Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene and δ-valerolactone as the substrates.

Oil.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 80 %

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 1.49-1.66 (m, 2H), 1.66-1.80 (m, 2H), 1.80-1.98 (m, 2H), 3.71-3.78 (m, 2H), 4.03 (td, $J = 2.8$, $J = 11.6$ Hz, 1H), 4.13 (ddd, $J = 5.2$, $J = 10.8$, $J = 26.4$ Hz, 1H), 4.21 (d, $J = 1.6$ Hz, 1H), 4.62 (d, $J = 11.6$ Hz, 1H), 4.68 (d, $J = 11.6$ Hz, 1H), 7.31-7.40 (m, 5H).

$^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −118.9 (td, $J = 5.7$ Hz, $J = 263.9$ Hz), −121.47 (ddd, $J = 12.6$, $J = 27.0$, $J = 263.9$ Hz).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 17.7, 25.1, 26.8, 61.5, 69.0 (dd, $J = 26.0$ Hz, $J = 39.0$ Hz), 74.4, 96.0 (dd, $J = 27.0$ Hz, $J = 31.0$ Hz), 117.7 (t, $J = 248.0$ Hz), 128.0, 128.4, 128.7, 136.6. IR (ATR, neat) ν (cm$^{-1}$): 3471, 2988, 2971, 2901, 1079, 1066, 1050, 1028, 1009. HRMS (ESI+) m/z: 295.1124 calcd for [C$_{14}$H$_{18}$F$_2$O$_3$ + Na$^+$] : 295.1122
Prepared according to the general procedure using \((2\text{-bromo-2,2-difluoroethoxy)methyl})\text{benzene 314} \text{ and butyrolactone as the substrates.}

Oil.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 69 %

\(^1\text{H NMR}\) (400 MHz, CDCl\(_3\)) \(\delta\) (ppm): 1.87-1.98 (m, 2H), 2.05-2.17 (m, 1H), 2.30-2.38 (m, 1H), 3.75-3.82 (m, 1H), 3.93-3.98 (m, 1H), 4.07-4.17 (m, 2H), 4.29 (s, 1H), 4.65 (d, \(J = 12\) Hz, 1H), 4.67 (d, \(J = 12\) Hz, 1H), 7.30-7.39 (m, 5H).

\(^19\text{F NMR}\) (376 MHz, CDCl\(_3\)) \(\delta\) (ppm): –116.1 (ddd, \(J = 11.6\) Hz, \(J = 26.3\) Hz, \(J = 262.4\) Hz), –117.8 - –118.7 (m).

\(^{13}\text{C NMR}\) (100 MHz, CDCl\(_3\)) \(\delta\) (ppm): 25.1, 32.5, 69.5, 69.5 (dd, \(J = 26.2\) Hz, \(J = 41.1\) Hz), 74.4, 105.5 (dd, \(J = 29.1\) Hz, \(J = 31.0\) Hz), 117.7 (dd, \(J = 245.1\) Hz, \(J = 249.9\) Hz), 128.0, 128.4, 128.7, 136.5. 

\(\text{IR (ATR, neat) } \nu(\text{cm}^{-1}):\) 3461, 2882, 1454, 1368, 1296, 1237, 1198, 1107. 

\(\text{HRMS (ESI+) } m/z: 281.0970 \text{ calcld for } [C_{13}H_{16}F_2O_3 + Na]^+: 281.0965\)
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene 314 and pentan-3-one as the substrates.

Oil.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 65 %

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 0.93 (m, 6H), 1.69 (m, 4H), 3.85 (t, $J$ = 13.6 Hz, 2H), 4.64 (s, 2H), 7.31-7.39 (m, 5H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −118.9 (t, $J$ = 13.5 Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 7.6, 25.6 (t, $J$ = 2.2 Hz), 69.4 (t, $J$ = 30.5 Hz), 74.4, 77.0 (t, $J$ = 23.3 Hz), 121.6 (t, $J$ = 250.2 Hz), 128.0, 128.3, 128.7, 137.0. IR (ATR, neat) ν (cm$^{-1}$): 3476, 2973, 2901, 2886, 1077, 1067, 1028. HRMS (El) m/z: 258.1442 calcd for [C$_{14}$H$_{20}$F$_2$O$_2$]$^+$: 258.1431
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene and cyclohexanone as the substrates.

White solid.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 60%

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ (ppm): 1.50-1.73 (m, 10H), 2.34 (s, 1H), 3.86 (t, $J = 13.6$ Hz, 2H), 4.64 (s, 2H), 7.29-7.38 (m, 5H). $^{19}$F NMR (376 MHz, CDCl$_3$) $\delta$ (ppm): $-119.5$ (t, $J = 13.5$ Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ (ppm): 20.7, 25.5, 30.4, 68.8 (t, $J = 30.6$ Hz), 73.8 (t, $J = 24.0$ Hz), 74.2, 121.5 (t, $J = 248.7$ Hz), 128.0, 128.3, 128.7, 137.0. IR (ATR, neat) $\nu$ (cm$^{-1}$): 3435, 2953, 2933, 2901, 2853, 1102, 1023. HRMS (EI) m/z: 270.1439 calcd for [C$_{15}$H$_{20}$F$_2$O$_2$]$^+$: 270.1431. mp = 55-56°C
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene and acetophenone as the substrates.

Oil.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 61 %

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 1.64 (s, 3H), 3.48-3.59 (m, 2H), 3.62 (s, 1H), 4.41 (d, $J = 12.0$ Hz, 1H), 4.46 (d, $J = 12.0$ Hz, 1H), 7.18-7.20 (m, 2H), 7.22-7.32 (m, 6H), 7.48-7.50 (m, 2H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): $-114.1$ (d, $J = 259.8$ Hz), $-117.4$ (d, $J = 259.8$ Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 23.7, 69.5 (dd, $J = 28.0$ Hz, $J = 32.8$ Hz), 74.3, 76.7 (t, $J = 24.4$ Hz), 120.4 (dd, $J = 243.8$ Hz, $J = 249.9$ Hz), 128.0, 127.8, 128.0, 128.2, 128.3, 128.7, 136.6, 141.6 (d, $J = 3.3$ Hz). IR (ATR, neat) ν (cm$^{-1}$): 3475, 2988, 2901, 1100, 1074, 1066, 1028. HRMS (El) m/z: 292.1268 calcd for [C$_{17}$H$_{18}$F$_2$O$_2$]$^+$ : 292.1263
12
67%
Prepared according to the general procedure using \((2\text{-bromo-2,2\text{-difluoroethoxy)methyl}benzene 314\) and benzophenone as the substrates.

**White solid.**

**Flash column chromatography 95:5 (Petroleum ether/diethyl ether)**

**Yield = 67 %**

\(^1\text{H NMR}\) (400 MHz, \(\text{C}_6\text{D}_6\)) \(\delta\) (ppm): 3.81 (t, \(J = 13.2\) Hz, 2H), 4.15 (s, 1H), 4.49 (s, 2H), 7.13-7.19 (m, 2H), 7.27-7.37 (m, 9H), 7.56-7.63 (m, 4H). \(^{19}\text{F NMR}\) (376 MHz, \(\text{C}_6\text{D}_6\)) \(\delta\) (ppm): −109.3 (t, \(J = 13.2\) Hz). \(^{13}\text{C NMR}\) (100 MHz, \((\text{CD}_3)_2\text{CO}) \(\delta\) (ppm): 69.7 (t, \(J = 24.7\) Hz), 74.3, 79.8 (t, \(J = 24.0\)), 123.5 (t, \(J = 253.5\) Hz), 128.2, 128.3, 128.3, 128.5, 129.0, 136.7, 142.8. **IR (ATR, neat)** \(\nu\) (cm\(^{-1}\)): 3061, 2944, 2866, 1496, 1450, 1157, 1142, 1063, 1047, 1031. **HRMS (ESI\(^+\))** \(m/z\): 377.1333 calcd for [\(\text{C}_{22}\text{H}_{20}\text{F}_{2}\text{O}_{2} + \text{Na}\)]\(^+\): 377.1329. \(\text{mp } = 120-121\)^\(^\circ\)C
$\text{BnO} \quad F \quad F \quad \quad 5 \quad (\text{X} = \text{OEt}) \quad 48\%$
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene 314 and ethyl acetate as the substrates.

Oil.

Flash column chromatography 98:2 (Petroleum ether/diethyl ether)

Yield = 48 %

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 2.37 (t, $J = 1.6$ Hz, 3H), 3.84 (t, $J = 12.4$ Hz, 2H), 4.59 (s, 2H), 7.29-7.38 (m, 5H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −114.2 (dt, $J = 1.5$ Hz, $J = 12.4$ Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 25.4, 68.6 (t, $J = 29.1$ Hz), 74.2, 115.2 (t, $J = 252.7$ Hz), 127.9, 128.2, 128.6, 136.8, 198.8 (t, $J = 29.8$ Hz). IR (ATR, neat) ν (cm$^{-1}$): 2988, 2972, 2901, 1745, 1101, 1066, 1057. HRMS (El) m/z: 214.0806 calcd for [C$_{11}$H$_{12}$F$_2$O$_2$]$^+$: 214.0805.
6 (X = OMe)
36%
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene and methyl benzoate as the substrates.

Oil.

Flash column chromatography 98:2 (Petroleum ether/diethyl ether)

Yield = 36%

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 4.04 (t, J = 13.6 Hz, 2H), 4.65 (s, 2H), 7.27-7.36 (m, 5H), 7.47-7.51 (m, 2H), 7.64 (tt, J = 1.6 Hz, J = 7.2 Hz, 1H), 8.10 (dd, J = 1.2 Hz, J = 8.4 Hz, 2H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): $-107.3$ (t, J = 13.2 Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 69.1 (t, J = 27.2 Hz), 74.3, 116.9 (t, J = 254.5 Hz), 127.9, 128.2, 128.6, 128.8, 130.2 (t, J = 4.0 Hz), 132.5 (t, J = 2.0 Hz), 134.5, 137.0, 189.6 (t, J = 28.7 Hz). IR (ATR, neat) ν (cm$^{-1}$): 2922, 2872, 1698, 1598, 1450, 1102. HRMS (ESI$^+$) m/z: 299.0865 calcd for [C$_{16}$H$_{14}$F$_2$O$_2$ + Na]$^+$ : 299.0860
\( \text{BnO} \quad \begin{array}{c} \text{F} \\ \text{Ph} \end{array} \quad \begin{array}{c} \text{F} \\ \text{O} \end{array} \quad 2 \quad (X = \text{OEt}) \quad 58\% \)
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene and ethyl phenylacetate as the substrates.

Oil.

Flash column chromatography 97:3 (Petroleum ether/diethyl ether)

Yield = 58%

\(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) (ppm): 3.86 (t, \(J = 12.4\) Hz, 2H), 4.03 (s, 2H), 4.58 (s, 2H), 7.24-7.40 (m, 10H). \(^19\)F NMR (376 MHz, CDCl\(_3\)) \(\delta\) (ppm): -113.8 (t, \(J = 13.2\) Hz). \(^13\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) (ppm): 44.2, 68.8 (t, \(J = 29.5\) Hz), 73.9, 115.6 (t, \(J = 252.7\) Hz), 126.9, 127.2, 127.7, 128.0, 129.7, 131.8, 136.6, 198.2 (t, \(J = 28.7\) Hz).
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene 314 and pivalaldehyde as the substrates.

Oil.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 74 %

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 1.07 (s, 9H), 2.36 (d, J = 7.2 Hz, 1H), 3.58-3.70 (m, 2H), 3.91 (ddd, J = 7.6 Hz, J = 11.2 Hz, J = 23.6 Hz, 1H), 4.61 (d, J = 12.0 Hz, 1H), 4.67 (d, J = 12.0 Hz, 1H), 7.28-7.42 (m, 5H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): 70.4 (tdd, J = 7.9 Hz, J = 24.1 Hz, J = 261.3 Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 26.9, 34.7, 70.4 (dd, J = 27.7 Hz, J = 36.9 Hz), 74.1, 76.6 (dd, J = 23.0 Hz, J = 28.8 Hz), 123.4 (t, J = 248.6 Hz), 128.0, 128.2, 128.7, 137.2.
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene and hexanal as the substrates.

Oil.

**Flash column chromatography 95:5 (Petroleum ether/diethyl ether)**

**Yield** = 40%

**$^1$H NMR** (400 MHz, CDCl$_3$) $\delta$ (ppm): 0.84-0.96 (m, 3H), 1.21-1.74 (m, 8H), 2.08 (d, $J = 6.8$ Hz, 1H), 3.72 (q, $J = 11.2$ Hz, 1H), 3.80-3.97 (m, 2H), 4.62 (s, 2H), 7.28-7.41 (m, 5H).

**$^{19}$F NMR** (376 MHz, CDCl$_3$) $\delta$ (ppm): $-114.9$ (dddd, $J = 6.8$ Hz, $J = 12.0$ Hz, $J = 18.4$ Hz, $J = 259.4$ Hz), $-120.2$ - $-121.1$ (m).

**$^{13}$C NMR** (100 MHz, CDCl$_3$) $\delta$ (ppm): 14.1, 22.6, 25.3, 29.5, 31.7, 68.9 (dd, $J = 29.5$ Hz, $J = 33.9$ Hz), 71.3 (t, $J = 26.6$ Hz), 74.1, 121.4 (t, $J = 245.7$ Hz), 128.0, 128.2, 128.7, 137.1.
F

\[ \text{TIPS} \]

21 (X = OEt)

48%
Prepared according to the general procedure using (3-bromo-3,3-difluoroprop-1-yn-1-yl)triisopropylsilane 324 and ethyl phenylacetate as the substrates.

**Oil.**

**Flash column chromatography 98:2 (Petroleum ether/diethyl ether)**

**Yield = 48 %**

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 1.06-1.15 (m, 21H), 4.05 (s, 2H), 7.20-7.23 (m, 2H), 7.27-7.37 (m, 3H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −93.6 (s). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 11.0, 18.5, 42.3, 94.9 (t, $J$ = 36.8 Hz), 97.3 (t, $J$ = 5.5 Hz), 106.9 (t, $J$ = 243.7 Hz), 127.7, 128.9, 129.8, 131.8, 193.2 (t, $J$ = 136.0 Hz). IR (ATR, neat) ν (cm$^{-1}$): 2945, 2868, 1763, 1463, 1187, 1144, 1072. HRMS (EI$^+$) m/z: 307.1319 calcd for [C$_{17}$H$_{22}$F$_2$OSi − C$_4$H$_7$]$^+$: 307.1329
Prepared according to the general procedure using (3-bromo-3,3-difluoroprop-1-yn-1-yl)triisopropylsilane 324 and benzophenone as the substrates.

**Oil.**

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 66%

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 0.93-1.01 (m, 21H), 2.86 (s, 1H), 7.28-7.34 (m, 6H), 7.55-7.62 (m, 4H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −90.0 (s). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 10.8, 18.3, 81.0 (t, $J = 25.8$ Hz), 94.4 (t, $J = 4.7$ Hz), 97.5 (t, $J = 36.7$ Hz), 114.0 (t, $J = 241.5$ Hz), 127.8, 127.9, 128.1, 140.3. IR (ATR, neat) ν (cm$^{-1}$): 2944, 2866, 1463, 1450, 1157, 1142, 1063, 1047, 1031. HRMS (ESI$^+$) m/z: 397.2158 calcd for [C$_{25}$H$_{30}$F$_2$ + H – H$_2$O]$^+$: 397.2163
Prepared according to the general procedure using (3-bromo-3-difluoroprop-1-yn-1-yl)triisopropylsilane 324 and ethyl δ-valerolactone as the substrates.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 73%

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 1.02-1.17 (m, 21H), 1.49-1.67 (m, 2H), 1.67-1.78 (m, 2H), 1.78-1.95 (m, 2H), 2.54 (brs, 1H), 3.75-3.83 (m, 1H), 3.93 (dt, $J = 3.6$ Hz, $J = 11.2$ Hz, 1H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −101.6 (d, $J = 274.9$ Hz), −104.1 (d, $J = 275.2$ Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 11.0, 18.1, 18.6, 24.8, 26.9, 62.1, 92.6 (t, $J = 5.5$ Hz), 95.6 (t, $J = 28.0$ Hz), 96.6 (t, $J = 37.1$ Hz), 112.3 (t, $J = 239.3$ Hz). IR (ATR, neat) ν (cm$^{-1}$): 3427, 2945, 2901, 1464, 1405, 1394, 1184, 1086, 1049, 1027. HRMS (ESI) m/z: 331.1908 calcd for [C$_{17}$H$_{30}$F$_2$O$_2$Si$-$H] : 331.1905
24 (X = OEt) 48%
Prepared according to the general procedure using (3-bromo-3,3-difluoroprop-1-yn-1-yl)benzene 323 and ethyl phenylacetate as the substrates.

Oil (mixture of ethyl phenylacetate and product).

Flash column chromatography 98:2 (Petroleum ether/diethyl ether)

Yield = 42 %

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 4.10 (s, 2H), 7.24-7.53 (m, 10H).  $^{19}$F NMR (376 MHz,CDCl$_3$) δ (ppm): −93.2 (s). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm) : 42.7, 78.1 (t, J = 38.2 Hz), 92.0 (t, J = 6.6 Hz), 108.1 (t, J = 243.7 Hz), 119.4, 127.7, 128.7, 128.9, 129.8, 130.7, 132.0, 132.5. IR (ATR, neat) ν (cm$^{-1}$): 2234, 1733, 1491, 1455, 1445, 1281, 1134, 1112, 1070, 1029. HRMS (ASAP$^+$) m/z: 271.0934 calcd for [C$_{17}$H$_{12}$F$_2$O+H]$^+$ : 271.0934
Prepared according to the general procedure using (3-bromo-3,3-difluoroprop-1-yn-1-yl)benzene \textbf{323} and benzophenone as the substrates.

\textbf{White solid.}

\textbf{Flash column chromatography 95:5 (Petroleum ether/diethyl ether)}

\textbf{Yield = 48 %}

\textbf{H NMR} (400 MHz, CDCl$_3$) $\delta$ (ppm) : 2.90 (s, 1H), 7.20-7.37 (m, 12H), 7.51-7.57 (m, 3H). \textbf{F NMR} (376 MHz, CDCl$_3$) $\delta$ (ppm): $-$88.9 (s). \textbf{C NMR} (100 MHz, CDCl$_3$) $\delta$ (ppm) : 80.9 (t, $J = 38.9$ Hz), 81.4 (t, $J = 25.8$ Hz), 90.2 (t, $J = 6.5$ Hz), 115.6 (t, $J = 241.9$ Hz), 126.2, 128.0, 128.2, 128.3, 128.6, 130.2, 132.2, 140.7. \textbf{IR} (ATR, neat) $\nu$ (cm$^{-1}$): 3543, 2244, 1490, 1448, 1292, 1279, 1144, 1123, 1113. \textbf{HRMS (ASAP')} m/z: 317.1142 calcd for [C$_{22}$H$_{16}$F$_2$O-OH]$^+$ : 317.1142. $mp = 82$-$83^\circ$C
Prepared according to the general procedure using (3-bromo-3,3-difluoroprop-1-yn-1-yl)benzene 323 and δ-valerolactone as the substrates.

Oil.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 56%

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ (ppm) : 1.55-1.98 (m, 6H), 3.82-3.89 (m, 1H), 3.99 (td, $J = 3.2$ Hz, $J = 11.2$ Hz, 1H), 7.32-7.46 (m, 3H), 7.51-7.58 (m, 2H). $^{19}$F NMR (376 MHz, CDCl$_3$) $\delta$ (ppm): −100.4 (d, $J = 274.1$ Hz), −102.9 (d, $J = 274.1$ Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ (ppm) : 18.1, 24.8, 26.9, 62.3, 79.3 (t, $J = 38.2$ Hz), 88.6 (t, $J = 6.2$ Hz), 95.8 (t, $J = 28.4$ Hz), 113.5 (t, $J = 239.3$ Hz), 120.1, 128.6, 130.2, 132.5. IR (ATR, neat) $\nu$ (cm$^{-1}$): 3427, 2945, 2901, 2868, 1464, 1405, 1394, 1184, 1086, 1049, 1027. HRMS (ASAP$^+$) m/z: 235.0938 calcld for [C$_{14}$H$_{14}$F$_2$O$_2$−OH]$^+$ : 235.0934
Prepared according to the general procedure using ((4-bromo-4,4-difluorobutoxy)methyl)benzene 317 and δ-valerolactone as the substrates.

Oil.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 63%

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm): 1.56-2.16 (m, 10H), 2.56 (t, $J$ = 2.4 Hz, 1H), 3.53 (t, $J$ = 6.0 Hz, 2H), 3.71-3.78 (m, 1H), 3.94 (td, $J$ = 3.6 Hz, $J$ = 11.6 Hz, 1H), 4.51 (s, 2H), 7.27-7.39 (m, 5H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −117.1 - −118.0 (m), −119.5 - −120.3 (m).
$^{19}$F $^{21}$OEt $^{21}$% (a)

BnO Ph
Prepared according to the general procedure using ((4-bromo-4,4-difluorobutoxy)methyl)benzene 317 and ethyl phenylacetate as the substrates.

Oil.

**Flash column chromatography 98.2 (Petroleum ether/diethyl ether)**

Yield = 21%

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 1.71-1.80 (m, 2H), 2.02-2.18 (m, 2H), 3.48 (t, $J = 6.0$ Hz, 2H), 3.97 (s, 2H), 4.48 (s, 2H), 7.17-7.39 (m, 10H). $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −106.3 (t, $J = 17.7$ Hz).
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene and acetyltrimethylsilane as the substrates.

**Liquid.**

**Flash column chromatography 90:10 (Petroleum ether/diethyl ether)**

Yield = 62%

^1H NMR (400 MHz, CDCl₃) δ (ppm) : 0.13 (s, 9H), 1.32 (s, 3H), 3.77-3.98 (m, 2H), 4.60 (d, J = 11.6 Hz, 1H), 4.65 (d, J = 11.6 Hz, 1H), 7.28-7.40 (m, 5H). ^19F NMR (376 MHz, CDCl₃) δ (ppm): −106.9 (td, J = 15.4 Hz, J = 259.8 Hz), −110.3 (td, J = 11.3 Hz, J = 260.2 Hz). ^13C NMR (100 MHz, CDCl₃) δ (ppm): −2.7, 20.0 (dd, J = 2.9 Hz, J = 6.9 Hz), 69.8 (dd, J = 30.9 Hz, J = 33.1 Hz), 69.9 (dd, J = 31.3 Hz, J = 31.6 Hz), 74.4, 124.2 (dd, J = 245.5 Hz, J = 245.5 Hz), 128.1, 128.3, 128.7, 137.1. **IR (ATR, neat)** ν (cm⁻¹): 3501, 2959, 1497, 1454, 1249, 1084. **HRMS (ESI⁺)** m/z: 311.1259 calcd for [C₁₄H₂₂F₂O₂Si + Na]^⁺: 311.1255
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene 314 and 3-phenyl-1-((trimethylsilyl)propan-1-one 345 as the substrates.

**Flash column chromatography 80:20 (Petroleum ether/diethyl ether)**

**Yield = 58 %**

**$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) :** 0.14 (s, 9H), 1.83-2.03 (m, 2H), 2.62-2.76 (m, 2H), 3.70-3.90 (m, 2H), 4.51 (d, $J = 11.6$ Hz, 1H), 4.58 (d, $J = 11.6$ Hz, 1H), 7.01-7.33 (m, 10H). **$^{19}$F NMR (376 MHz,CDCl$_3$) δ (ppm):** –102.9 (td, $J = 15.8$ Hz, $J = 263.9$ Hz), –106.8 (td, $J = 10.9$ Hz, $J = 264.3$ Hz). **$^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm):** –1.6, 30.7, 37.5, 70.2 (t, $J = 32.4$ Hz), 72.5 (t, $J = 30.2$ Hz), 74.4, 124.4 (t, $J = 246.2$ Hz), 126.1, 128.2, 128.3, 128.4, 128.6, 128.7, 136.8, 142.5. **IR (ATR, neat) ν (cm$^{-1}$):** 3497, 2955, 1720, 1496, 1454, 1249, 1095. **HRMS (ESI$^+$) m/z:** 379.1900 calcd for [C$_{21}$H$_{28}$F$_2$O$_2$Si + H]$^+$ : 379.1904.
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene 314 and 2-methyl-1-(trimethylsilyl)propan-1-one 344 as the substrates.

Liquid.

Purified by flash column chromatography 80:20 (Petroleum ether/diethyl ether).

Yield = 17 %

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ (ppm) : 0.11 (s, 9H), 0.93-1.05 (m, 6H), 1.98 (sept, $J$ = 7.2 Hz, 1H), 2.46 (s, 1H), 3.64-3.91 (m, 2H), 4.51 (d, $J$ = 11.6 Hz, 1H), 4.57 (d, $J$ = 12.0 Hz, 1H), 7.19-7.33 (m, 5H). $^{19}$F NMR (376 MHz, CDCl$_3$) $\delta$ (ppm): −97.8 (dt, $J$ = 16.5 Hz, $J$ = 267.0 Hz), −103.3 (dt, $J$ = 10.9 Hz, $J$ = 266.6 Hz).

$^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ (ppm): −0.07, 18.3 (d, $J$ = 4.6 Hz), 19.2 (d, $J$ = 1.7 Hz), 34.7 (d, $J$ = 5.1 Hz), 70.8 (dd, $J$ = 29.4 Hz, $J$ = 32.4 Hz), 74.4, 75.8 (t, $J$ = 29.1 Hz), 125.2 (dd, $J$ = 245.5 Hz, $J$ = 248.9 Hz), 128.0, 128.2, 128.7, 137.0. IR (ATR, neat) $\nu$ (cm$^{-1}$): 3511, 2958, 2889, 1390, 1249, 1090. HRMS (Fl$^+$) m/z: 316.1651 calcd for [C$_{16}$H$_{26}$F$_2$O$_2$Si]$^+$ : 316.1670.
F F
\text{OBn} \text{OH}
\text{Si(\text{-Bu})Me}_2

30
31\%
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene 314 and 1-(tert-butylimethylsilyl)ethan-1-one 349 as the substrates.

Liquid.

Purified by flash column chromatography 80:20 (Petroleum ether/diethyl ether).

Yield = 31%

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 0.10 (s, 6H), 0.98 (s, 9H), 1.38 (s, 3H), 3.78-3.99 (m, 2H), 4.60 (d, $J$ = 11.9 Hz, 1H), 4.66 (d, $J$ = 11.9 Hz, 1H), 7.18-7.40 (m, 5H).  $^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −104.9 (dt, $J$ = 16.2 Hz, $J$ = 258.4 Hz), −109.3 (dt, $J$ = 10.8 Hz, $J$ = 258.2 Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): −6.1 (t, $J$ = 1.4 Hz), −5.9 (t, $J$ = 1.9 Hz), 18.5, 21.7 (dd, $J$ = 1.7 Hz, $J$ = 7.6 Hz), 27.6, 69.8 (dd, $J$ = 30.8 Hz, $J$ = 33.6 Hz), 71.6 (dd, $J$ = 32.1 Hz, $J$ = 34.5 Hz), 74.3, 124.0 (t, $J$ = 245.6 Hz), 128.1, 128.3, 128.7, 137.0. IR (ATR, neat) ν (cm$^{-1}$): 3506, 2930, 2857, 2028, 1453, 1363, 1250, 1205, 1079, 1027. HRMS (ESI$^+$) m/z: 331.1905 calcd for [C$_{17}$H$_{28}$F$_2$O$_2$Si+H]$^+$ : 331.1904.
Prepared according to the general procedure using ((2-bromo-2,2-difluoroethoxy)methyl)benzene 314 and 1-(triethylsilyl)ethan-1-one 350 as the substrates.

Liquid.

Purified by flash column chromatography 90:10 (Petroleum ether/diethyl ether).

Yield = 42 %

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 0.72 (q, J = 7.6 Hz, 6H), 1.00 (t, J = 8.0 Hz, 9H), 1.34 (s, 3H), 3.77-3.97 (m, 2H), 4.60 (d, J = 11.6 Hz, 1H), 4.66 (d, J = 11.6 Hz, 1H), 7.27-7.40 (m, 5H).

$^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −106.4 (dt, J = 16.2 Hz, J = 259.1 Hz), −110.0 (dt, J = 11.3 Hz, J = 259.1 Hz).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): 2.6, 7.8, 21.1 (dd, J = 1.5 Hz, J = 7.7 Hz), 69.6 (t, J = 32.4 Hz), 71.3 (t, J = 33.1 Hz), 74.3, 124.0 (t, J = 245.0 Hz), 128.1, 128.2, 128.7, 137.0.
The image contains a chemical structure of compound 34 with a yield of 54%. The structure includes fluoro functionality, a hydroxyl group, and a trimethylsilyl group. The 1H NMR spectrum is shown, with peaks at various ppm values, indicating the chemical shift positions of the hydrogen atoms in the compound. The 13C NMR spectrum is also included, showing carbon shifts at different ppm values.
Prepared according to the general procedure using 2-(bromodifluoromethyl)benzoxazole \textbf{331} and acetyltrimethylsilane as the substrates.

Yellow solid.

**Flash column chromatography 90:10 (Petroleum ether/diethyl ether)**

**Yield = 54 %**

\textbf{\textsuperscript{1}H NMR} (400 MHz, CDCl\textsubscript{3}) \(\delta\) (ppm) : 0.19 (s, 9H), 1.43 (s, 3H), 2.89 (s, 1H), 7.39-7.50 (m, 2H), 7.60-7.67 (m, 1H), 7.78-7.86 (m, 1H). \textbf{\textsuperscript{19}F NMR} (376 MHz, CDCl\textsubscript{3}) \(\delta\) (ppm): −100.2 (d, \(J = 276.7\) Hz), −104.3 (d, \(J = 277.5\) Hz). \textbf{\textsuperscript{13}C NMR} (100 MHz, CDCl\textsubscript{3}) \(\delta\) (ppm): −2.8, 19.9 (d, \(J = 6.9\) Hz), 70.2 (t, \(J = 32.0\) Hz), 111.5, 119.6 (t, \(J = 243.6\) Hz), 121.3, 125.5, 126.9, 139.8, 150.3, 157.4 (t, \(J = 35.6\) Hz). \textbf{IR (ATR, neat) \(\nu\) \(\text{cm}^{-1}\)}: 3403, 2969, 1455, 1322, 1299, 1250, 1099. \textbf{HRMS (ESI\textsuperscript{+})} \(m/z\): 286.1075 calcd for \([\text{C}_{13}\text{H}_{17}\text{F}_{2}\text{NO}_{2}\text{Si}+\text{H}]^{+}\): 286.1069. \textbf{mp = 77-78°C}
Prepared according to the general procedure using 3-bromo-3,3-difluoroprop-1-ene and acetyltrimethylsilane as the substrates.

Yellow liquid.

Flash column chromatography 95:5 (Petroleum ether/diethyl ether)

Yield = 31 %

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ (ppm) : 0.11-0.17 (m, 9H), 1.23-1.25 (m, 3H), 5.48-5.54 (m, 1H), 5.62-5.70 (m, 1H), 5.97-6.12 (m, 1H). $^{19}$F NMR (376 MHz, CDCl$_3$) $\delta$ (ppm): $-103.4$ (dd, $J = 10.9$ Hz, $J = 245.1$ Hz), $-106.7$ (dd, $J = 12.8$ Hz, $J = 245.1$ Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ (ppm): $-2.7$, $19.7$ (dd, $J = 3.1$ Hz, $J = 6.0$ Hz), $69.7$ (dd, $J = 3.3$ Hz, $J = 3.4$ Hz), $120.5$ (dd, $J = 9.4$ Hz, $J = 9.4$ Hz), $124.0$ (t, $J = 241.5$ Hz), $130.4$ (dd, $J = 27.0$ Hz, $J = 27.0$ Hz).
Prepared according to the general procedure using (3-bromo-3,3-difluoroprop-1-yn-1-yl)triisopropylsilane 324 and acetyltrimethylsilane as the substrates.

Yellow liquid.

Flash column chromatography 98:2 (Petroleum ether/diethyl ether)

Yield = 46%

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 0.17 (s, 9H), 1.00-1.19 (m, 21H), 1.36 (s, 3H), 1.57 (brs, 1H).

$^{19}$F NMR (376 MHz, CDCl$_3$) δ (ppm): −88.3 (d, $J = 272.6$ Hz), −89.6 (d, $J = 273.0$ Hz).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): −2.6, 11.1, 18.6, 20.9, 70.1 (dd, $J = 32.0$ Hz and $J = 34.2$ Hz), 92.4 (t, $J = 5.8$ Hz), 97.6 (t, $J = 40.0$ Hz), 118.4 (t, $J = 234.6$ Hz).

IR (ATR, neat) ν (cm$^{-1}$): 2945, 2867, 1697, 1463, 1251, 1157, 1039.

HRMS (El$^+$) m/z: 348.2091 calcd for [C$_{17}$H$_{34}$F$_2$OSi]$^+$: 348.2116
Prepared according to the general procedure using (3-bromo-3,3-difluoroprop-1-yn-1-yl)benzene 323 and acetyltrimethylsilane as the substrates.

**Yellow liquid.**

**Flash column chromatography 90:10 (Petroleum ether/diethyl ether)**

**Yield = 46 %**

$^1$H NMR (400 MHz, CDCl$_3$) δ (ppm) : 0.20 (s, 9H), 1.42 (s, 3H), 7.33-7.45 (m, 3H), 7.49-7.55 (m, 2H). $^{19}$F NMR (376 MHz,CDCl$_3$) δ (ppm): –88.9 (d, J = 270.3 Hz), –90.4 (d, J = 270.3 Hz). $^{13}$C NMR (100 MHz, CDCl$_3$) δ (ppm): –2.7, 20.5, 70.7 (t, J = 31.7 Hz), 80.7 (t, J = 40.8 Hz), 88.9 (t, J = 6.6 Hz), 119.0 (t, J = 234.9 Hz), 120.4, 128.7, 130.1, 132.3. IR (ATR, neat) ν (cm$^{-1}$): 3460, 2961, 2239, 1490, 1278, 1250, 1134, 1072, 1031. **Elemental analysis** calculated : 62.66 (%C); 6.76 (%H) found : 62.93 (%C); 7.01 (%H).