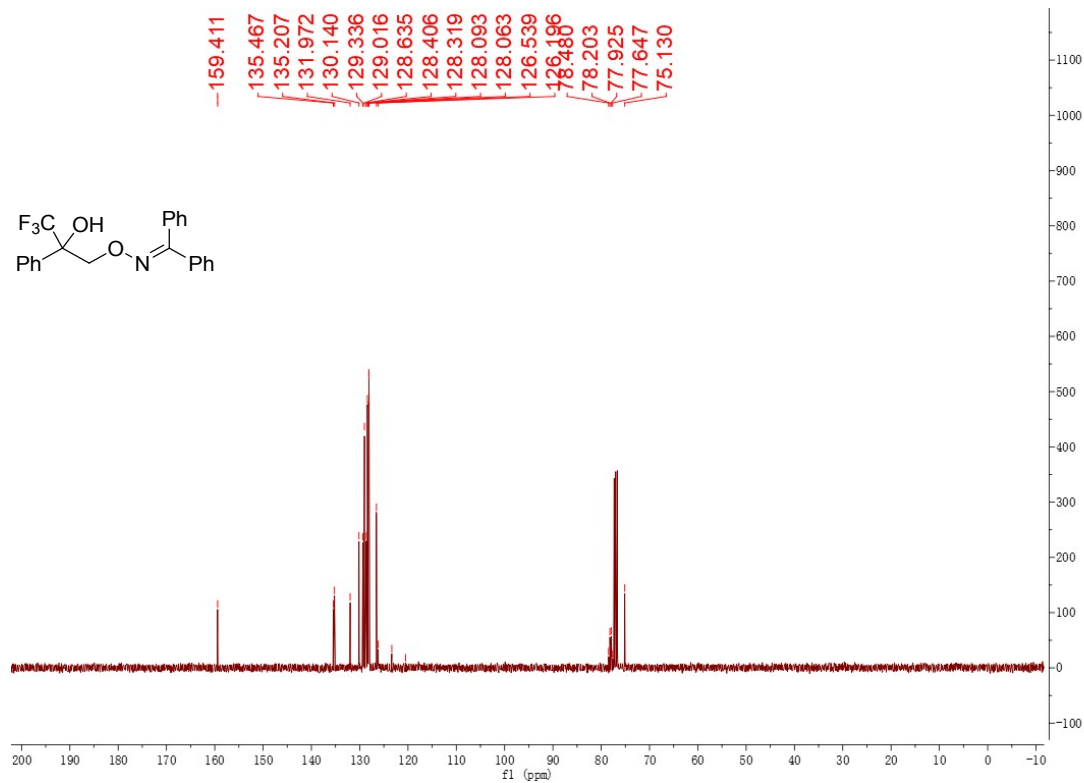
FC(F)(F)C(O)COC(=N)C1=CC=CC=C1C2=CC=CC=C2

The spectrum displays a single sharp peak at  $\delta = -76.170$  ppm, corresponding to the solvent peak of DMSO- $d_6$ .

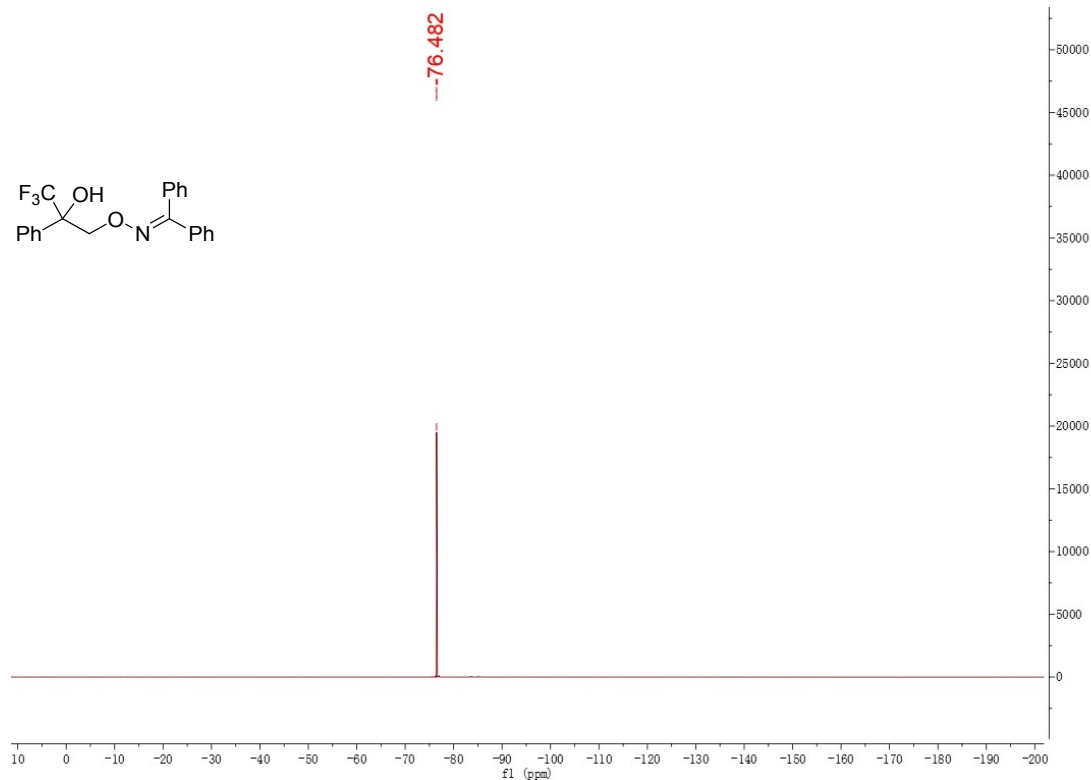
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3aq**



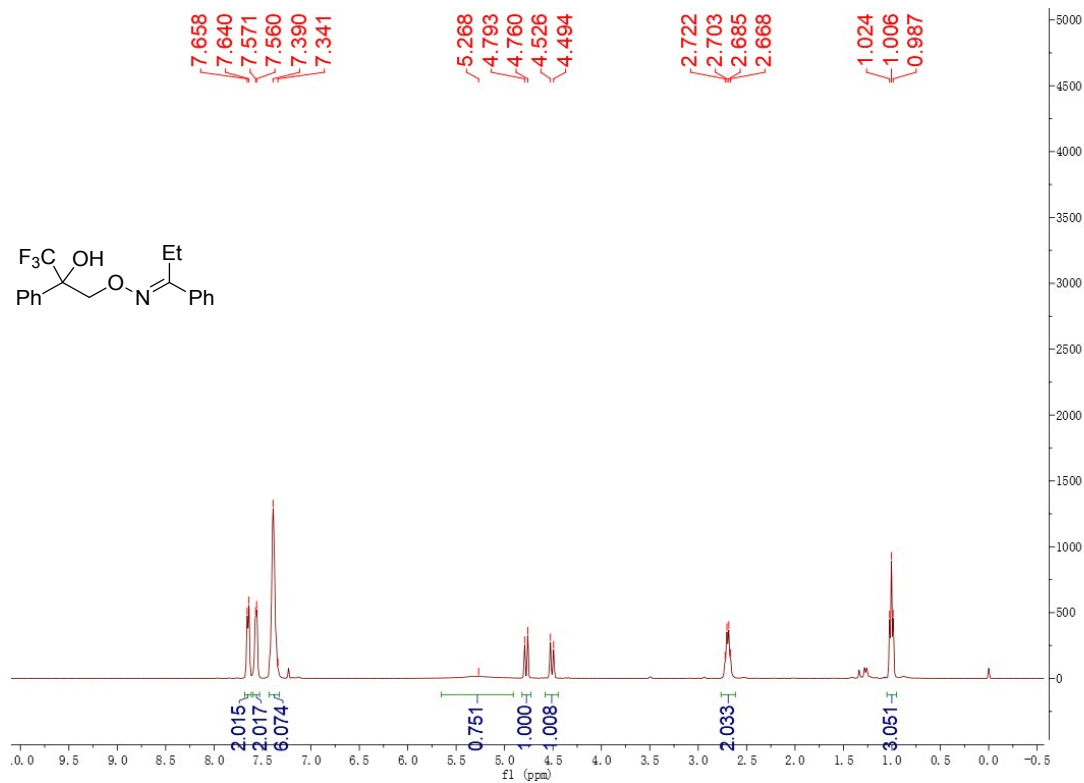
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3aq**



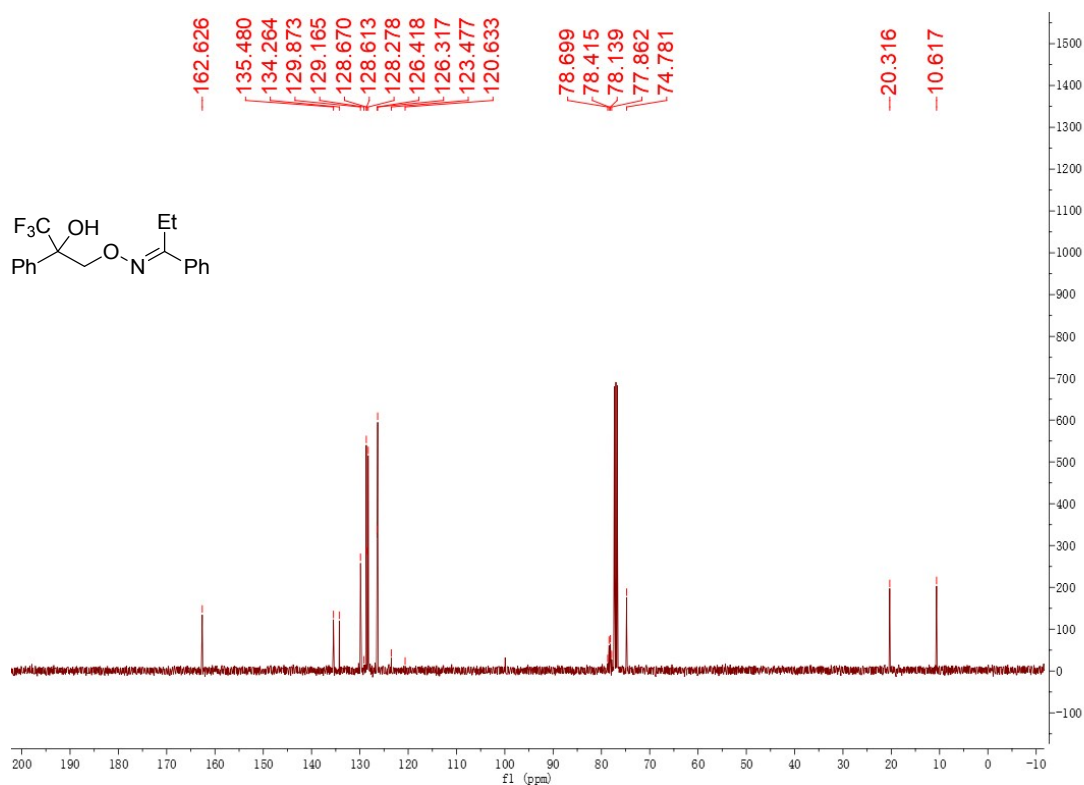
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3aq**



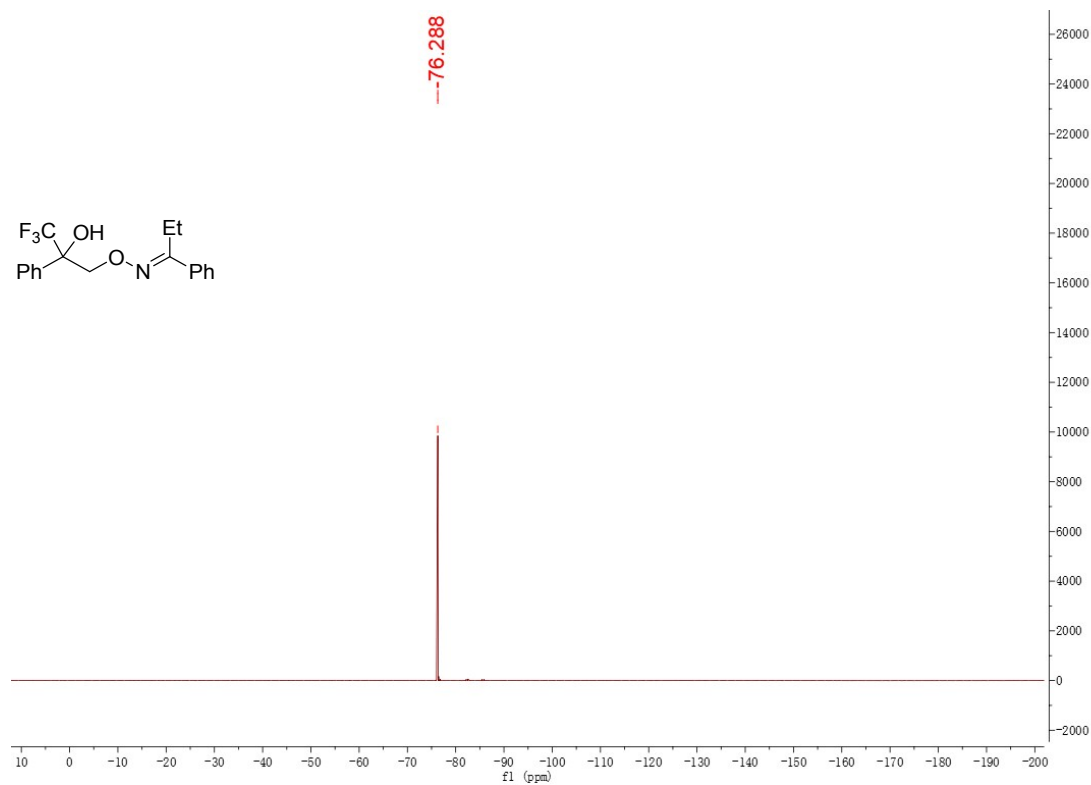
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3ar**



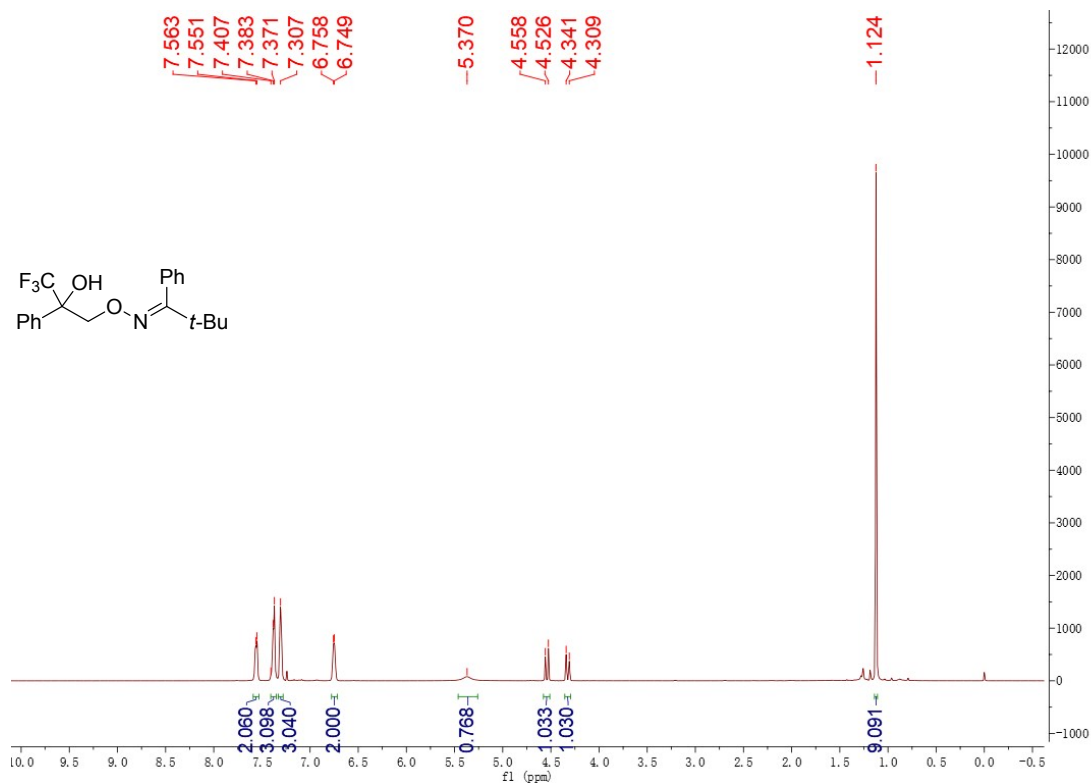
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3ar**



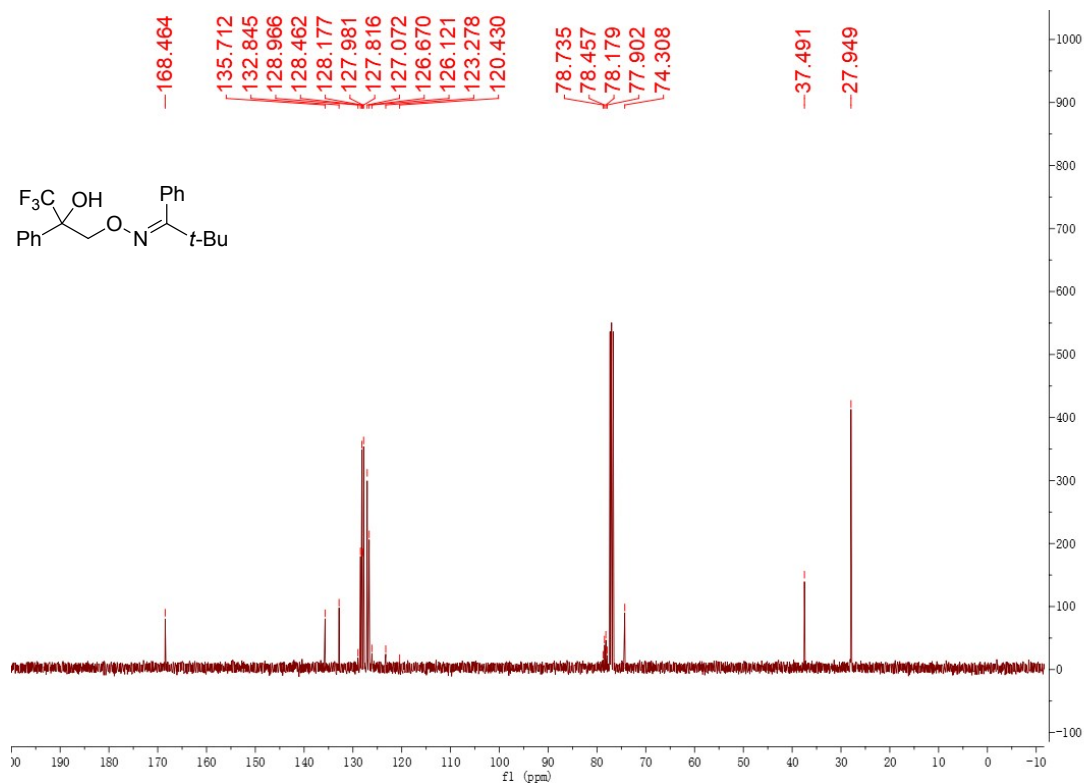
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ar**



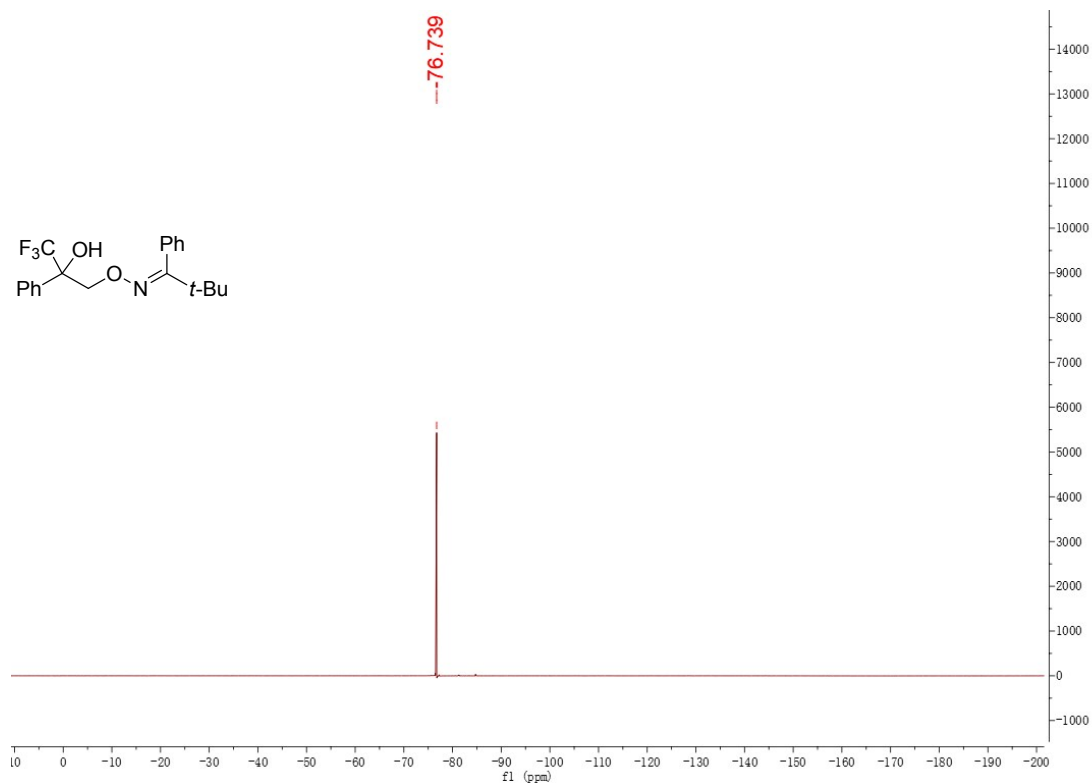
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3as**



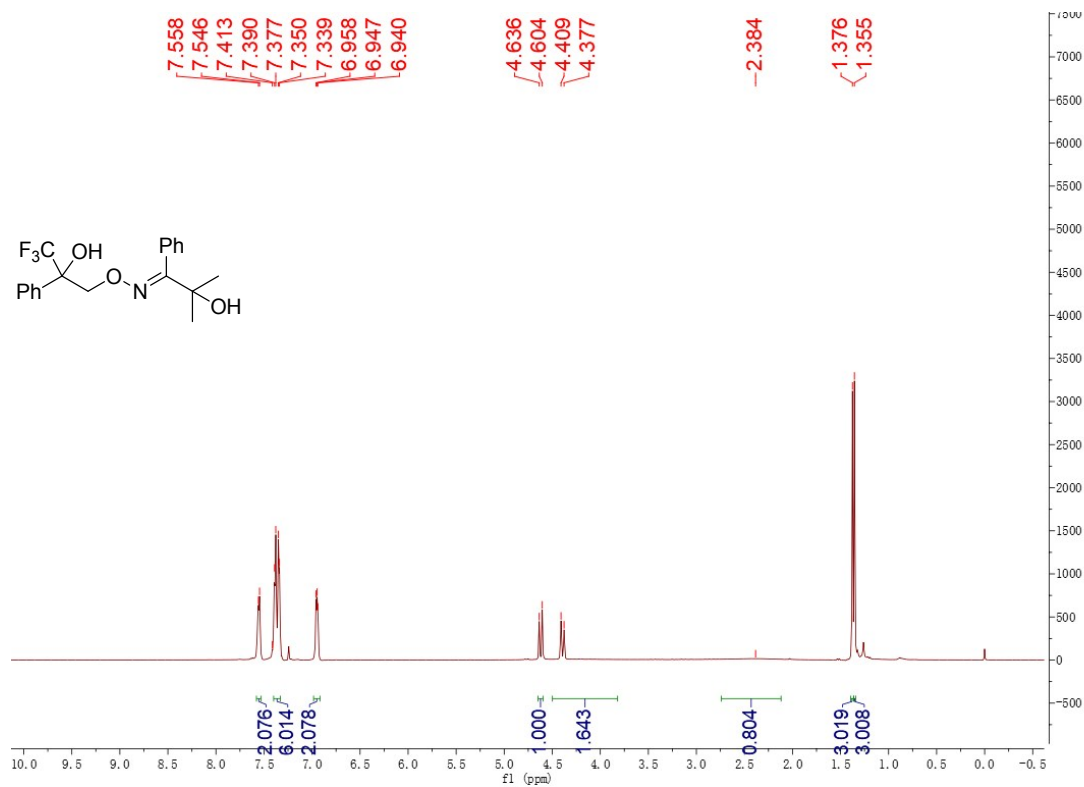
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3as**



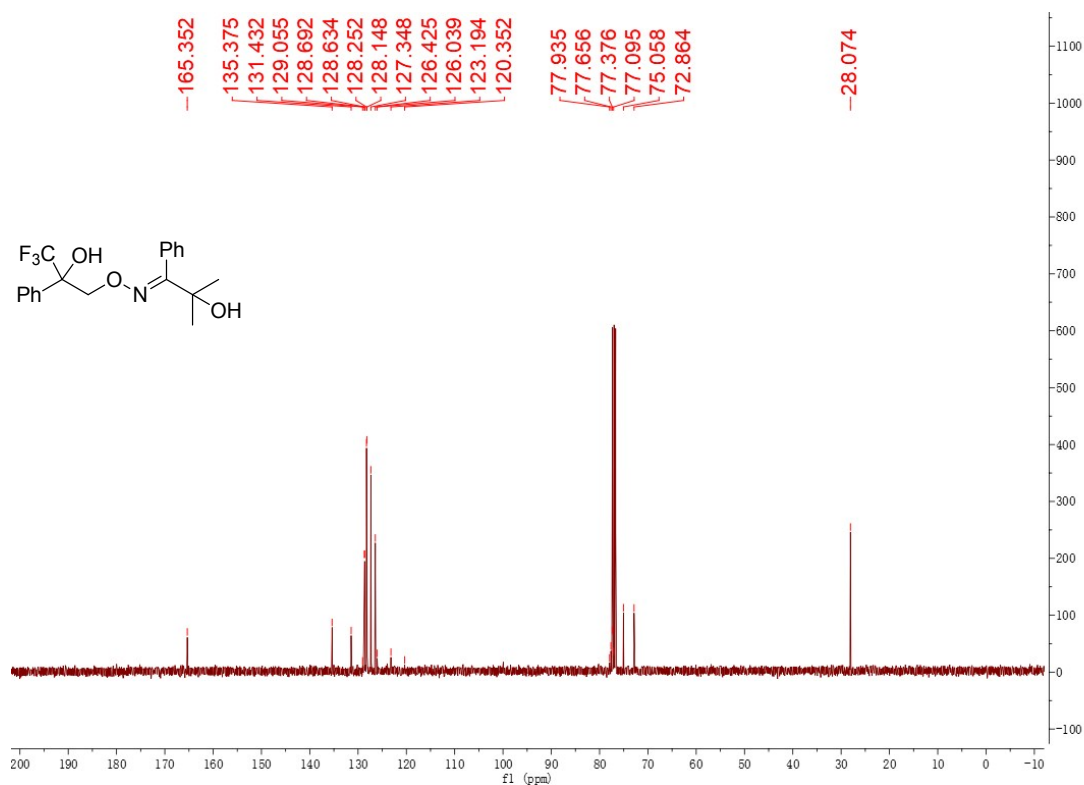
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3as**



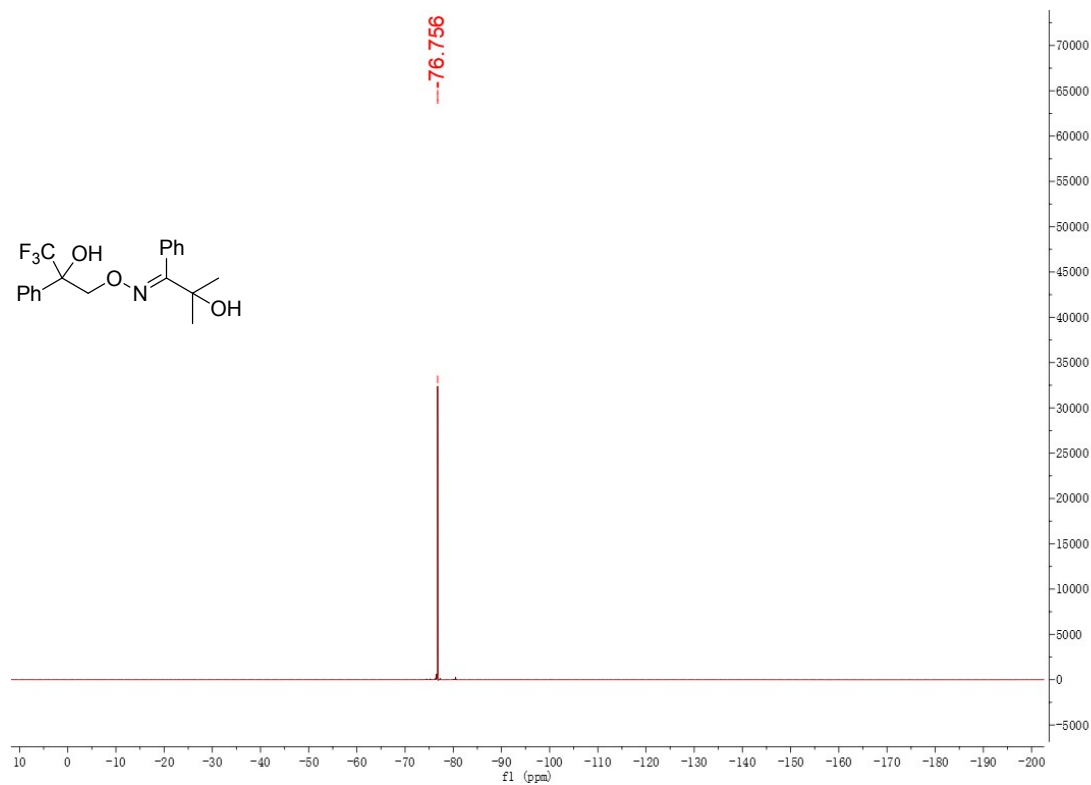
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3at**



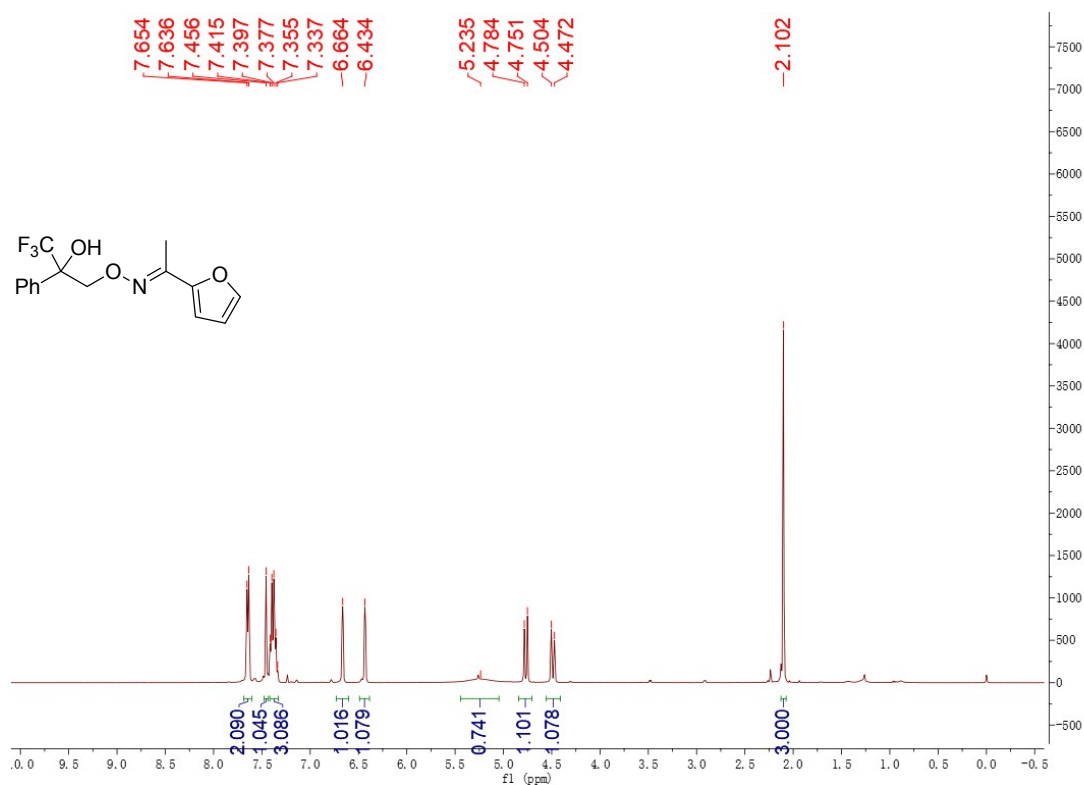
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3at**



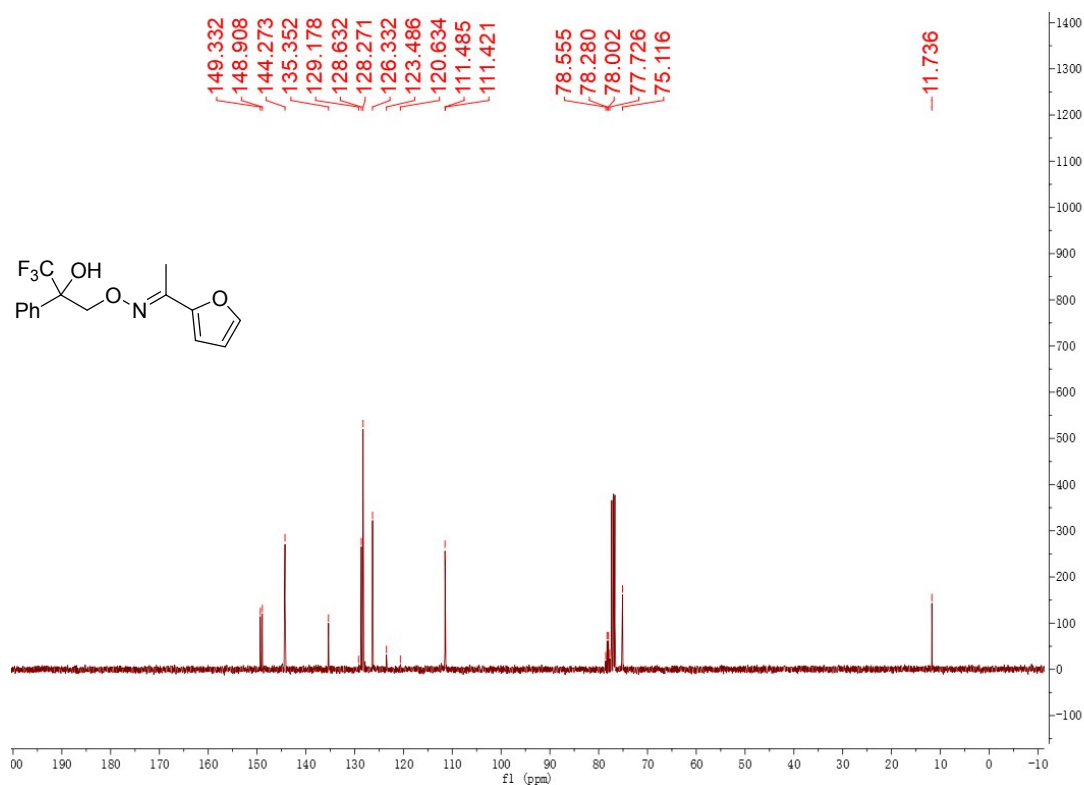
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3at**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3au**



**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3au**

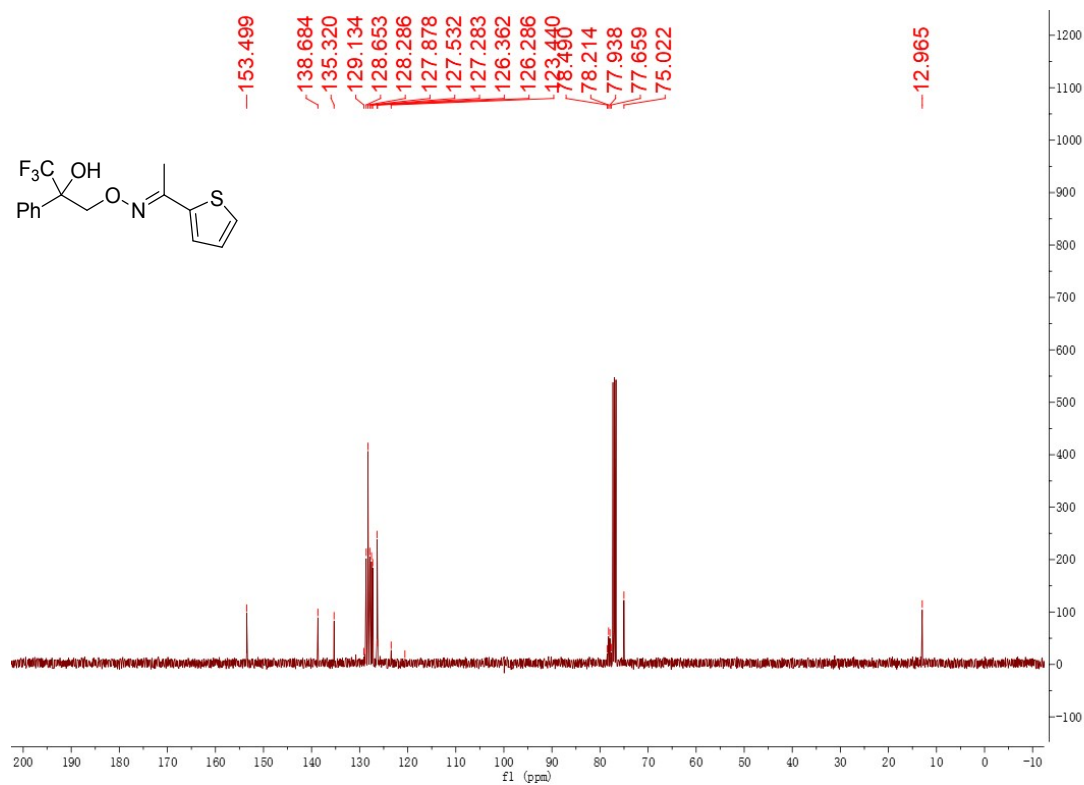


CC1=CC=C(C=C1)C(=O)C(C)(F)(F)FCC(=O)C1=CC=C(C=C1)C(F)(F)F

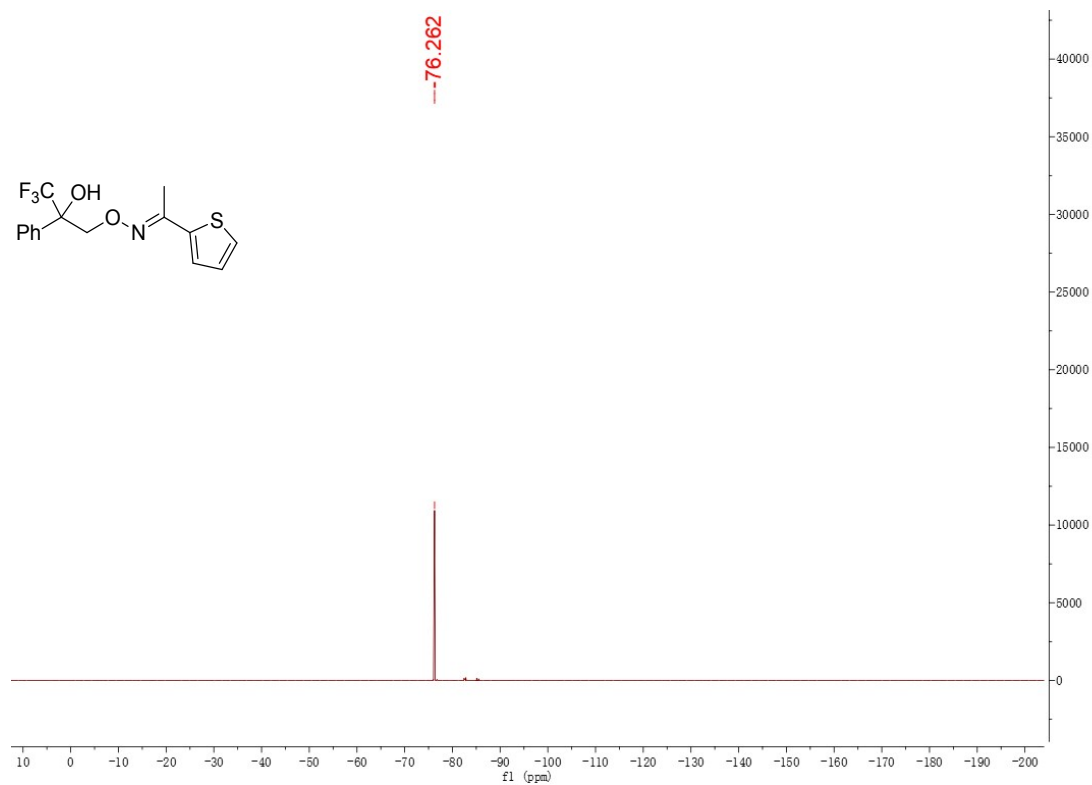
Chemical structure: CC(=O)C1=CC=C(C=C1)C(F)(F)F

<sup>1</sup>H NMR spectrum (CDCl<sub>3</sub>) showing peaks at 7.653, 7.634, 7.421, 7.403, 7.384, 7.360, 7.341, 7.323, 7.310, 7.258, 7.252, 7.238, 7.033, 7.022, 7.011, 5.104, 4.765, 4.733, 4.495, 4.463, and 2.198 ppm.

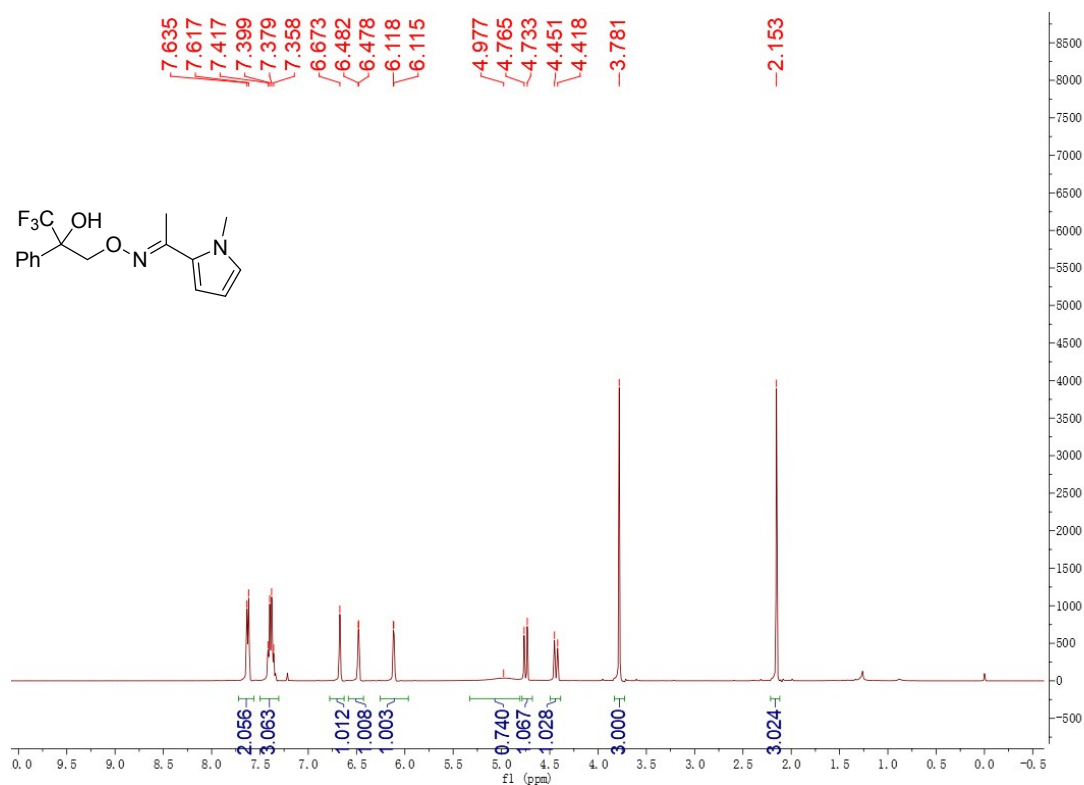
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3av**



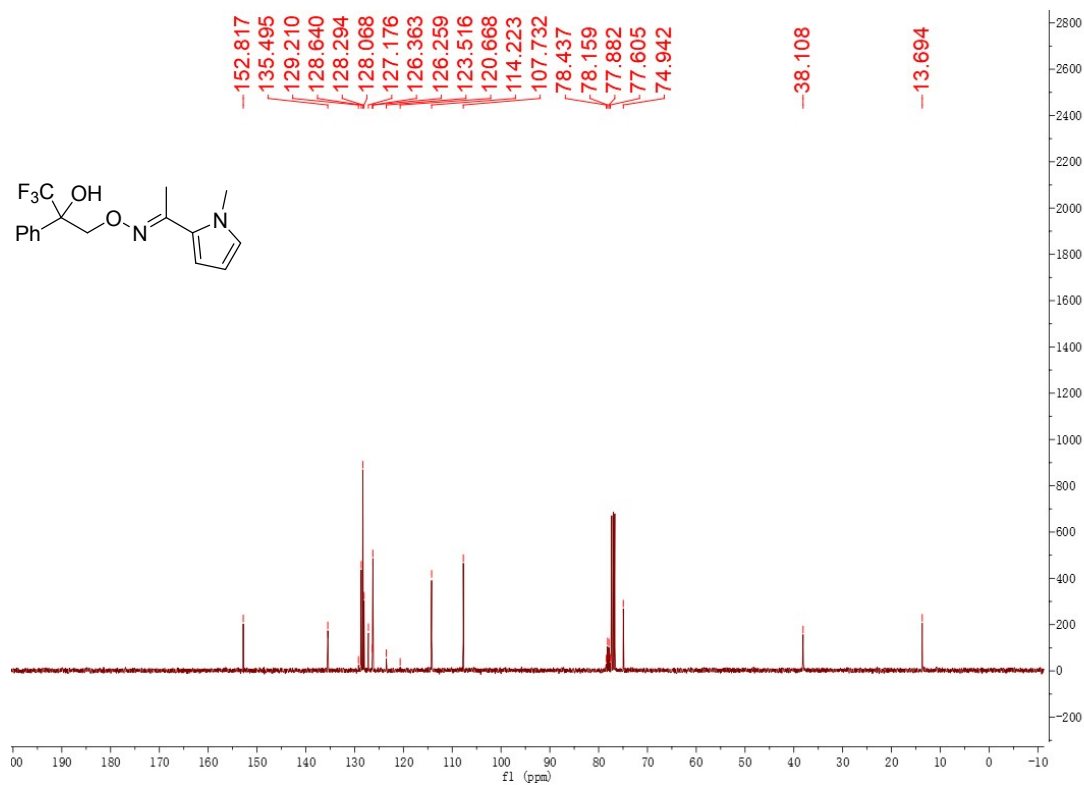
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3av**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3aw**



**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3aw**



Chemical structure of the compound is shown above the spectrum. The structure is 1-methyl-2-(2-(2-(2,2,2-trifluoroethyl)oxy)-2-phenylpropan-2-yl)pyrrole.

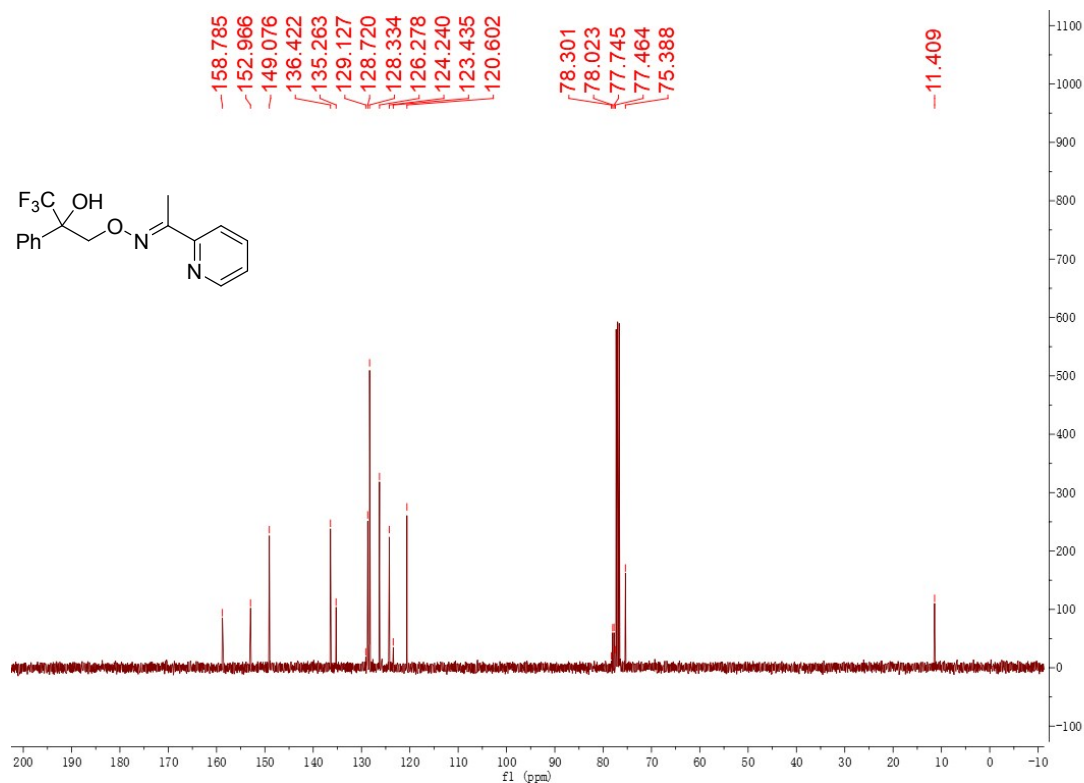
The spectrum shows a single sharp peak at  $\delta = 7.6282$  ppm, corresponding to the aromatic protons of the phenyl group.

Chemical structure: CC(=NOC(C)(O)C1=CC=CC=C1)c2ccncc2

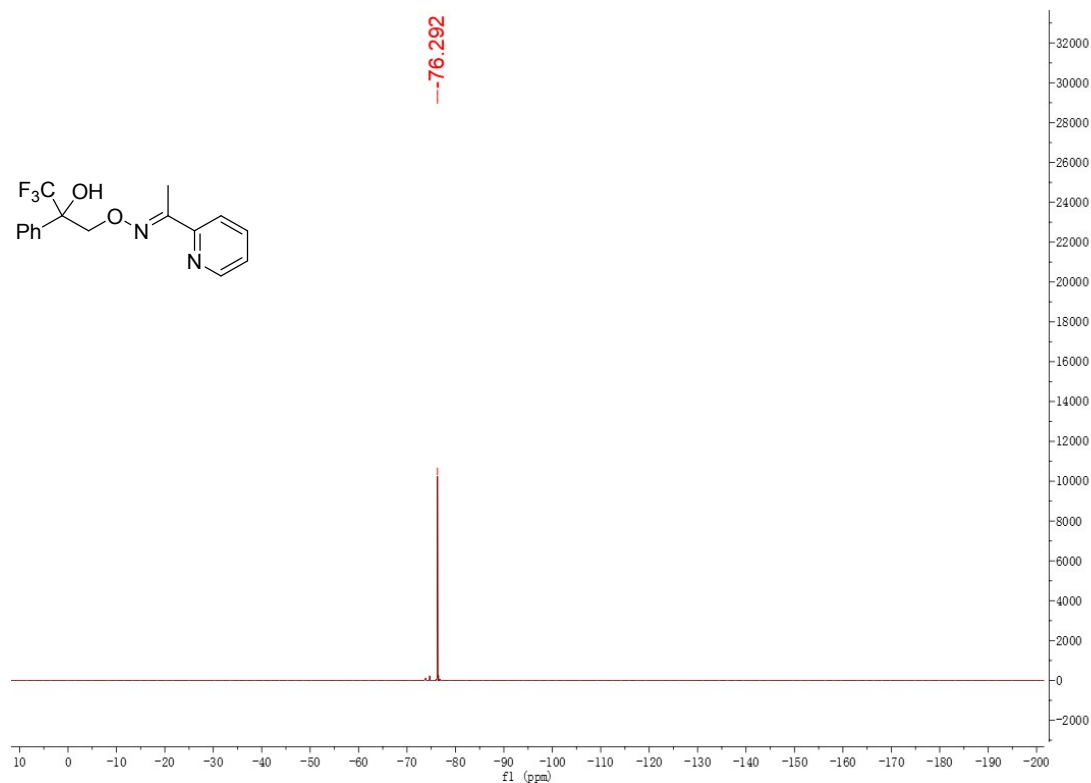
<sup>1</sup>H NMR spectrum (CDCl<sub>3</sub>) showing peaks and integrations:

| Chemical Shift (ppm)                                                                                    | Integration                |
|---------------------------------------------------------------------------------------------------------|----------------------------|
| 8.612, 8.602                                                                                            | 1.026                      |
| 7.785, 7.765, 7.696, 7.677, 7.659, 7.641, 7.431, 7.413, 7.393, 7.372, 7.289, 4.859, 4.827, 4.572, 4.540 | 1.036, 3.058, 3.092, 1.075 |
| 4.827, 4.572, 4.540                                                                                     | 1.020, 1.003, 1.003        |
| 2.313                                                                                                   | 3.000                      |

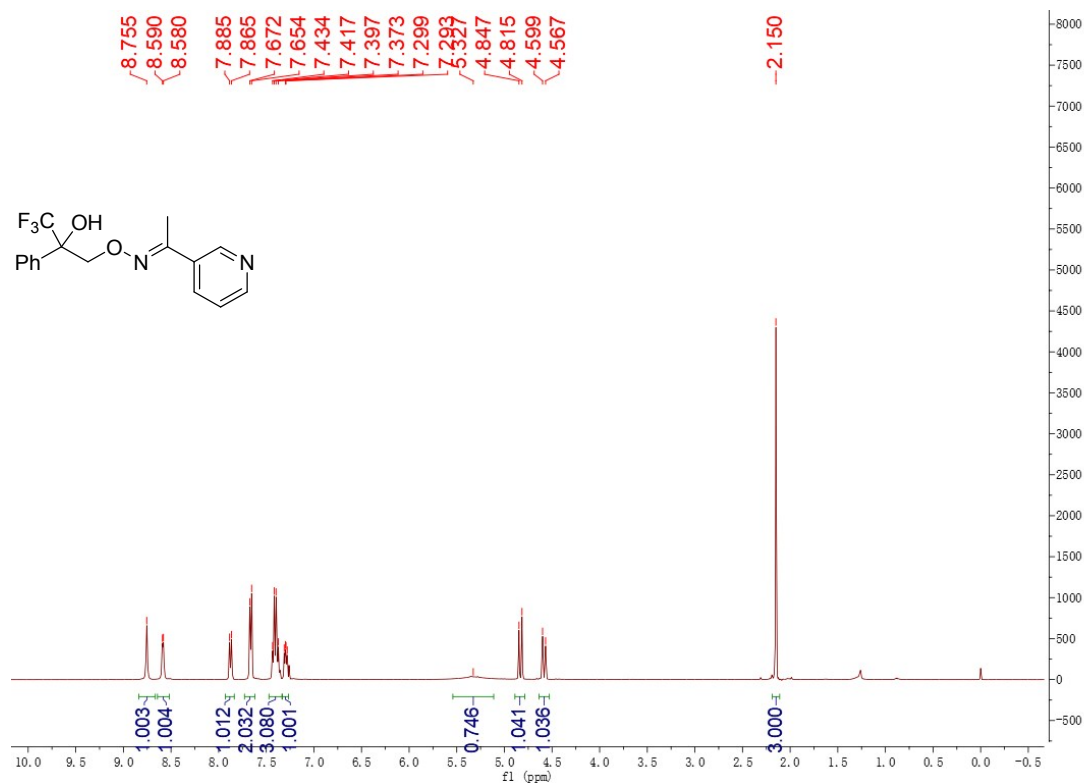
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3ax**



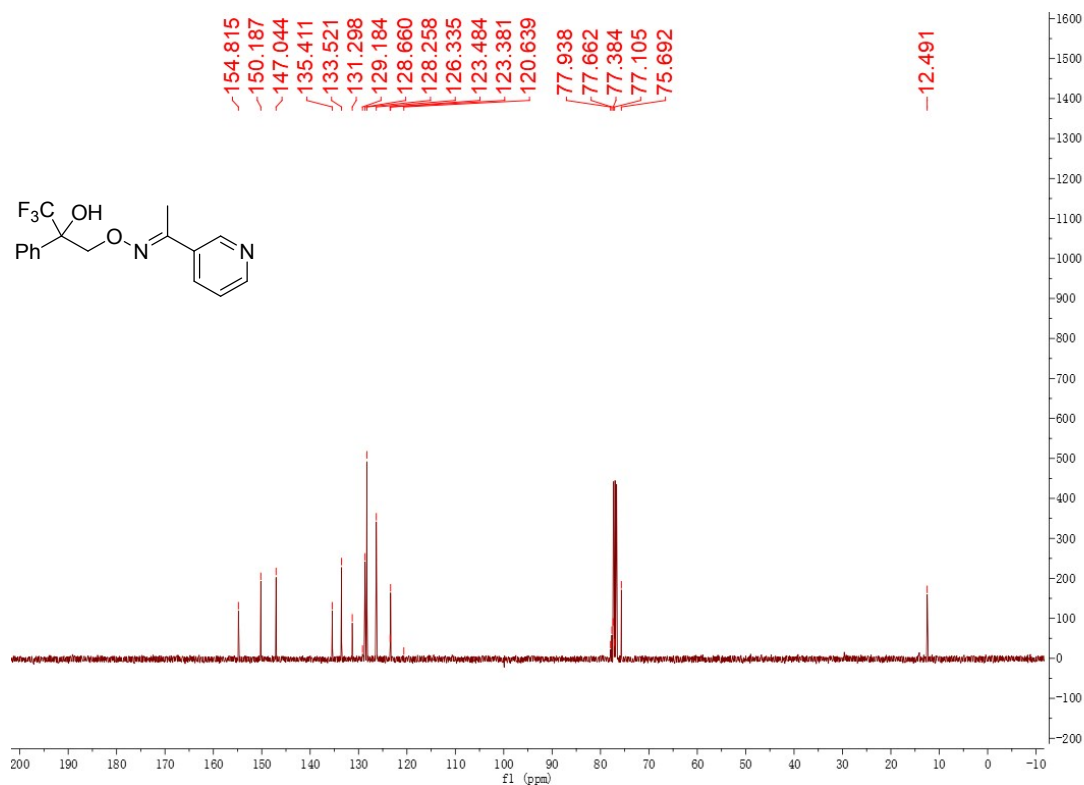
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ax**



**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3ay**



**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3ay**



Chemical structure: CC1=CC=CC=C1C(=O)OCC(OC(=O)C1=CC=CC=C1)C(F)(F)F

<sup>13</sup>C NMR spectrum (CDCl<sub>3</sub>) showing a single sharp peak at  $\delta$  76.316 ppm, corresponding to the solvent (CDCl<sub>3</sub>).



| Chemical Shift ( $\delta$ , ppm) |
|----------------------------------|
| 76.316                           |

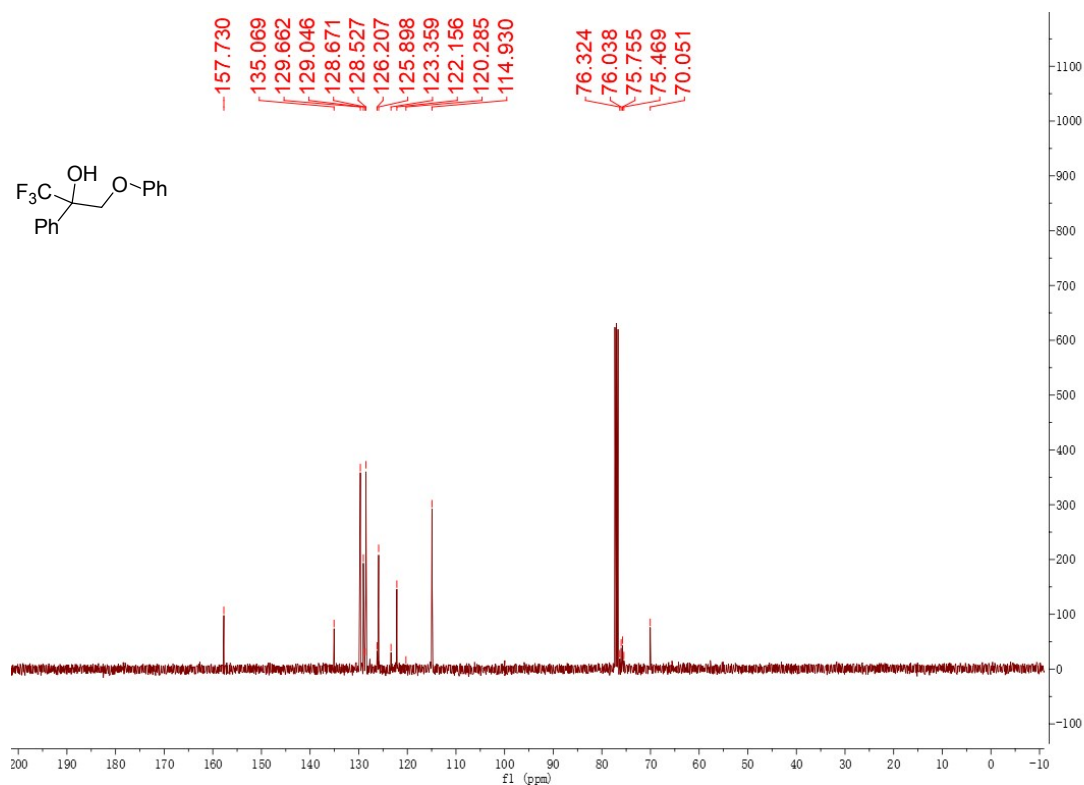
COc1ccccc1OC(C)(O)C(F)(F)F

**Chemical Structure:** (S)-1-(benzyloxy)-1-phenylethanol-2,2,2-trifluoroethane

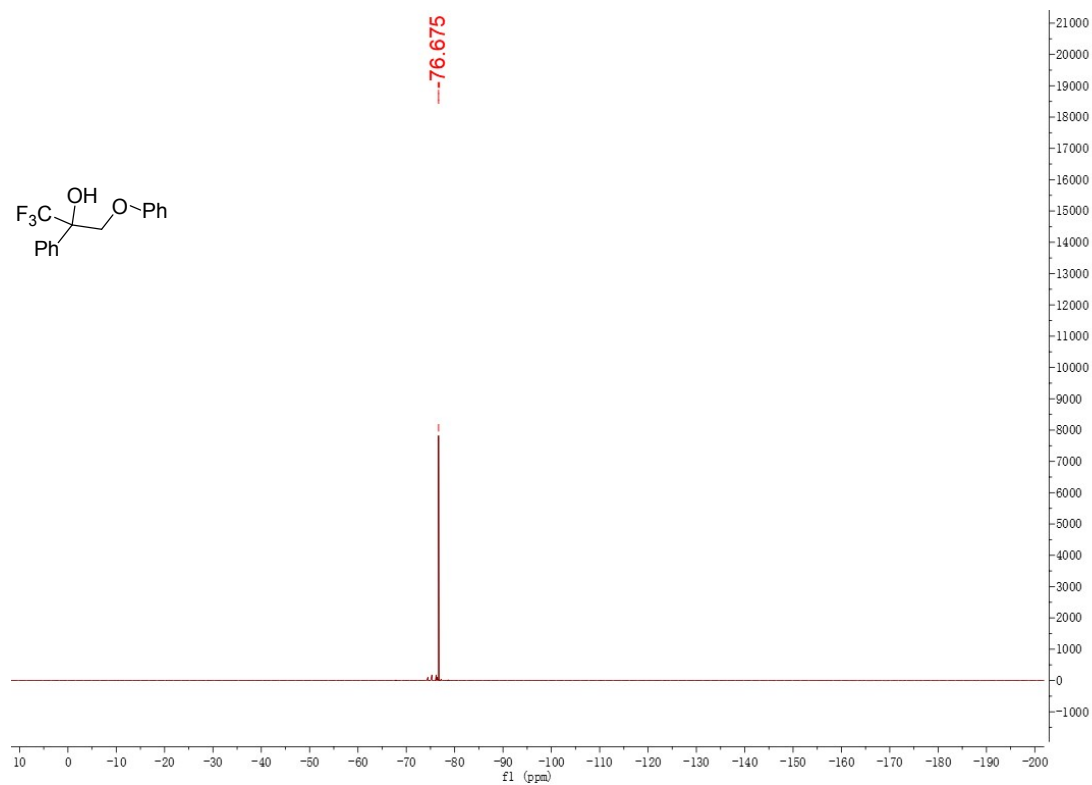
**<sup>1</sup>H NMR Data (CDCl<sub>3</sub>):**

| Chemical Shift (ppm)                                                                                           | Integration                       |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------|
| 7.637, 7.619, 7.448, 7.441, 7.436, 7.427, 7.409, 7.396, 7.311, 7.291, 7.271, 7.028, 7.009, 6.991, 6.930, 6.910 | 2.002, 3.029, 2.089, 1.054, 2.075 |
| 4.604, 4.580, 4.236, 4.212                                                                                     | 1.051, 1.000                      |
| 3.521                                                                                                          | 0.767                             |

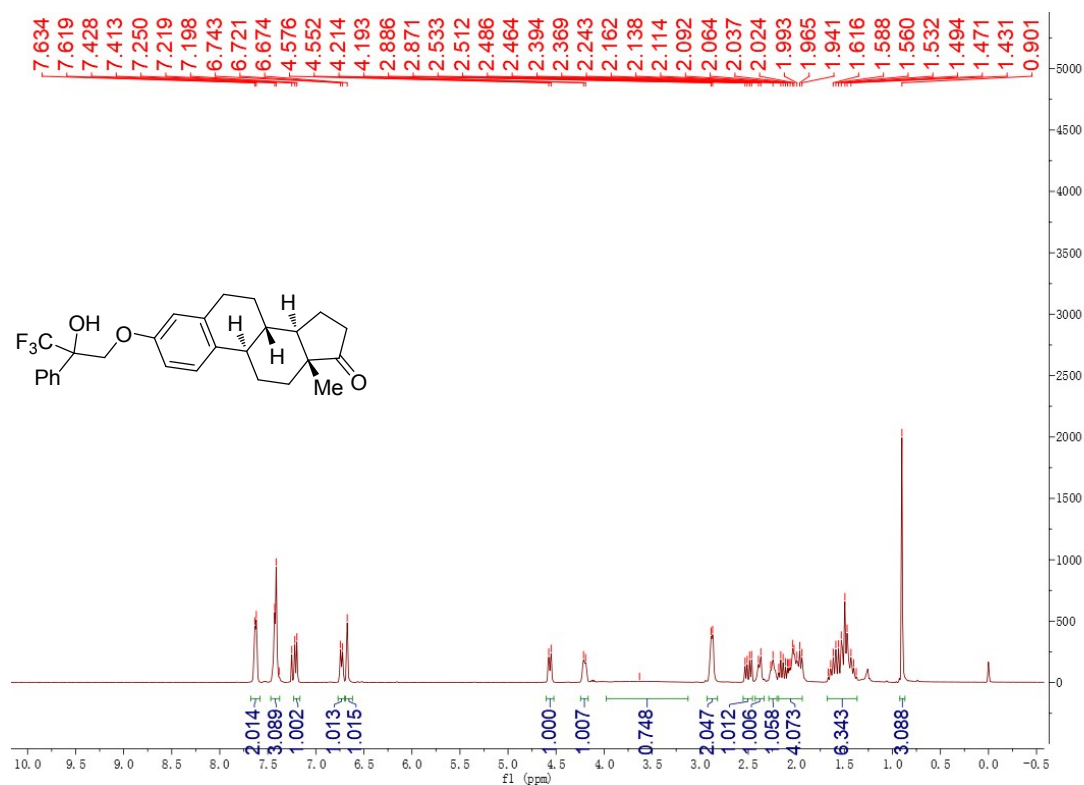
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3az**



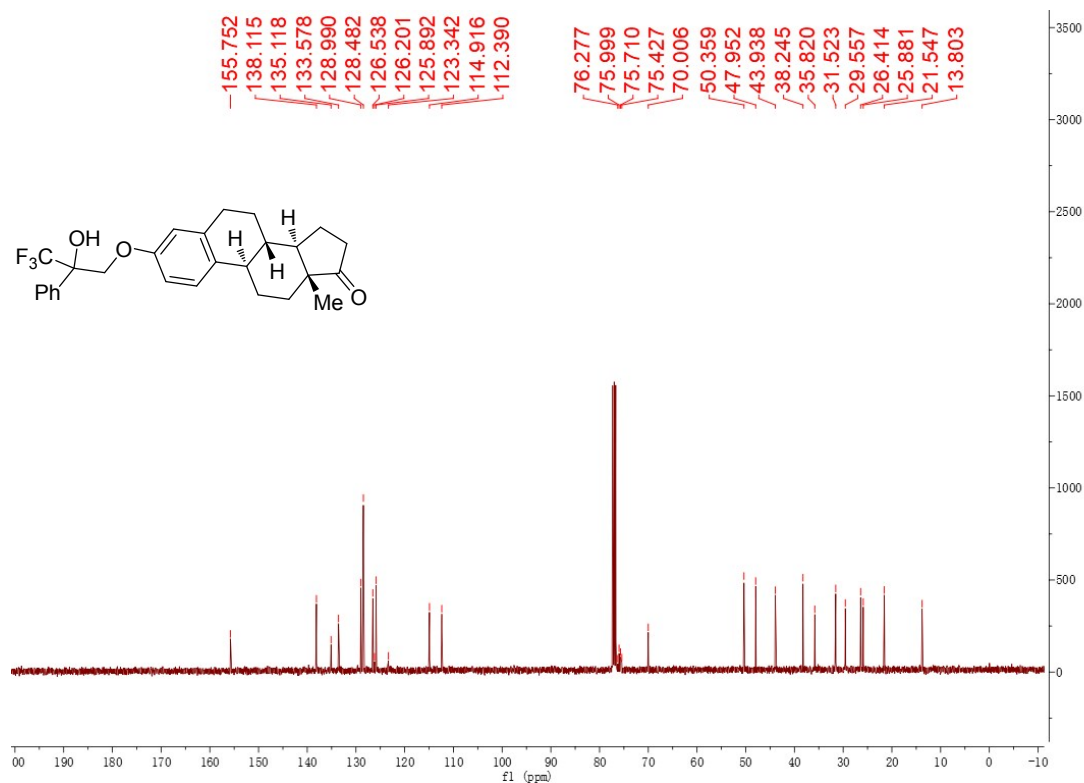
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3az**



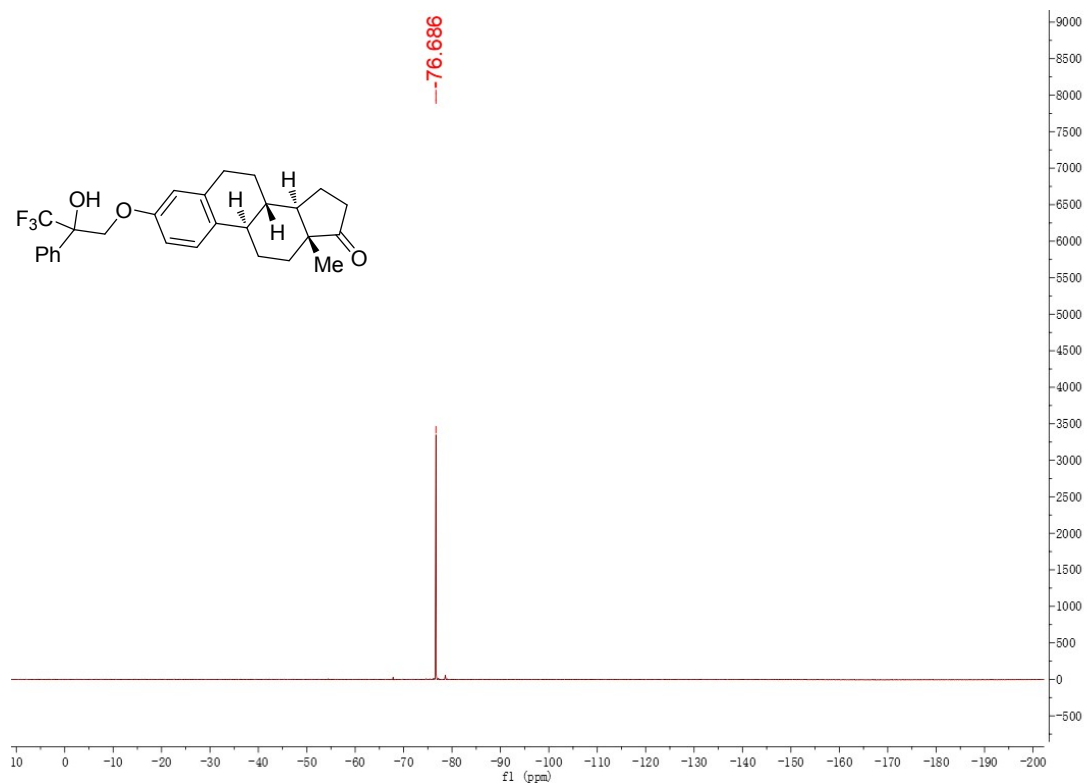
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3ba**



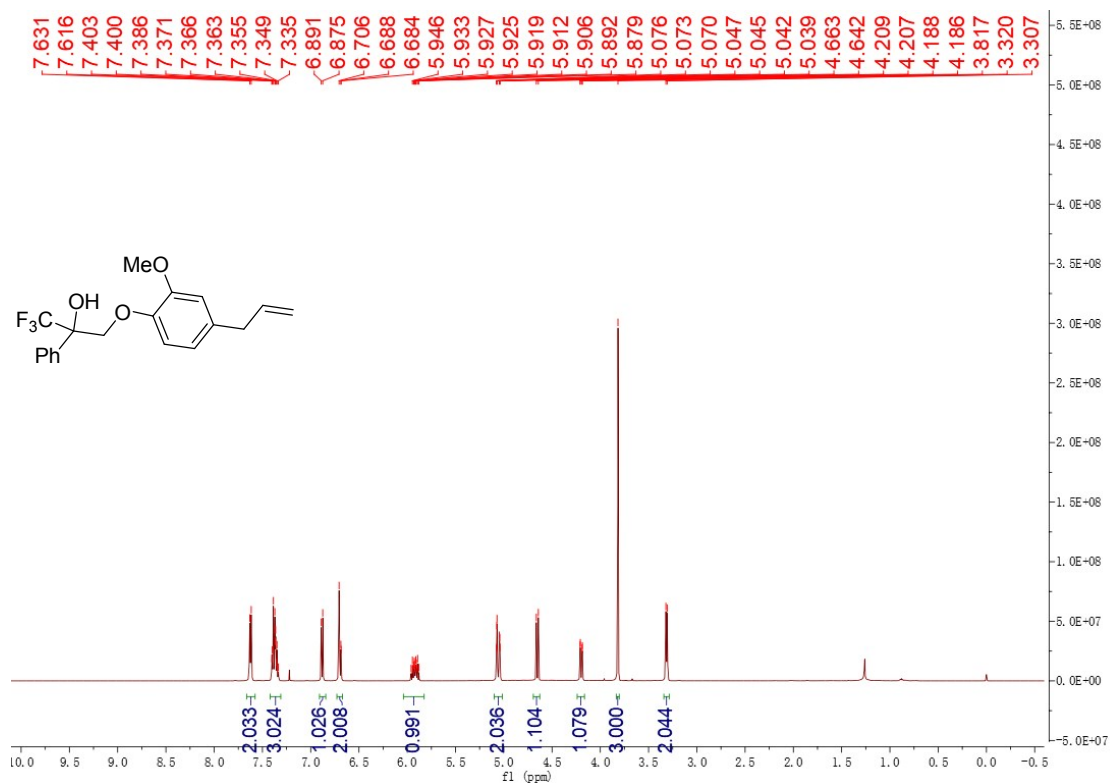
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3ba**



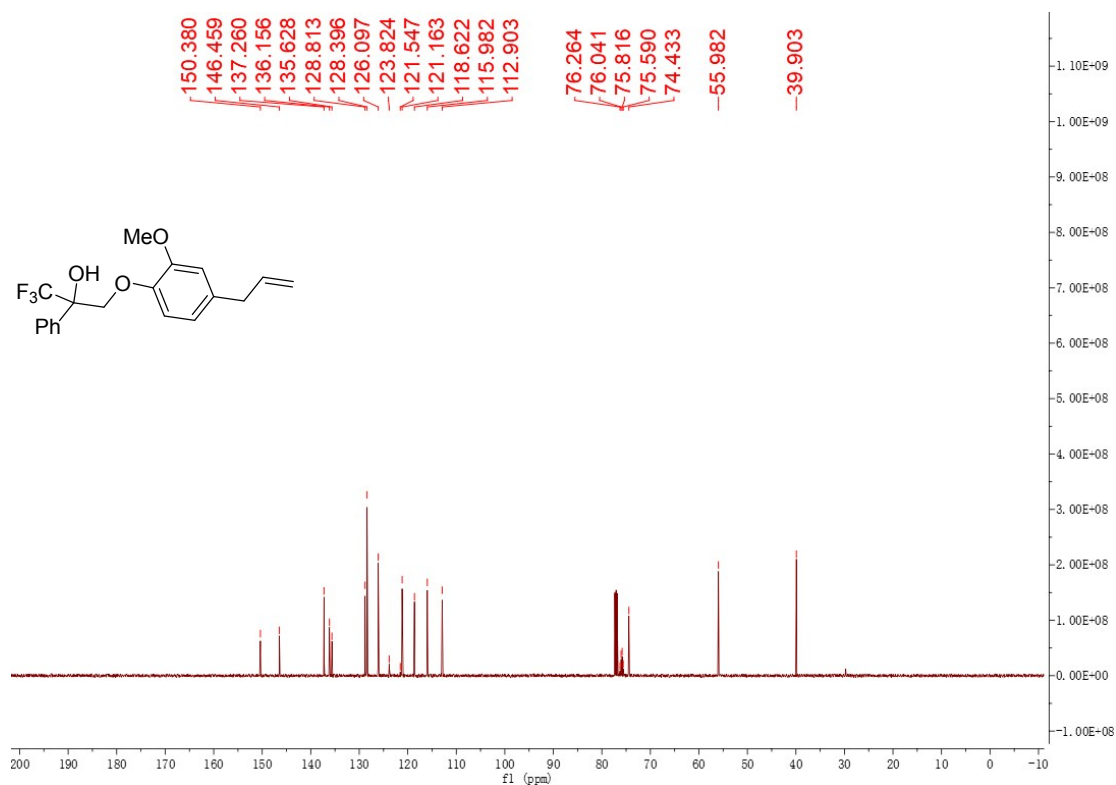
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3ba**



**$^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ ) spectrum for 3bb**



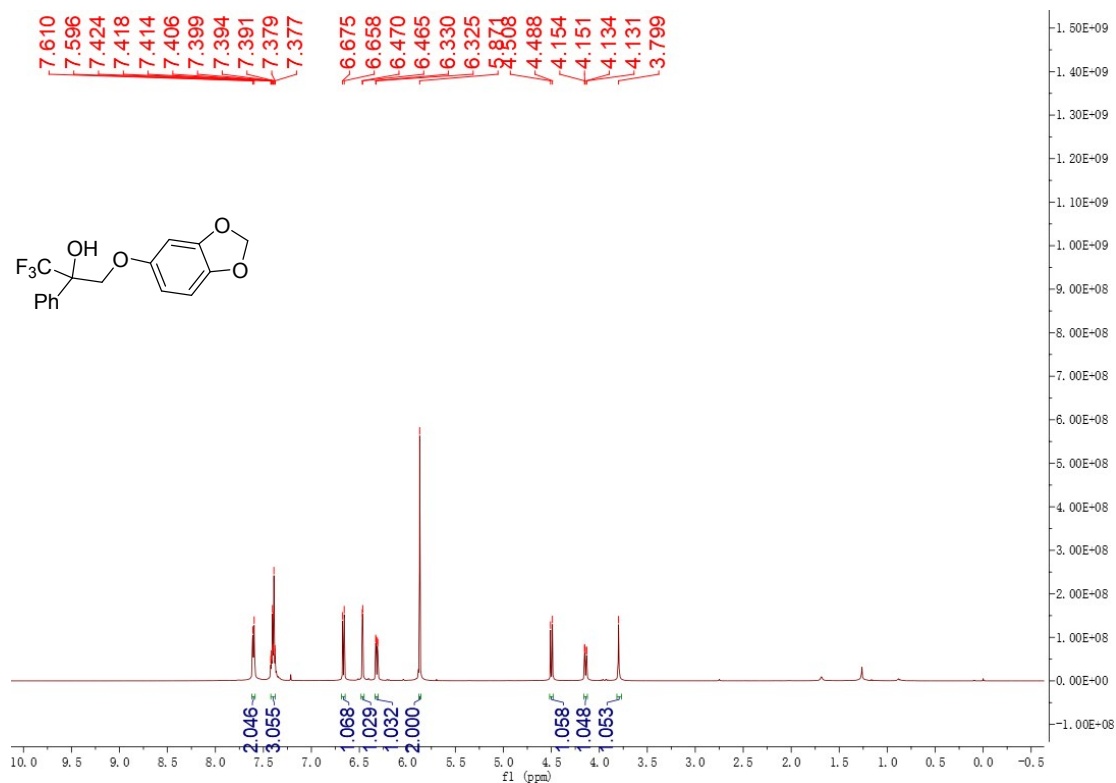
**$^{13}\text{C}$  NMR (125 MHz,  $\text{CDCl}_3$ ) spectrum for 3bb**



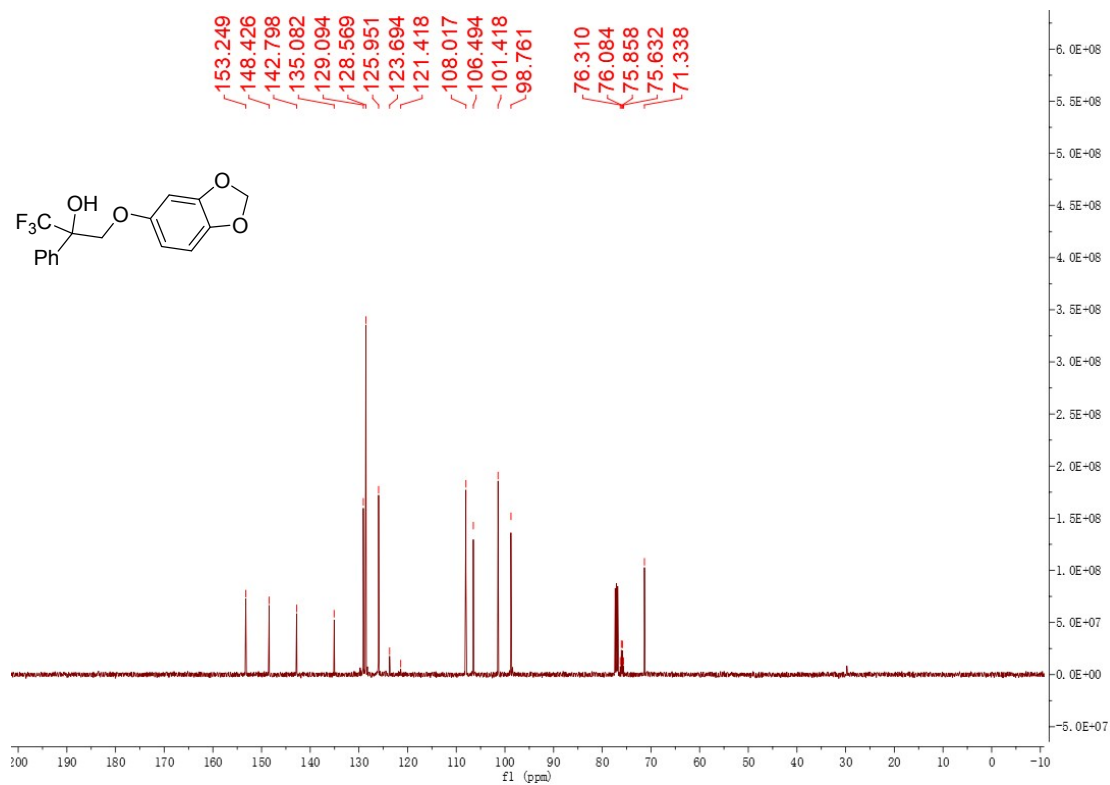
**$^{19}\text{F}$  NMR (470 MHz,  $\text{CDCl}_3$ ) spectrum for 3bb**



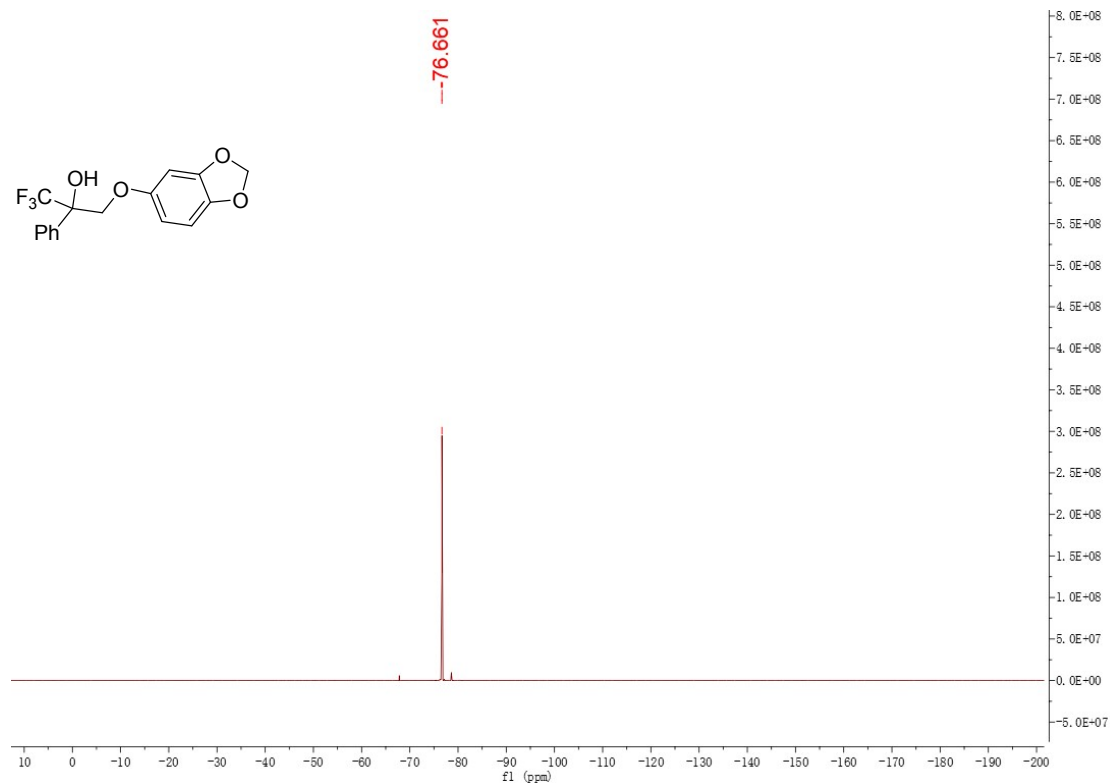
**<sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) spectrum for 3bc**



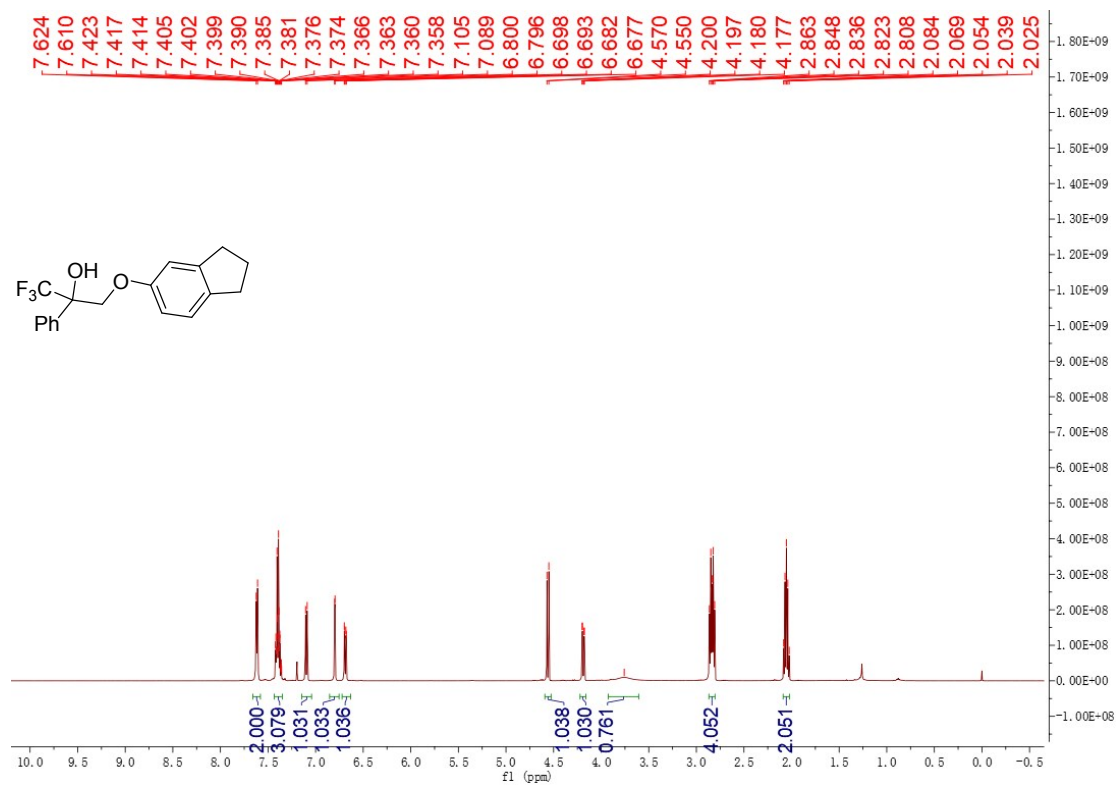
**<sup>13</sup>C NMR (125 MHz, CDCl<sub>3</sub>) spectrum for 3bc**



**$^{19}\text{F}$  NMR (470 MHz,  $\text{CDCl}_3$ ) spectrum for 3bc**



**$^1\text{H}$  NMR (500 MHz,  $\text{CDCl}_3$ ) spectrum for 3bd**



Chemical structure of the compound is shown above the spectrum:

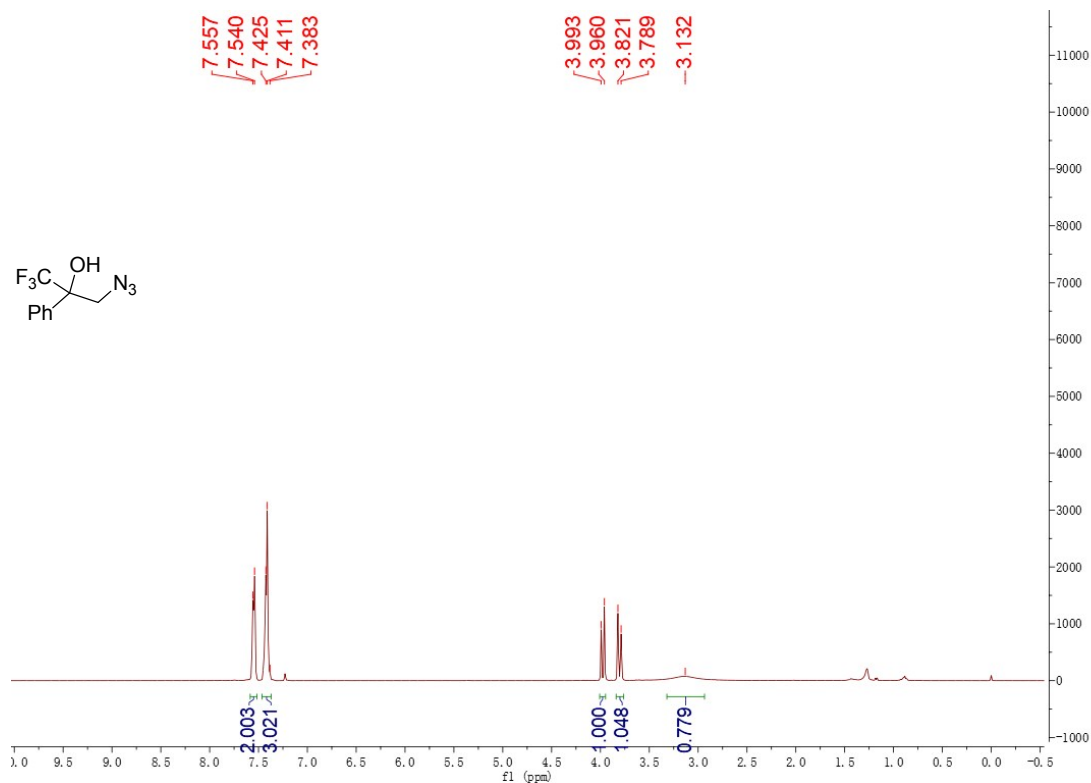
COc1ccc2ccccc2c1C(F)(F)F

The spectrum displays chemical shifts (ppm) on the x-axis, ranging from -10 to 200. The y-axis represents intensity, ranging from -1.00E+00 to 1.10E+09. Key peaks are labeled with their chemical shift values:

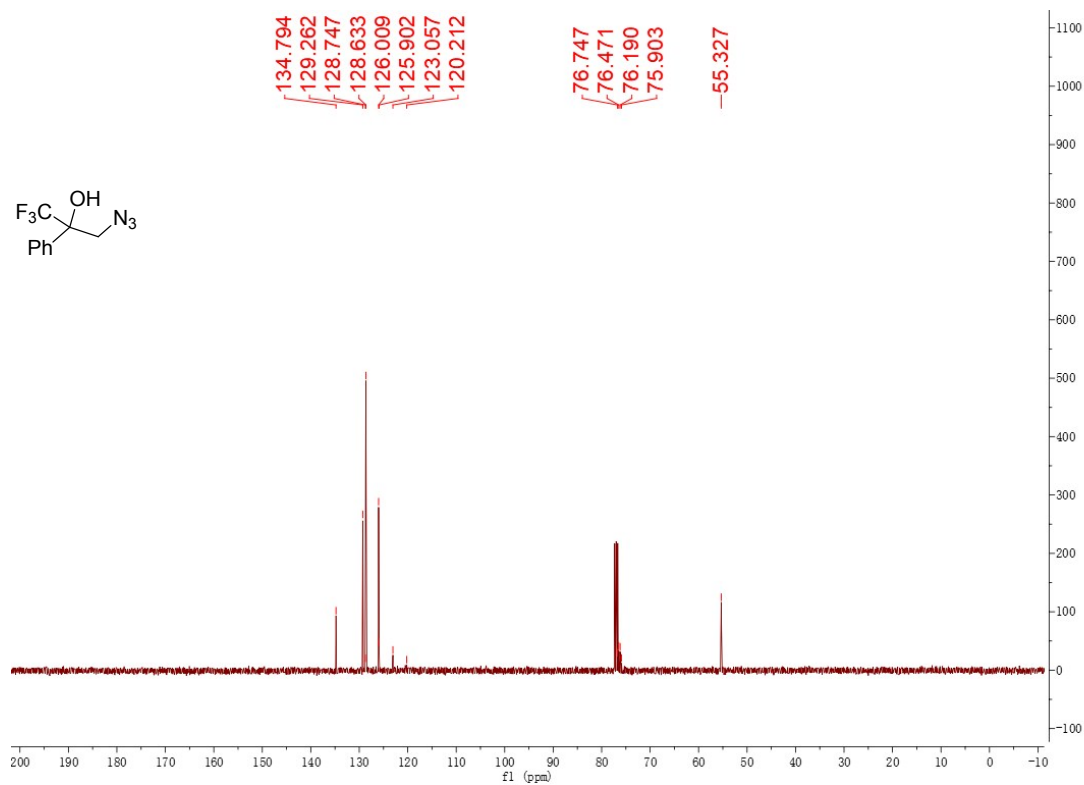
- 156.771
- 146.066
- 137.884
- 135.293
- 129.030
- 128.543
- 128.319
- 126.040
- 125.978
- 124.970
- 123.761
- 121.484
- 112.995
- 111.237
- 76.312
- 76.086
- 75.860
- 75.634
- 70.519
- 33.143
- 32.042
- 25.864

[illegible]

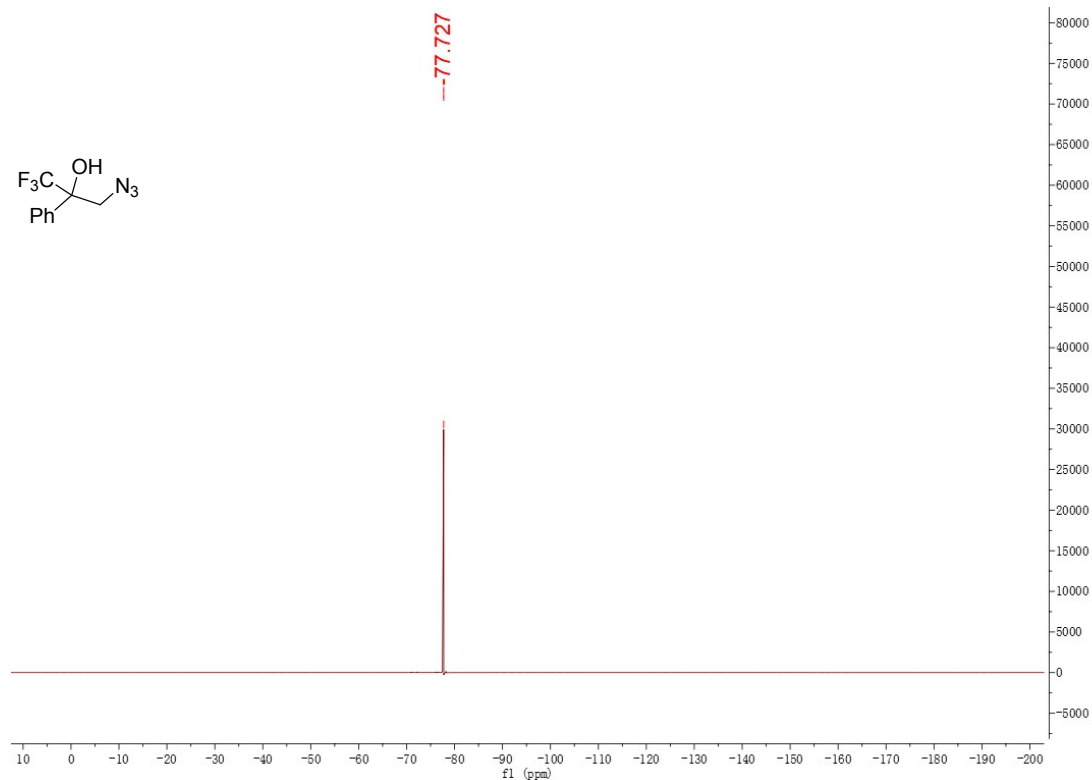
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 3be**



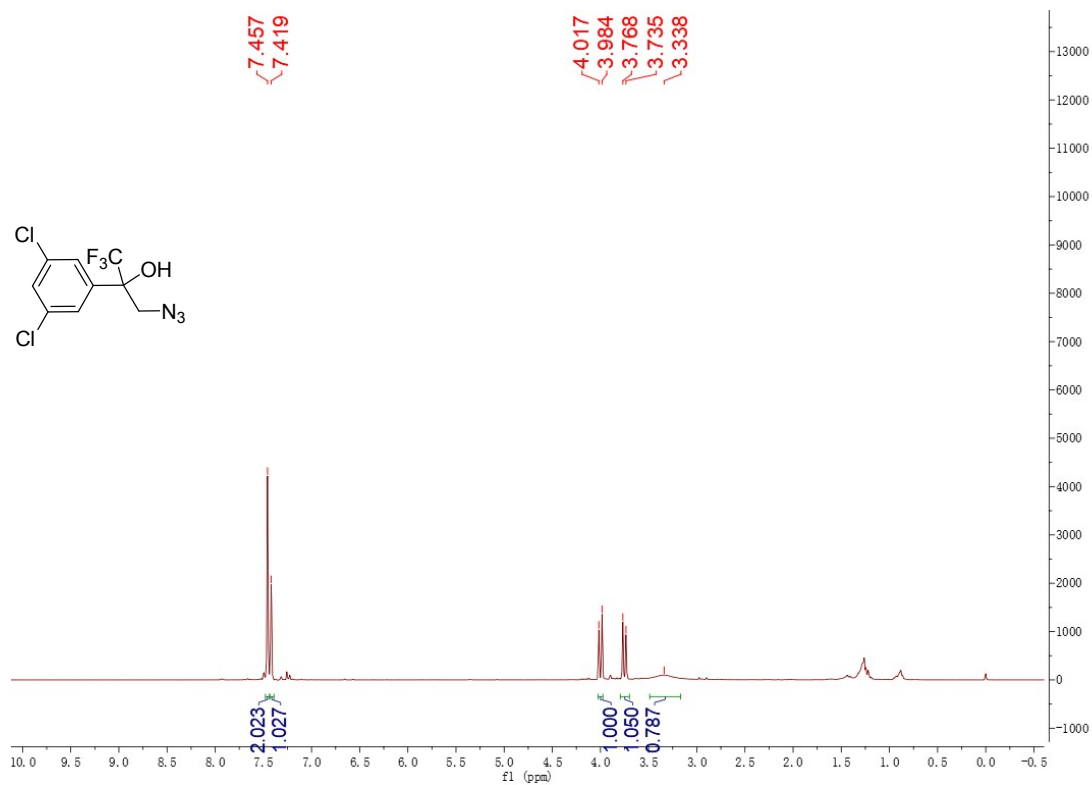
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 3be**



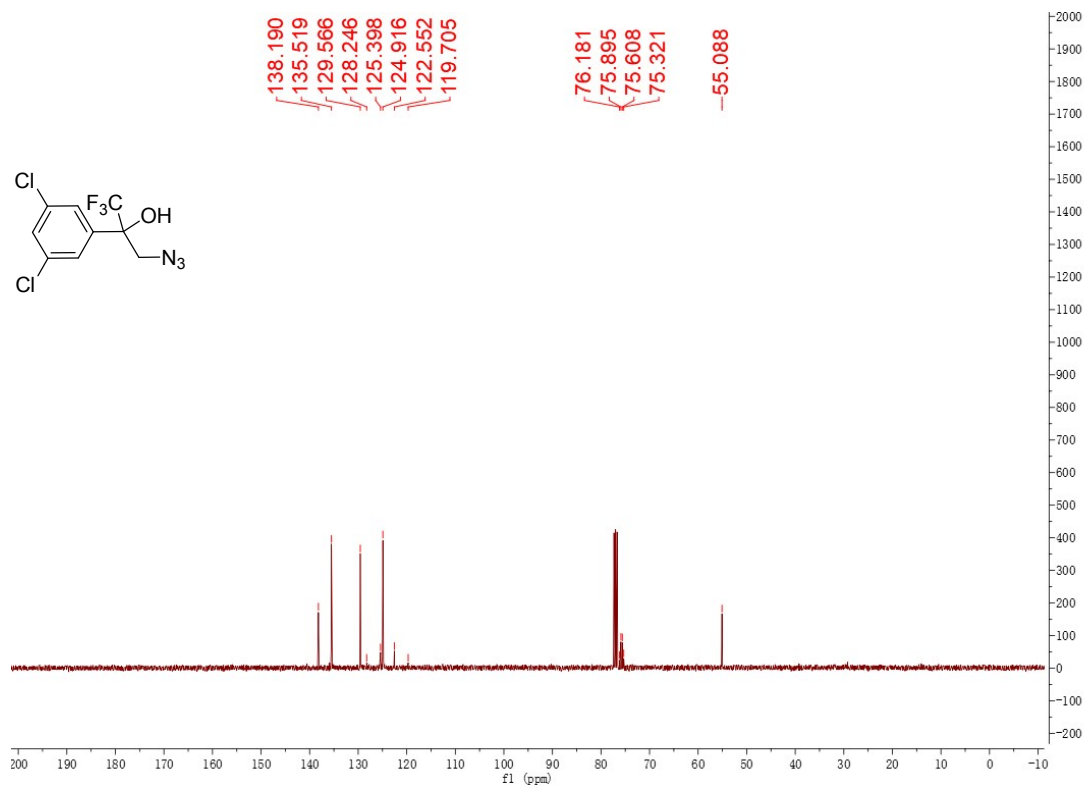
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3be**



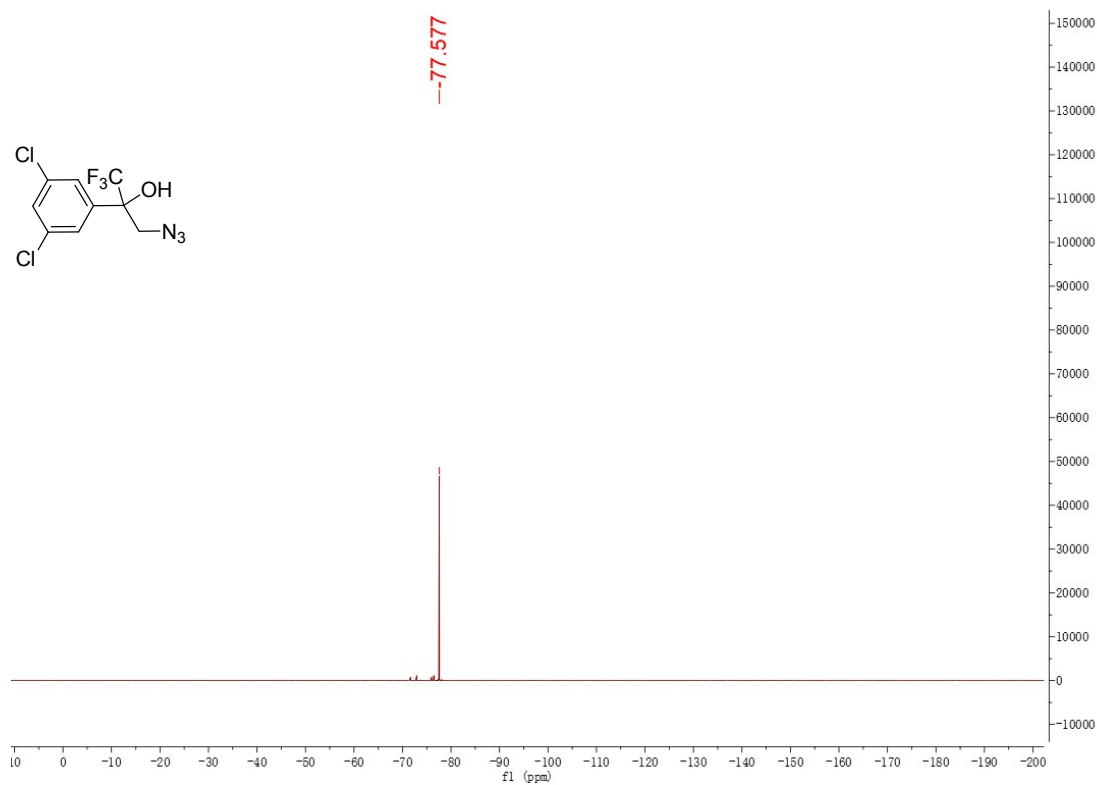
**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 3bf**



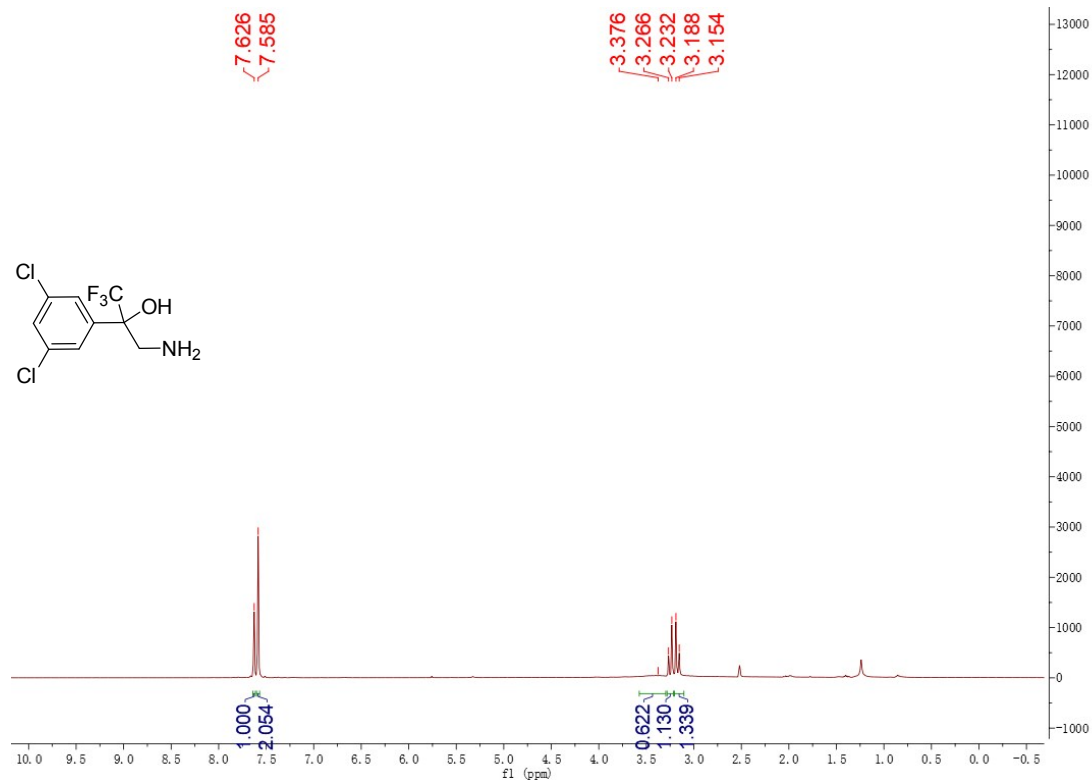
**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 3bf**



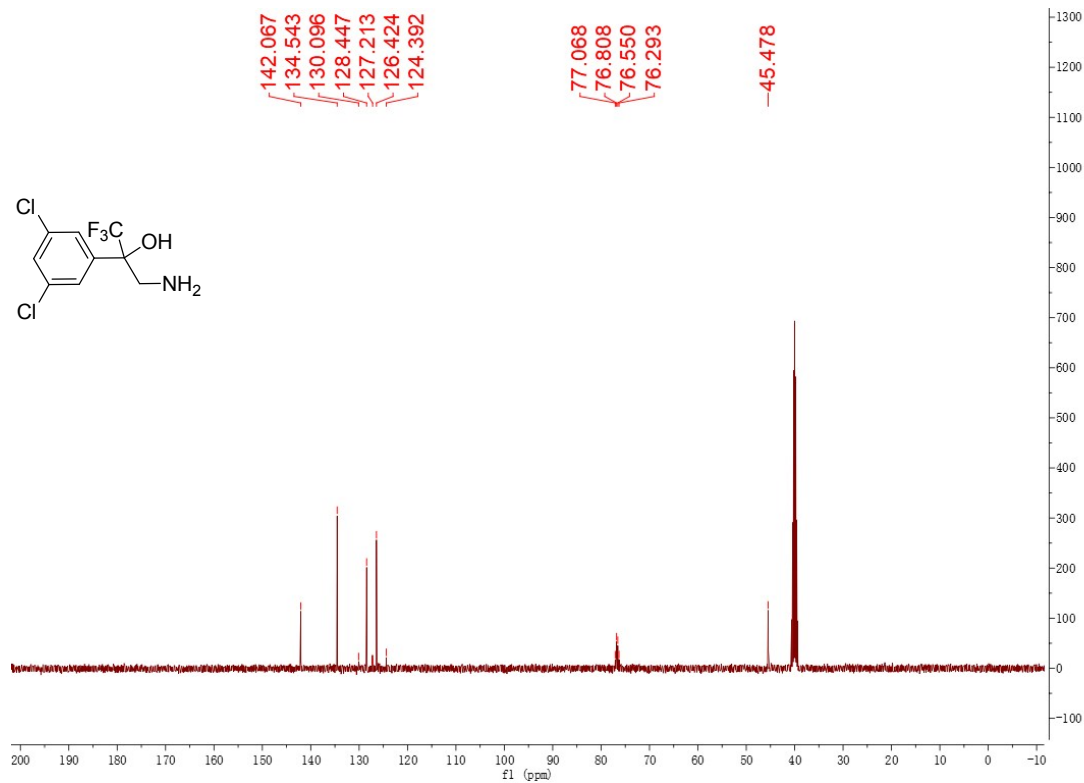
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 3bf**



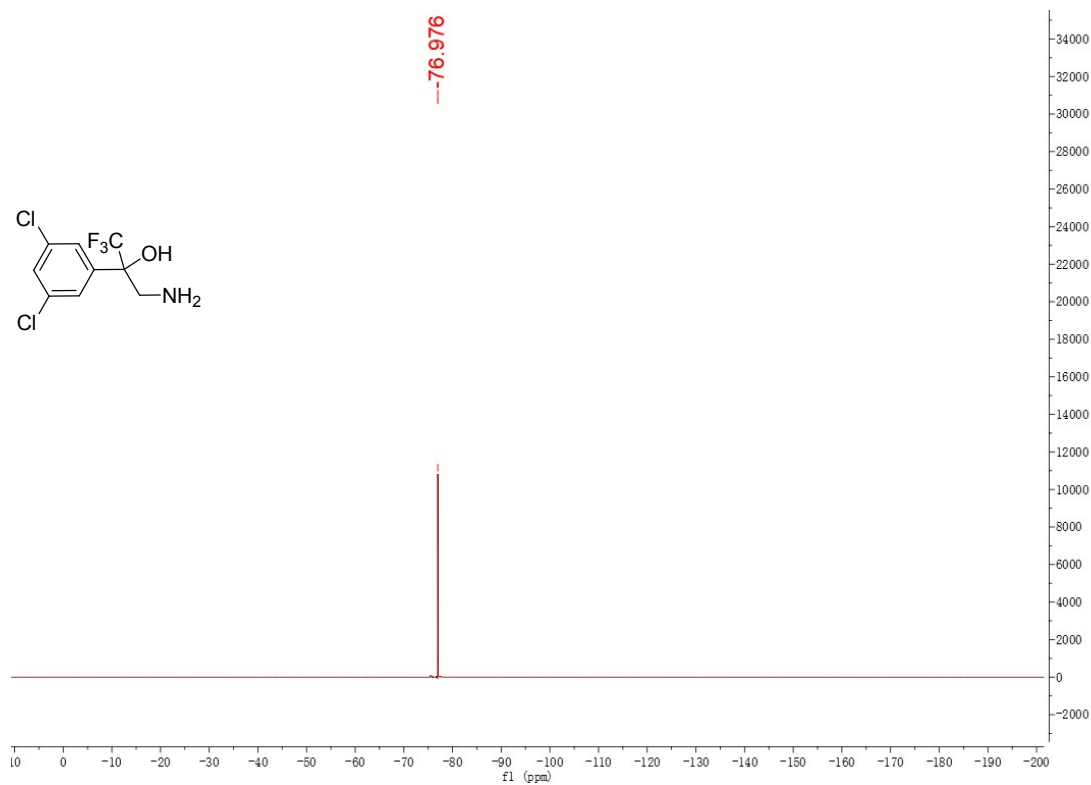
**<sup>1</sup>H NMR (400 MHz, *d*<sub>6</sub>-DMSO) spectrum for 4**



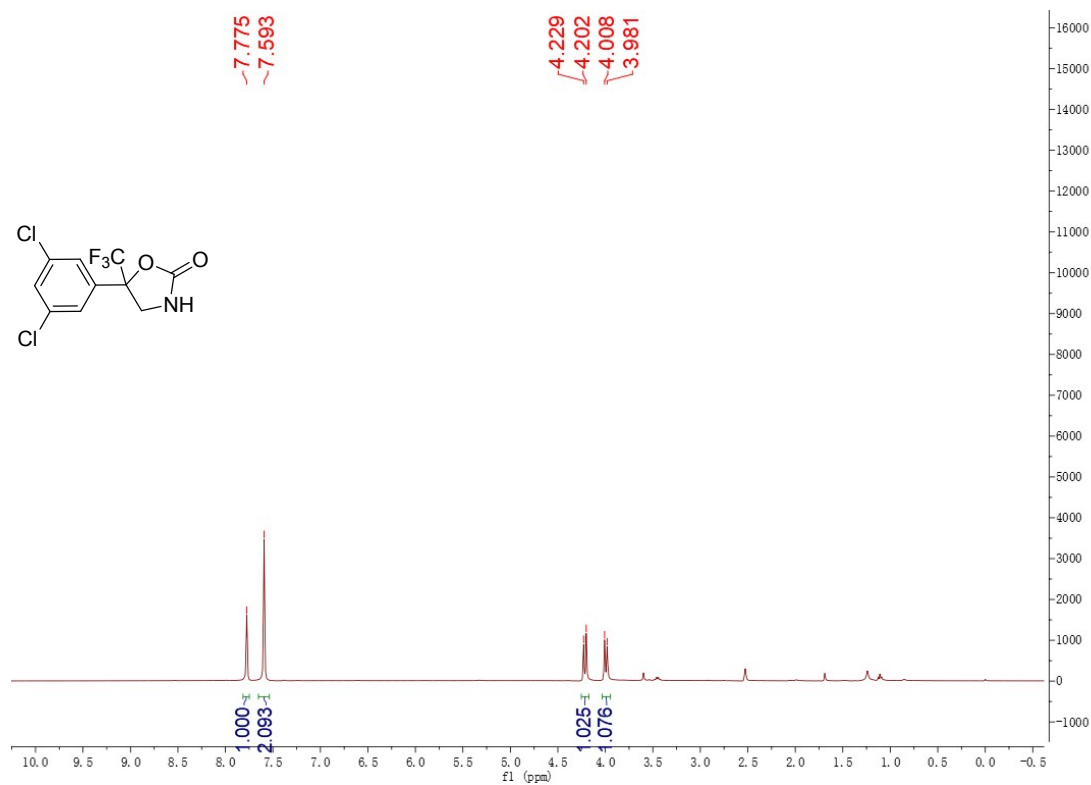
**<sup>13</sup>C NMR (100 MHz, *d*<sub>6</sub>-DMSO) spectrum for 4**



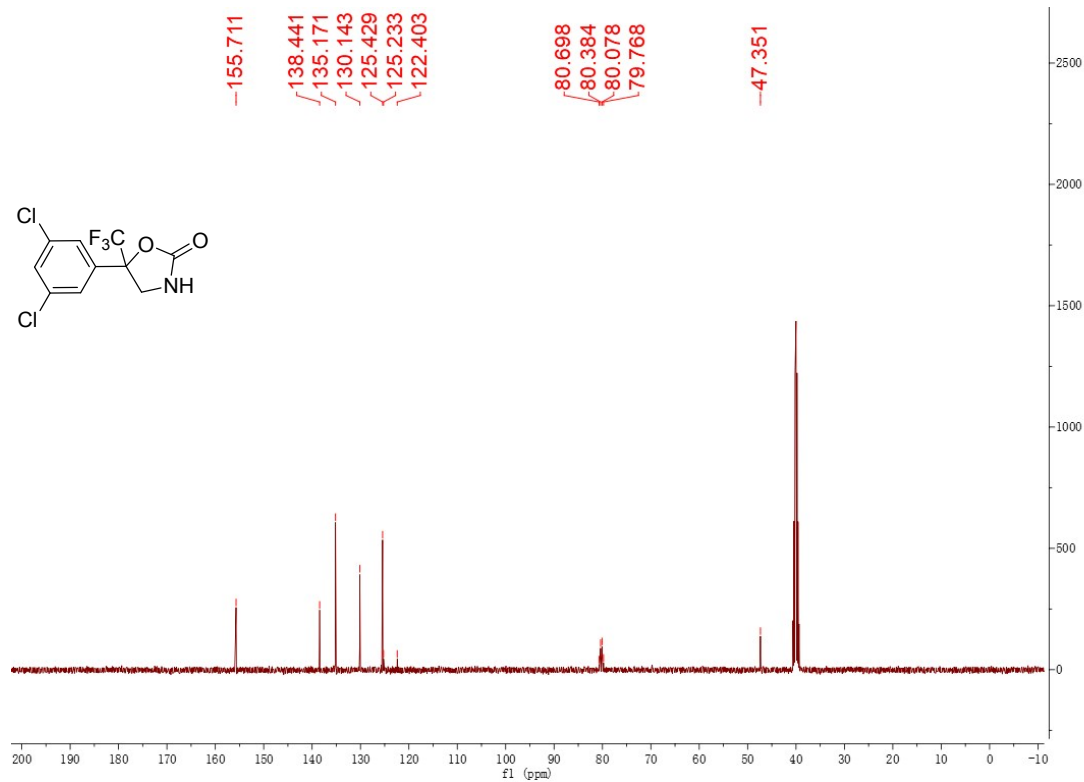
**$^{19}\text{F}$  NMR (376 MHz,  $d_6$ -DMSO) spectrum for 4**



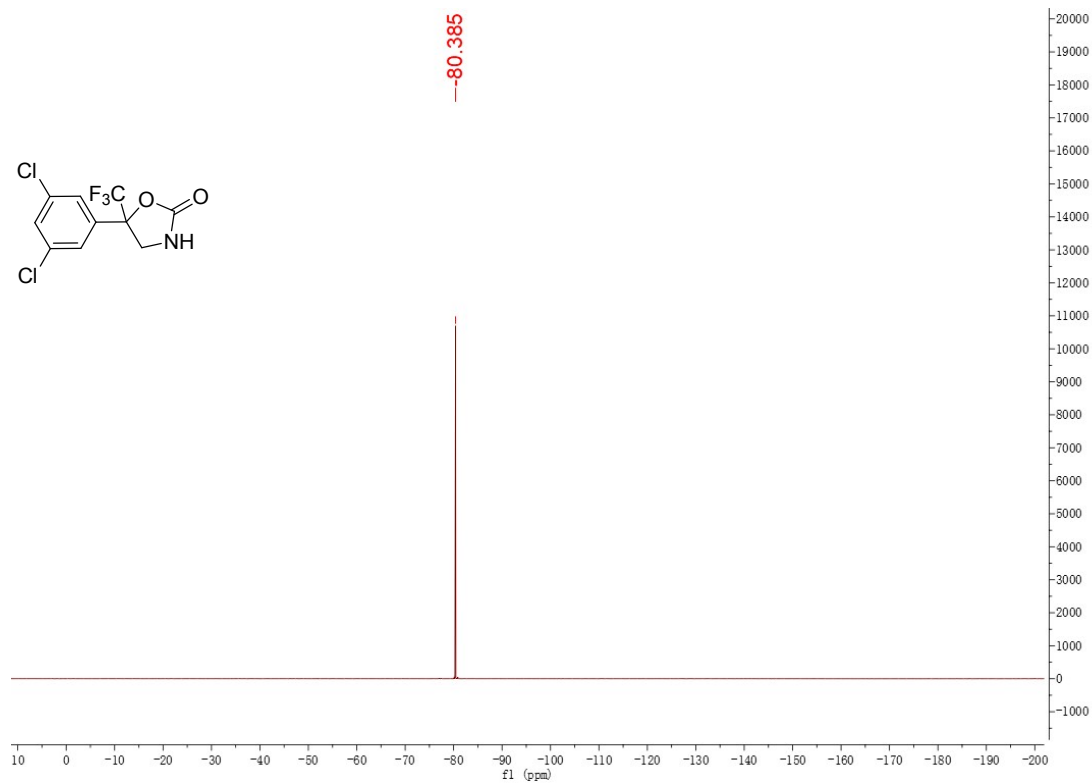
**$^1\text{H}$  NMR (400 MHz,  $d_6$ -DMSO) spectrum for 5**



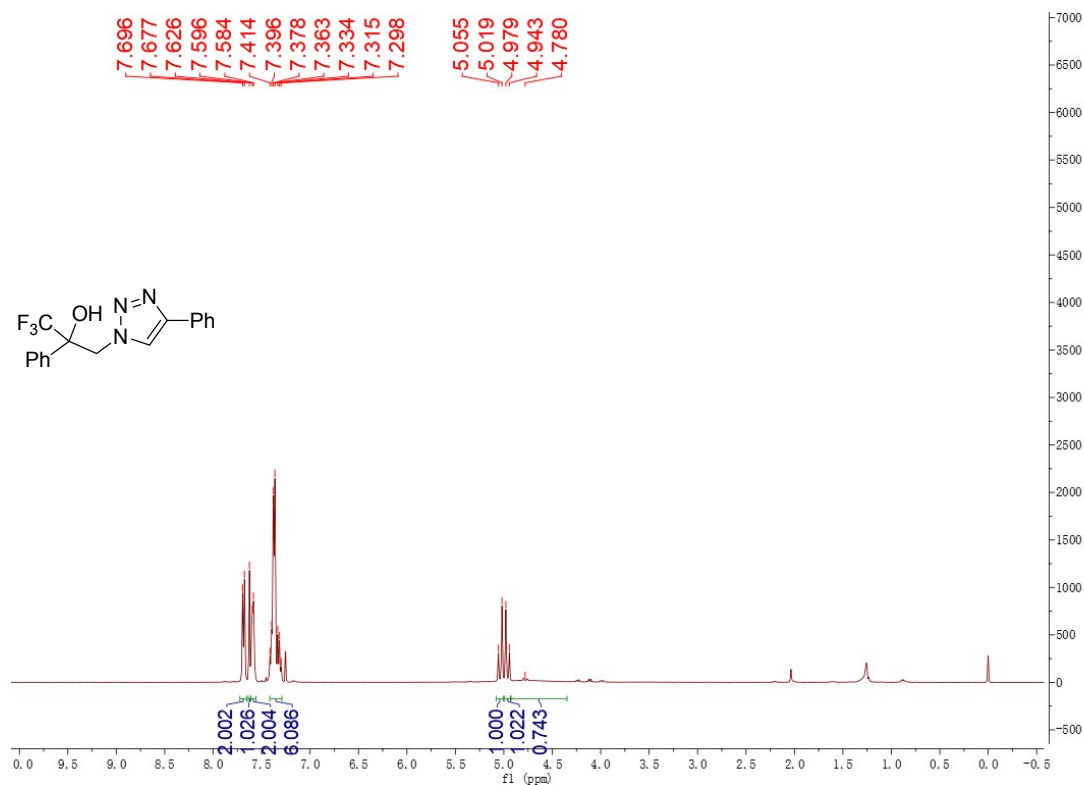
**$^{13}\text{C}$  NMR (100 MHz,  $d_6$ -DMSO) spectrum for 5**



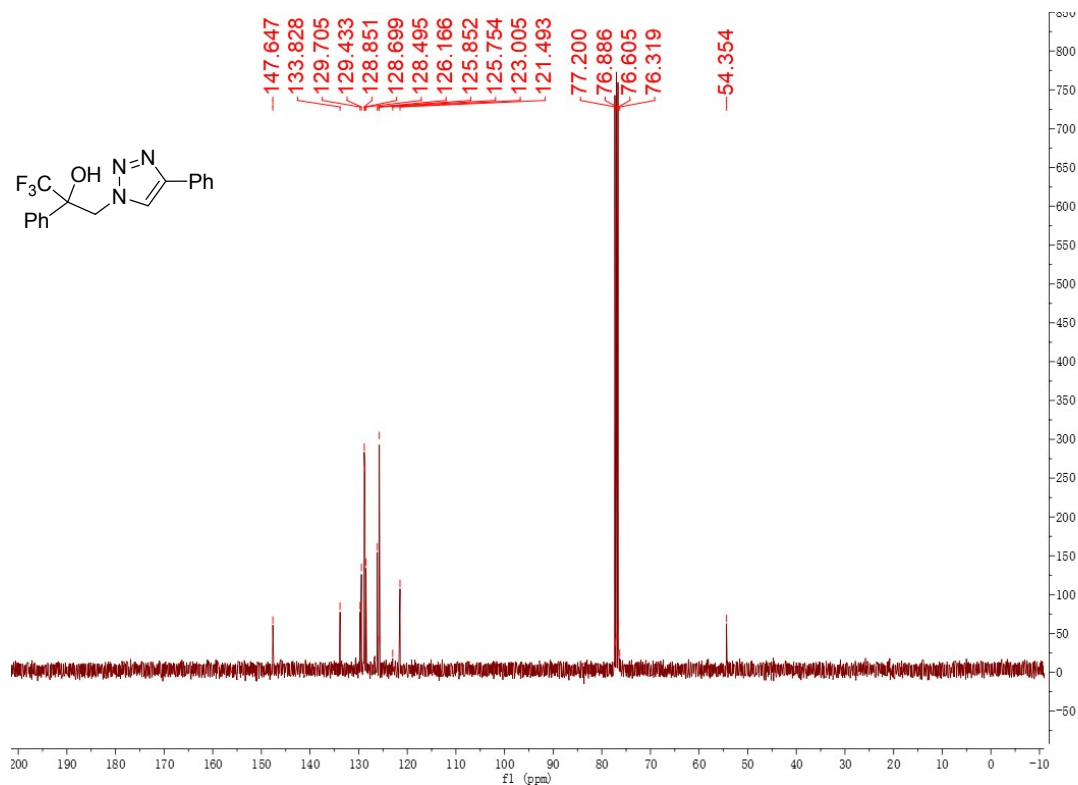
**$^{19}\text{F}$  NMR (376 MHz,  $d_6$ -DMSO) spectrum for 5**



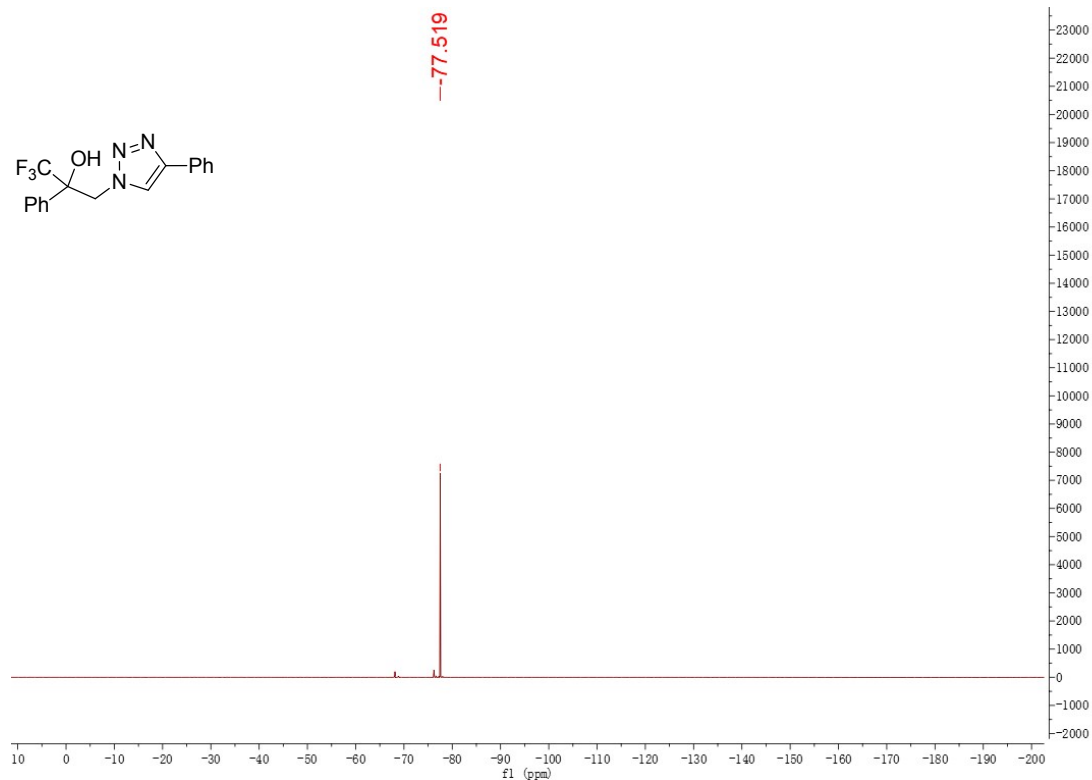
**<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) spectrum for 6**



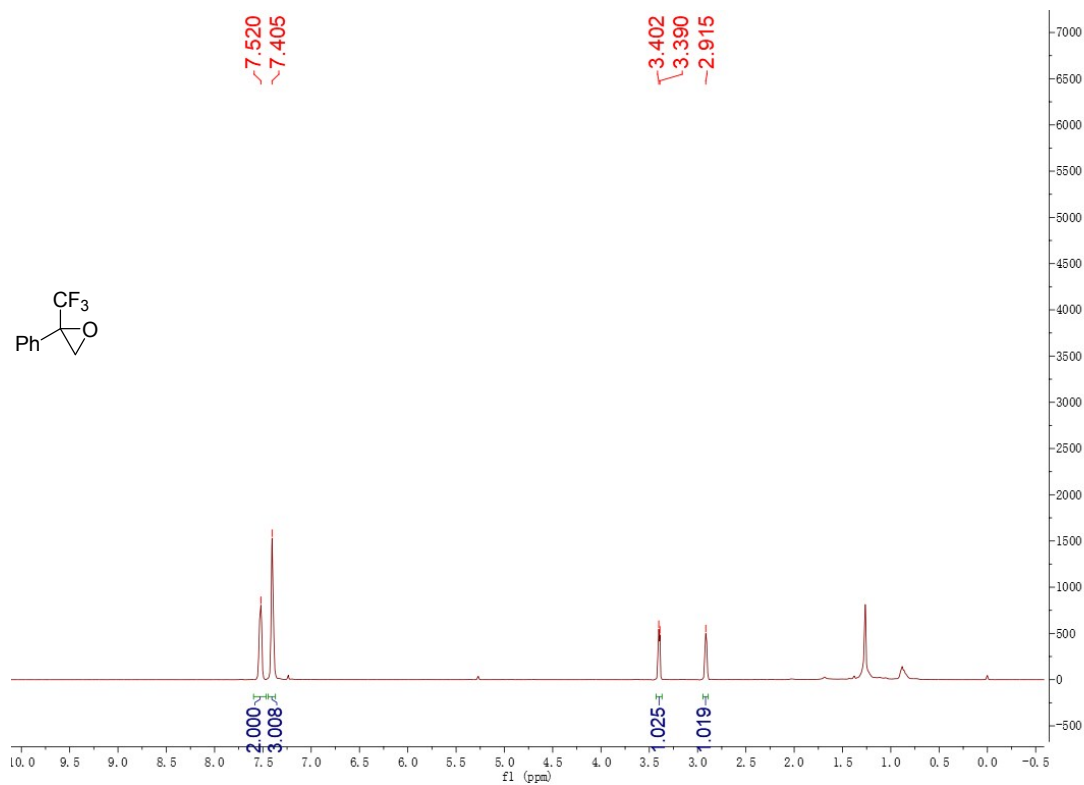
**<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) spectrum for 6**



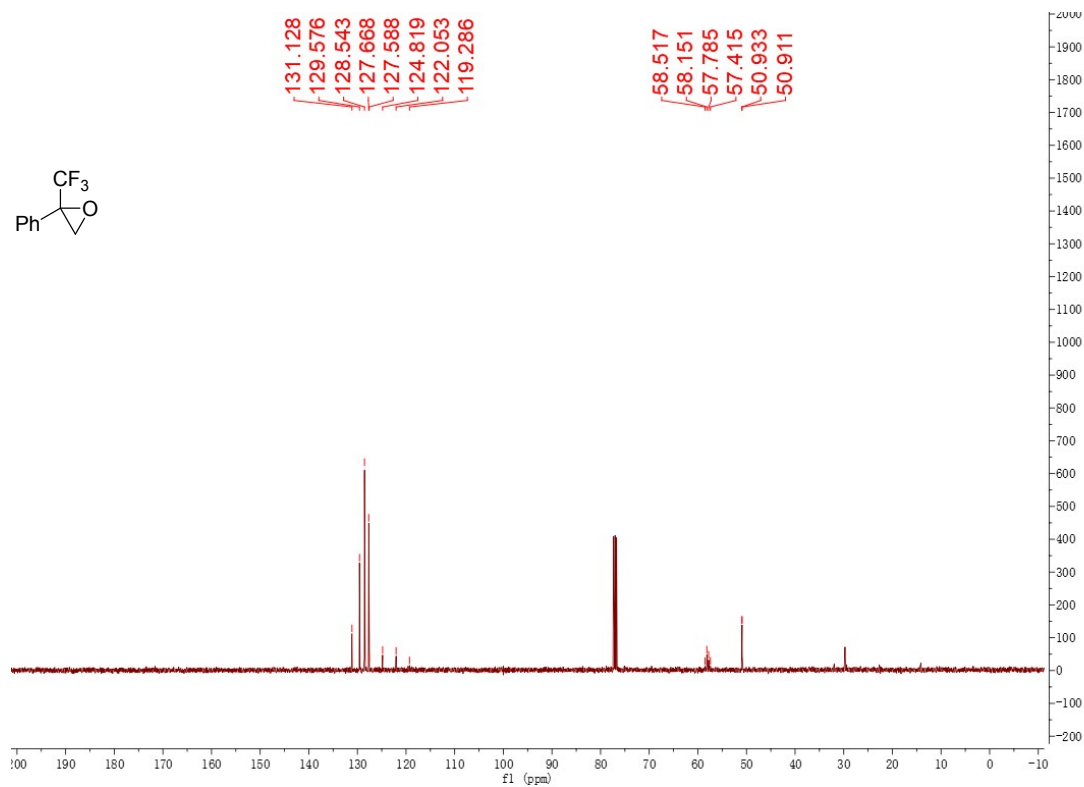
**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 6**



**$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) spectrum for 8**



**$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ ) spectrum for 8**



**$^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) spectrum for 8**

