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## General Experimental Details

Solvents and reagents were used as obtained from commercial sources and without purification. Tetrabutylammonium acetate was sourced from Sigma Aldrich. Infrared spectra were obtained for novel compounds and were measured on a Perkin Elmer Spectrum Two spectrometer, using universal ATR sampling accessories. Column chromatography was carried out using 60 Å (35–70 µm) silica. Thin-layer chromatography (TLC) was carried out on precoated silica gel plates (Merck 60 PF254). The developed plates were visualized under UV light. High-resolution precise mass spectra (HRMS) were recorded on a Waters LCT Premier time of flight (TOF) LC-MS instrument in University College Cork. Samples were run in electrospray ionization (ESI) mode using 50% acetonitrile/water containing 0.1% formic acid as an eluent; samples were made up at a concentration of *ca*. 1 mg $mL^{-1}$. Acquisitions were internally calibrated using sodium formate clusters. Low resolution mass spectra were recorded on a Waters Quattro Micro triple quadrupole spectrometer (QAA1202) in electrospray positive ionisation mode (ESI+) using acetonitrile:water (1:1) containing 0.1% formic acid as eluent. Nuclear magnetic resonance (NMR) samples were run using deuterated chloroform ($CDCl_3$) as solvent unless otherwise stated. $^1$H NMR (600 MHz), $^1$H NMR (500 MHz), $^1$H NMR (400 MHz), and $^1$H NMR (300 MHz) spectra were recorded on Bruker Avance III 600, Bruker Avance 500, Bruker Avance 400, and Bruker Avance III 300 NMR spectrometers, respectively, in proton-coupled mode using tetramethysilane (TMS) as the internal standard. Signal assignments were supported by COSY (correlation spectroscopy) or HMBC (Heteronuclear Multiple-Bond Correlation spectroscopy) NMR spectroscopic experiments where necessary. $^{13}$C NMR (150 MHz), $^{13}$C NMR (125 MHz), $^{13}$C NMR (100 MHz), and $^{13}$C NMR (75 MHz) spectra were recorded on Bruker Avance III 600, Bruker Avance 500, Bruker Avance 400, and Bruker Avance III 300 NMR spectrometers, respectively, in proton-decoupled mode at 300 K using TMS as the internal standard. All spectra were assigned with the aid of DEPT (Distortionless Enhancement by Polarisation Transfer) experiments run in DEPT-90, DEPT-135 and DEPT-q modes when necessary. Specific assignments were made using HSQC (Heteronuclear Single Quantum Correlation) and HMBC (Heteronuclear Multiple Bond Correlation) NMR spectroscopic experiments. All spectroscopic data for known compounds is in agreement with those previously reported unless otherwise stated. $^{19}$F NMR (282 MHz), $^{19}$F NMR (376 MHz) and $^{19}$F NMR (471 MHz) spectra were recorded on a Bruker Avance III 300 NMR spectrometer, Bruker Avance 400, and Bruker Avance 500 in proton-decoupled mode at 300 K. All spectra were run at University College Cork. Chemical shifts (δ) are expressed as parts per million (ppm), positive shift being downfield from TMS; coupling constants (*J*) are expressed in hertz (Hz). Splitting patterns in $^1$H NMR spectra are designated as follows: s (singlet), br s (broad singlet), d (doublet), dd (doublet of doublets), ddd (doublet of doublets of doublets), t (triplet), td (triplet of doublets), q (quartet), quin (quintet), and m (multiplet). Melting points were measured in a Thomas

Hoover Capillary Melting Point apparatus and are uncorrected. The COware apparatus was purchased from Sigma Aldrich and the hydrogen pressure was estimated using the *PV = nRT* formula. It is worth noting that a 20 mL COware apparatus was used for these experiments. The COware apparatus has two chambers that are connected by a glass bridge, allowing for *ex situ* gas to be generated in one chamber which can then interact with the reaction mixture in the second chamber Warning: pressurised reaction vessel (**Figure 1S**). These can be annotated as chamber 'A' and chamber 'B'.

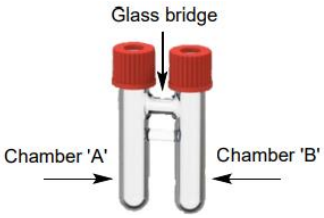



**Figure 1S**: COware apparatus and set-up.

The procedure followed to synthesise the benzofuroquinoline substrates depended on availability of starting materials at the time (see General Procedures below). Benzofuroquinoline substrates **1e**, **1k**, **1l**, **1o**, **3a** and **S1** (**Figure 2s**) were synthesised during previous work in the group (see reported procedures) and were provided as starting materials for this work.[24a,b]

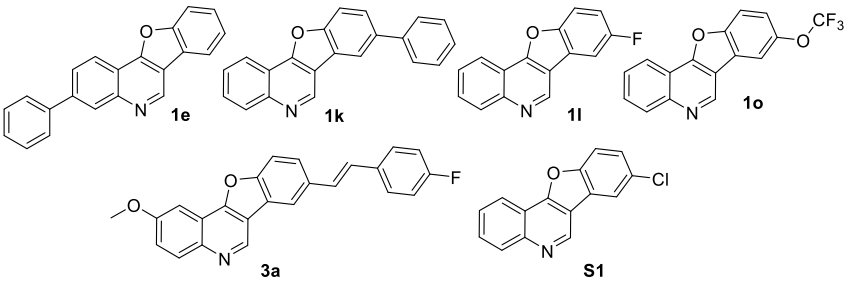


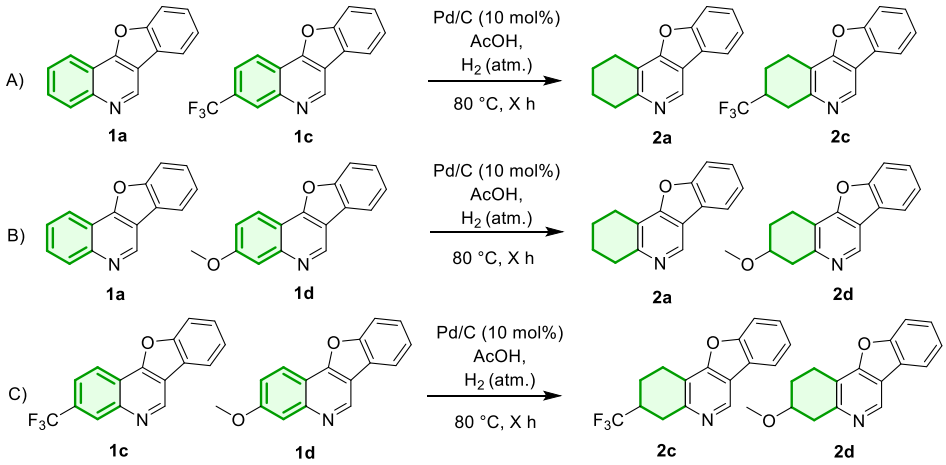

**Figure 2S**: Benzofuroquinoline substrates **1e**, **1k**, **1l**, **1o**, **3a** and **S1**.

Additional Experiments:

## Competition Experiments (See substrate scope in main manuscript)

A series of competition experiments were carried out to determine the effect of electron withdrawing or electron donating groups on the rate of reaction (in comparison to unsubstituted benzofuroquinoline) (**Table 1S**). Comparing **1c and 1d** to **1a**, it was found that **1a** reduced faster on both occasions.

**Table 1S***:* Competition experiments between unsubstituted, electron-withdrawing and electron donating group containing benzofuroquinolines.

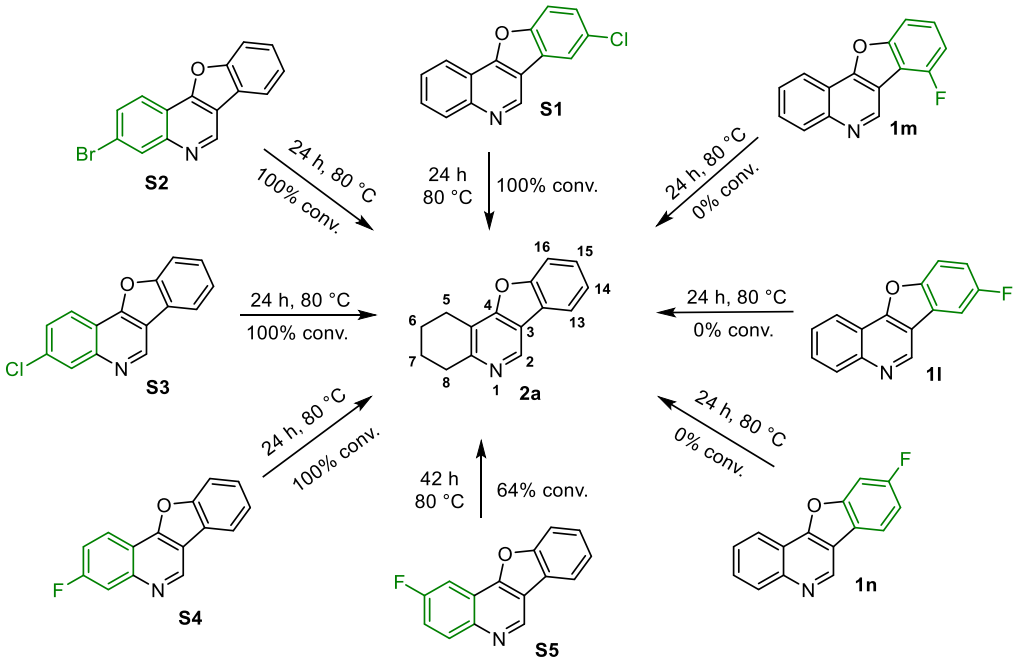



| Reaction | 4 h (conv. %)[a] | | 24 h (conv. %)[a] | |
|---|---|---|---|---|
| **A** | **2a** | **2c** | **2a** | **2c** |
| | 100 | 5 | 100 | 48 |
| **B** | **2a** | **2d** | **2a** | **2d** |
| | 100 | 15 | 100 | 85 |
| **C** | **2c** | **2d** | **2c** | **2d** |
| | 6 | 17 | 48 | 87 |

[a] Conversion determined by $^{1}$H NMR analysis at both 4 hours and 24 hours.

Additionally, **1c** had a slower reaction rate than **1d**. These results indicate that the rate of the hydrogenation reaction is reduced with substitution and is reduced more by the presence of the electron withdrawing substituents, in comparison to the electron donating group. the 7-position.

Hydrodehalogenation (See substrate scope in main manuscript)



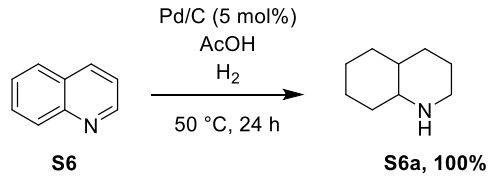

**Scheme 1S**: Hydrodehalogenation of chlorine, bromine and fluorine substituents on the A- and D-ring of benzofuroquinoline under the standard reaction conditions. Reaction conditions: 10 mol% Pd/C, $H_2$ (balloon), AcOH. All conversions determined using $^1$H NMR analysis.

Reactions were undertaken as per general procedure 5. Full hydrodehalogenation to unsubstituted benzofuroquinoline **2a** is observed for 7-bromobenzofuroquinoline **S2**, 7-chlorobenzofuroquinoline **S3** and 7-fluorobenzofuroquinoline **S4** (**Scheme 1S**). For **S5**, only 65% conversion to the A-ring reduced, defluorinated **2a** was observed, with the remaining reaction mixture being starting **S5**. D-ring substitution was more robust towards hydrodefluorination (see **1l, 1m, 1n**), however the chorine atom was fully cleaved in **S1**.

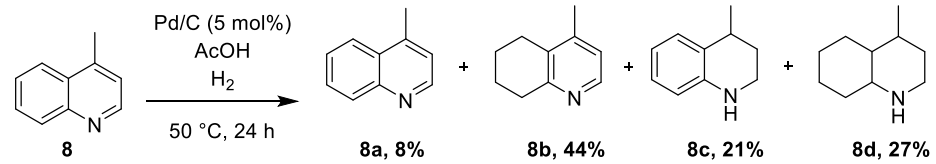
## Hydrogenation of Substituted Quinolines (See scheme 5 in main manuscript)

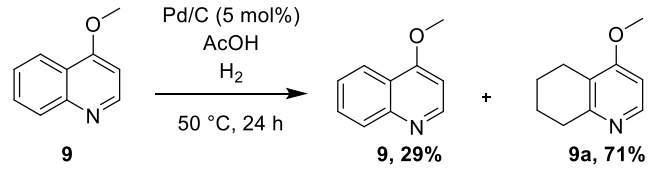
All reactions were carried out as per general procedure 5. All percentages are conversions from the respective quinoline starting material. All conversions were determined using $^{1}H$ NMR analysis of starting materials and products.

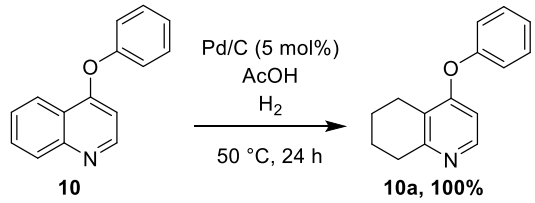
**Unsubstituted quinoline**



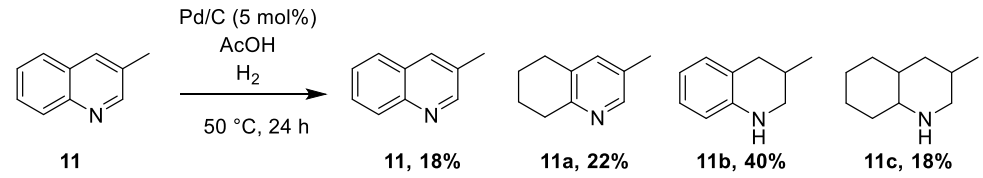

***C*-4 substituted quinolines**

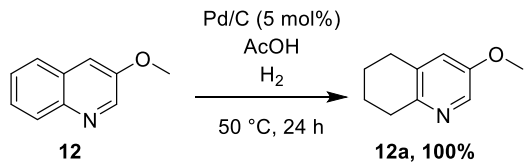


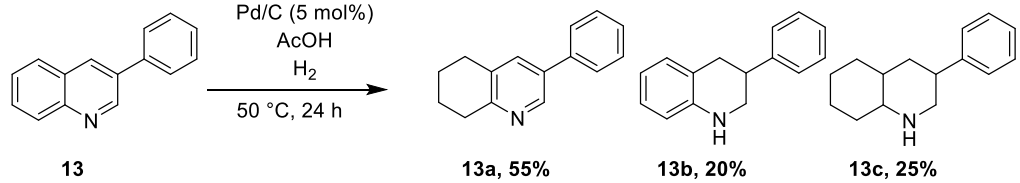



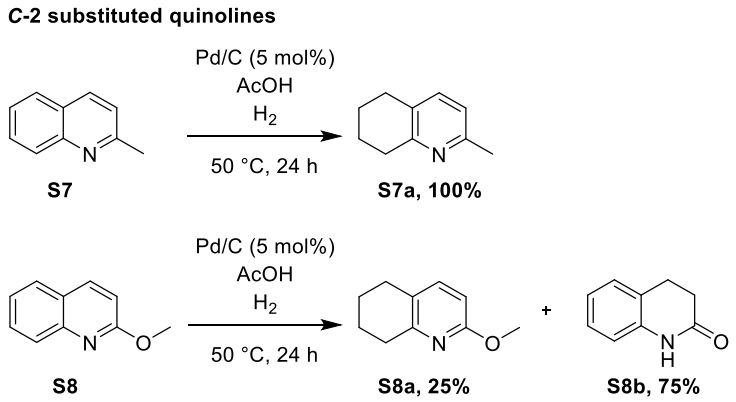




***C*-3 substituted quinolines**



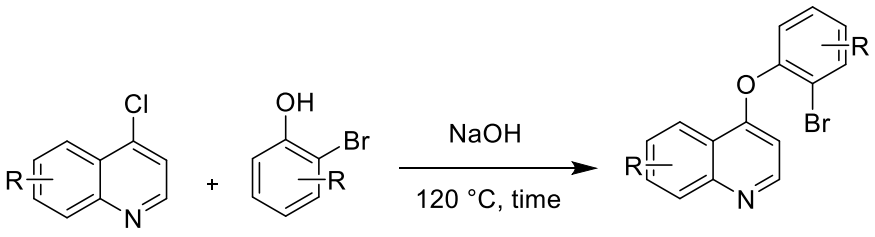



**Scheme 2S*:*** Mechanistic Insights: Expansion on products formed from the hydrogenation of *C*-2, *C*-3 and *C*-4 substituted quinolines.

In addition to the *C*-4 and *C*-3 positions discussed in the main manuscript, the *C*-2 position was also investigated. Reactions were undertaken with *C*-2 substituted **S7** and **S8** as per general procedure 5. In this case, both quinolines showed reduction at both hetero- and carbocycle reduction although only one contains an oxygen heteroatom. This may be due to strenuous conditions required to reduce the heterocyclic ring with *C*-2 substitution. The reduction of **S8** gave a mixture of reduced carbocycle **S8a** and reduced cyclic amide **S8b** while retaining the aromatic carbocyclic ring.

General Procedures

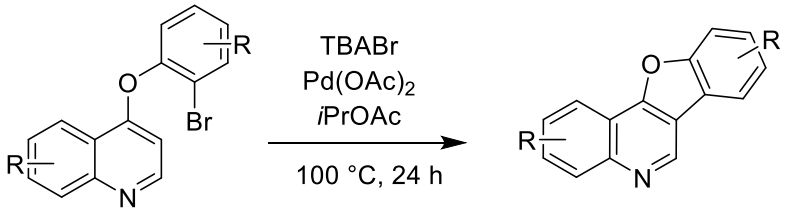
## General Procedure 1: Synthesis of phenoxyquinoline starting materials




A mixture of the 4-chloroquinoline substrate (1 eq.), the phenol (3.5 eq.) and NaOH (1.5 eq., crushed pellets) was stirred at 120 °C until TLC analysis indicated the reaction was complete (2 – 24 hours). The reaction mixture was cooled to room temperature and 10% aqueous NaOH was added and stirred for 30 min. The aqueous layer was extracted with DCM. The organic layers were combined and washed with 6M NaOH, water and brine, dried over $MgSO_4$, filtered, and concentrated in vacuo. Impure products were purified by column chromatography over silica gel using cyclohexane:EtOAc (100:0 - 70:30) or DCM:EtOAc (100:0 - 97:3).

## General Procedure 2: Synthesis of benzofuroquinolines using tetrabutylammonium bromide [24c]

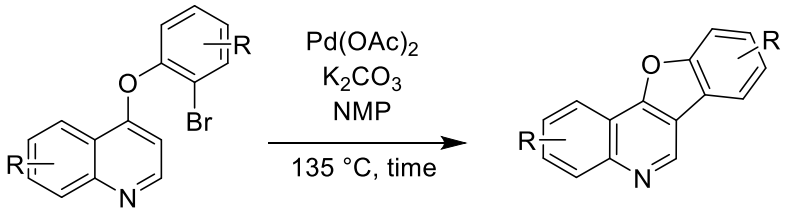
The procedure followed to synthesise the benzofuroquinoline substrates depended on availability of starting materials at the time.




To a screw capped vial was added the phenoxyquinoline substrate (1 eq.), $Pd(OAc)_2$ (5 mol%), tetrabutylammonium bromide (2 eq.), $K_2CO_3$ (2 eq) in isopropyl acetate (1.5 mL/ mmol) which was stirred at 100 °C for 24 hours. The crude reaction mixture was loaded directly onto silica gel for purification by column chromatography and eluted in DCM:EtOAc (100:0 – 95:5).

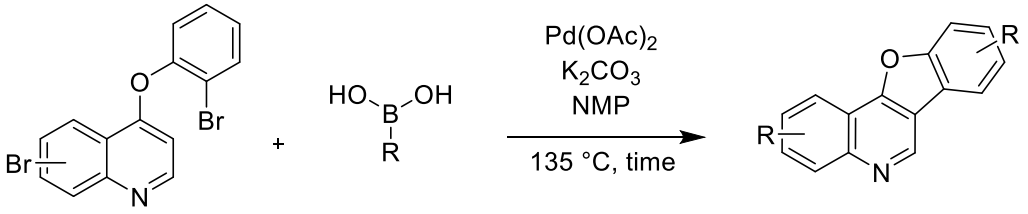
## General procedure 3: Synthesis of benzofuroquinolines using NMP[24a]

The procedure followed to synthesise the benzofuroquinoline substrates depended on availability of starting materials at the time.



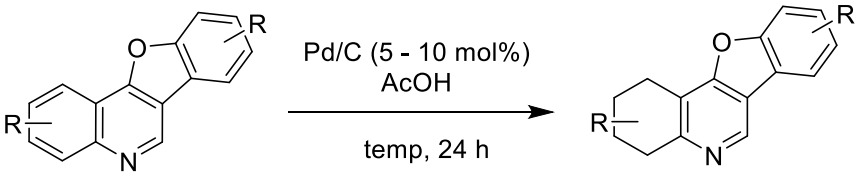

To a screw capped vial was added the phenoxyquinoline substrate (1 eq.), $Pd(OAc)_2$ (5 mol%), $K_2CO_3$ (2 eq.) in NMP (1.5 mL/ mmol) which was stirred at 135 °C and monitored by $^1H$ NMR. Upon reaction completion, the crude reaction mixture was filtered through celite, concentrated *in vacuo* and then loaded onto silica gel for purification by column chromatography and eluted in DCM:EtOAc (100:0 – 95:5).

## General procedure 4: Synthesis of benzofuroquinolines with Suzuki coupling using NMP[24b]




To a screw capped vial was added the di-brominated phenoxyquinoline substrate (1 eq.), $Pd(OAc)_2$ (5 mol%), $K_2CO_3$ (2 eq.), boronic acid (1.1 eq) in NMP (1.5 mL/ mmol) which was stirred at 135 °C and monitored by $^1H$ NMR. Upon reaction completion, the crude reaction mixture was filtered through celite, concentrated *in vacuo* and then loaded onto silica gel for purification by column chromatography and eluted in DCM:EtOAc (100:0 – 95:5).

## General Procedure 5: Hydrogenation of benzofuroquinolines

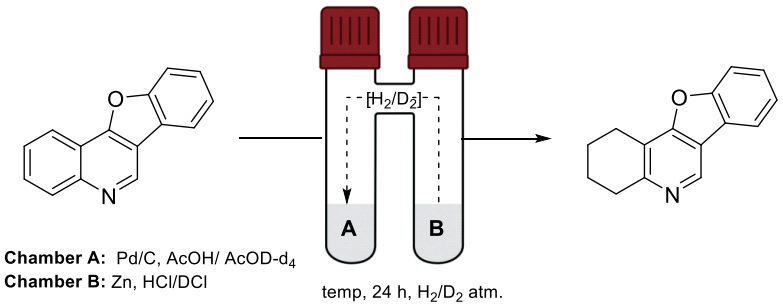



The benzofuroquinoline substrate (1 eq.) and Pd/C (10 wt%, 10 mol% [unless otherwise stated]) was added to the reaction tube, in acetic acid (6 mL/mmol). The reaction tube was sealed with a rubber septum and purged with $N_2$ before purging with $H_2$ *via* balloon and needle. The reaction was stirred under a $H_2$ atmosphere and heated to the desired temperature for 24 hours (unless otherwise stated). The reaction mixture was diluted with DCM and filtered through Celite. Water was added, and the filtrate was neutralised with solid $NaHCO_3$. The aqueous phase was then extracted with DCM and the combined organic phases were washed with sat. $NaHCO_3$, water, and brine, then dried over $MgSO_4$, filtered, and concentrated *in vacuo* to give the product. When necessary, chromatographic purification

was carried out by flash column chromatography in DCM/EtOAc (100:0 – 95:5) or DCM/MeOH (100:0 – 98:2).

Deuteration experiments

## General Procedure 6: Synthesis of deuterated benzofuroquinoline generating $D_2$ at 4 atm.

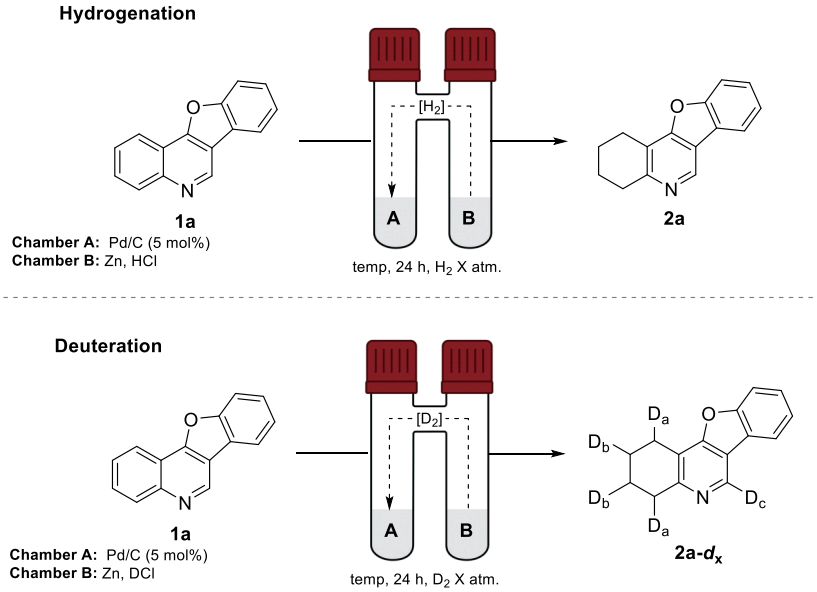



To chamber 'A' of the COware[28] apparatus was put the benzofuroquinoline substrate (1 eq.), Pd/C (10 %wt, 5 mol%) and AcOH/AcOD-$d_4$. To the second chamber 'B' was added zinc powder (6.8 eq.). Chamber 'A' was placed into an oil bath at 80 °C and HCl/DCl (4M, 13.6 eq.) was added via syringe to chamber 'B' which initiated the $D_2$ formation and reaction was let stir at 80 °C for 24 hours. The reaction mixture was diluted with DCM and filtered through Celite. Water was added, and the filtrate was neutralised with solid $NaHCO_3$. The aqueous phase was then extracted with DCM and the combined organic phases were washed with $NaHCO_3$, water, and brine, then dried over $MgSO_4$, filtered, and concentrated *in vacuo* to give the product. Chromatographic purification was carried out by flash column chromatography in DCM/EtOAc (100:0 – 97:3).

## Optimisation of COware Apparatus (See Scheme 4 in main manuscript)

Reactions were carried out as per general procedure 6. Initial use of the COware involved optimising hydrogenation conditions of benzofuroquinoline **1a** using HCl and Zn to form $H_2$ gas (Table **2S**, entries 1 – 3). It was found that an increase from 50 °C to 80 °C was necessary to achieve full reduction to **2a** in the COware apparatus at 4 atm. HCl was then replaced with DCl to generate $D_2$ gas and form the deuterated products **2a-*d*$_x$** (entries 4 – 6).

**Table 2S*:*** Optimisation of hydrogenation and deuteration in COware apparatus.




| Entry | Temp °C | Pressure Atm. | Gas source | Solvent | Zn | Conv. to 2a/2a-$d_x$ % | $D_2$ incorp[b] | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Hydrogenation | | | | | | |
| 1 | 50 | 3 | HCl | AcOH | Yes | 40 | NA | | |
| 2 | 50 | 4 | HCl | AcOH | Yes | 60 | NA | | |
| 3 | 80 | 4 | HCl | AcOH | Yes | 100 | NA | | |
| | | | Deuteration | | | | $D_a$ | $D_b$ | $D_c$ |
| 4 | 80 | 4 | DCl | AcOH | Yes | 99 | 0 | 0 | 43 |
| 5 | 80 | 4 | DCl | AcOD-$d_4$ | Yes | 100 | 100 | 100 | 98 |
| 6 | 80 | 4 | HCl | AcOD-$d_4$ | Yes | 100 | 68 | 50 | 46 |
| 7 | 80 | 4 | DCl | AcOH | No | 0 | NA | NA | NA |

[a]Conversion determined using $^1$H NMR analysis of **1a** and **2a**/**2a-*d*$_x$**.[b] Deuterium incorporation was determined by $^1$H NMR analysis.

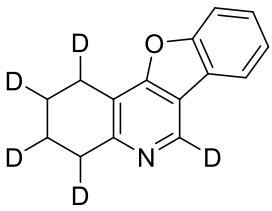
Using DCl and Zn to generate $D_2$ gas, we observed full reduction of the A-ring in AcOH at 80 °C. However, unexpectedly, deuterium incorporation was *only* observed at the *C*-2 position (labelled $D_c$) with 43% incorporation. There was no deuterium incorporation on the newly reduced carbocyclic ring (entry 4). To investigate further, we carried out the same reaction using AcOD-$d_4$ and found near full incorporation of deuterium (**2a-*d*$_5$**: $D_a$, 100%; $D_b$, 100%, $D_c$ 98%), in 94% isolated yield (entry 5). We then wondered if replacing $D_2$ gas with $H_2$ gas, and AcOD-$d_4$ as solvent, would maintain full deuterium incorporation in the carbocyclic ring. These conditions led to partial deuterium incorporation across each site ($D_a$, 68%; $D_b$, 50%, $D_c$ 46%) (entry 6). This tells us that both the solvent and the gas are

important sources of hydrogens/deuteriums this reaction. No reduction takes place in the absence of $H_2$ or $D_2$ gas in the COware apparatus (entry 7).

## Characterisation of Deuterated benzofuroquinoline

**1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinoline-1,2,3,4,6-$d_5$ (2a-$d_5$)**

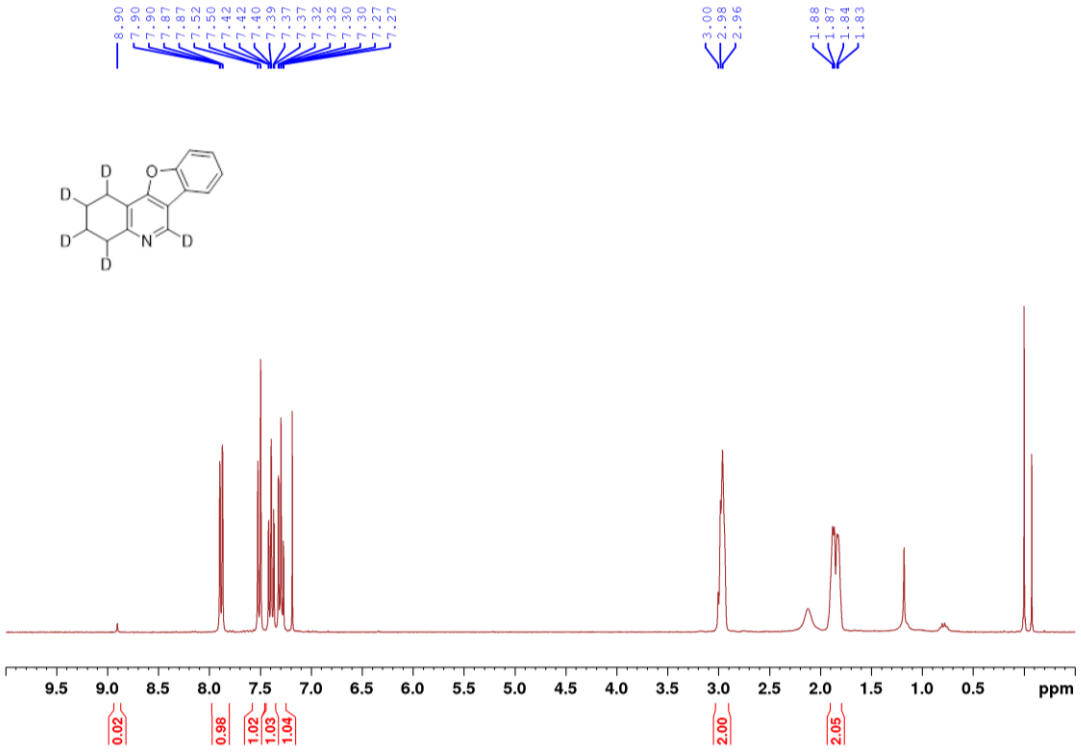
Synthesis of substrate **2a-$d_5$** as per general procedure 6 using **1a** (0.050 g, 0.23 mmol), Pd/C (12.2 mg, 0.023 mmol), AcOD-$d_4$ (1.10 mL) in chamber A and Zn (0.102 g, 1.56 mmol, 6.8 eq.) and DCl (4M, 0.78 mL, 3.12 mmol, 13.6 eq.) in chamber B.



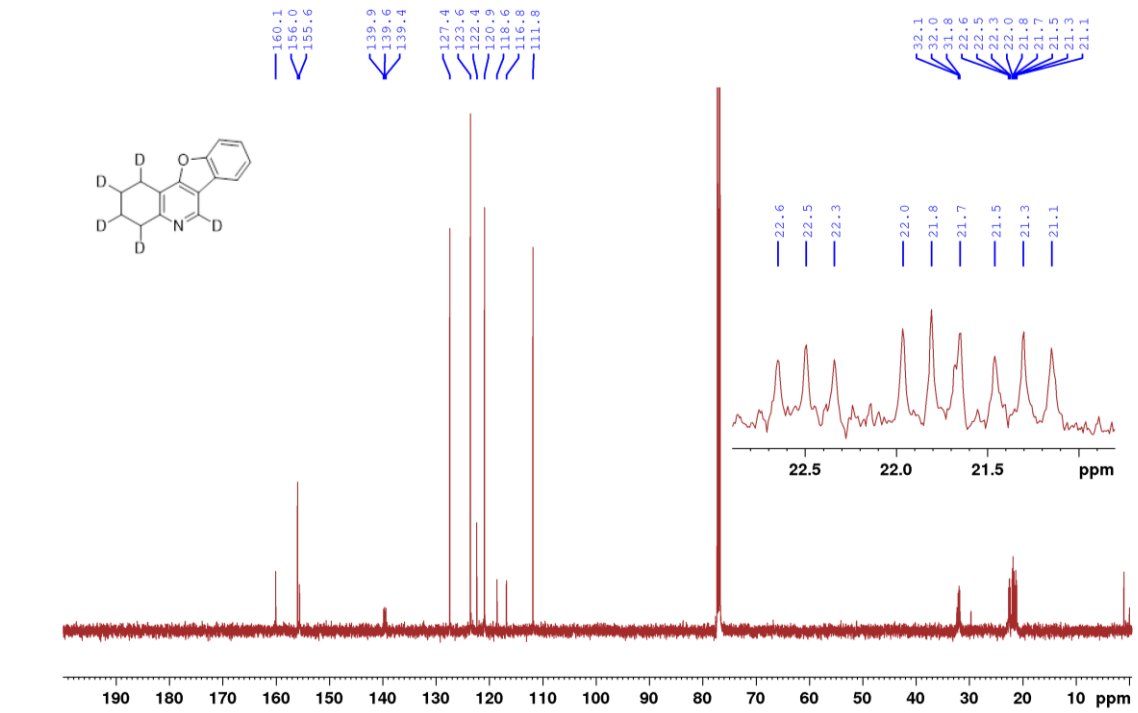
White solid; 89% (0.046 g); **m.p**. 146 – 148 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2961, 2926, 2851, 1558, 1392, 1191, 1011; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.90 (s, 1H), 7.89 (dd, 1H, *J* = 0.9, 7.5 Hz), 7.51 (d, 1H, *J* = 8.2 Hz), 7.40 (td, 1H, *J* = 1.4, 7.5 Hz), 7.36 (td, 1H, *J* = 0.9, 7.5 Hz), 3.03 – 2.90 (m, 2H), 1.93 – 1.78 (m, 2H) ppm; **$^2$H NMR (500 MHz, $CDCl_3$)** δ = 8.89 (br s), 2.93 (br s) 1.81 (br s) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 156.0 (q*C*), 155.6 (q*C*), 139.6 (t, $J_D$ = 28 Hz, *C*D/H), 127.4 (*C*H), 123.6 (*C*H), 122.4 (q*C*), 121.0 (*C*H), 118.6 (q*C*), 116.8 (q*C*), 111.8 (*C*H), 32.0 (t, $J_D$ = 20 Hz, *C*H/D), 22.5 (t, $J_D$ = 20 Hz, *C*H/D), 21.8 (t, $J_D$ = 20 Hz, *C*H/D), 22.0 (t, $J_D$ = 20 Hz, *C*H/D) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. For $[C_{15}H_9D_5NO]^+$: 229.1384; found: 229.1381.

## NMR Spctra of deuterated benzofuroquinoline

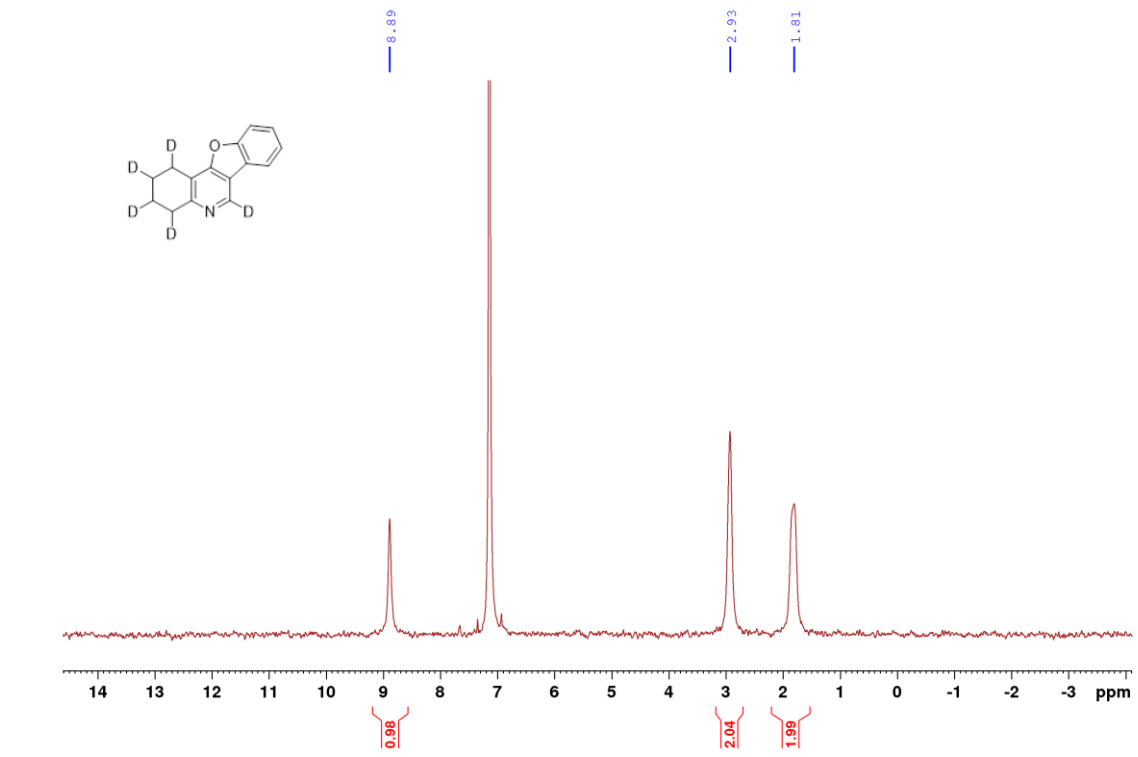
**$^1$H NMR, 300 MHz, $CDCl_3$ (2a-$d_5$)**



**$^{13}$C NMR, 125 MHz, $CDCl_3$ (2a-$d_5$)**

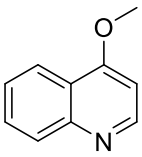



**$^{2}$H NMR, 500 MHz, $CHCl_3$ (2a-$d_5$)**



Synthesis of Quinolines

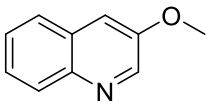
**4-Methoxyquinoline (9)**[31]



To MeOH (10 mL) at 0 °C was added sodium metal (0.500 g, 45.0 mmol, 15 eq.) and let stir until the sodium metal was consumed. To the resulting sodium methanolate was added 4-chloroquinoline (0.500 g, 3.06 mmol, 1eq.) in MeOH (5 mL) and the mixture was heated to 80 °C and let stir for 16 hours. The reaction was cooled to 0 °C and water was added and then extracted with $Et_2O$. The organic layer was washed with water and brine, dried over $MgSO_4$ and evaporated under vacuum. The crude mixture was purified by column chromatography in $Et_2O$ (100%) to yield **9**.

Light brown oil; 81% (0.317 g); **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 8.72 (d, 1H, *J* = 5.2 Hz), 8.18 (d, 1H, *J* = 8.4 Hz), 8.04 (d, 1H, *J* = 8.4 Hz), 7.68 (overlapping ddd, 1H, *J* = 1.2, 7.0, 8.4 Hz), 7.48 (overlapping ddd, 1H, *J* = 0.7, 7.0, 8.4 Hz), 6.68 (d, 1H, *J* = 5.2 Hz), 3.99 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 162.3 (q*C*-O), 151.3 (*C*H), 149.1 (q*C*), 129.7 (*C*H), 128.8 (*C*H) 125.6 (*C*H), 121.8 (*C*H), 121.4 (q*C*), 100.0 (*C*H), 55.6 ($CH_3$) ppm; **HRMS** (ESI-TOF positive mode) *m/z*: [M + H]+ calcd. for: $[C_{10}H_{10}NO]^+$: 160.0757 found: 160.0760.

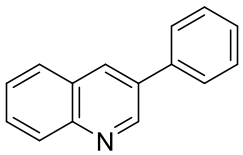
**3-Methoxyquinoline (12)**[32]



To MeOH (7 mL) at 0 °C was added sodium metal (0.500 g, 45.0 mmol, 18.8 eq.) and was let stir until the sodium metal as consumed. To the sodium methanolate solution was added 3-bromoquinoline (0.500 g, 2.40 mmol, 1 eq.) in dimethylformamide (5 mL) and copper iodide (23 mg, 0.12 mmol, 5 mol%). The mixture was refluxed at 180 °C for 48 h. The reaction was then cooled to 0 °C and water was added and the mixture was extracted with $Et_2O$. The organic layer was washed with water and brine, dried over $MgSO_4$ and evaporated under vacuum. The crude mixture was purified by column chromatography in $Et_2O$ (100%) to yield **12**.

Colourless oil; 45% (0.173 g); **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.68 (d, 1H, *J* = 2.9 Hz), 8.04 (ddd, 1H, *J* = 0.8, 1.5, 8.2 Hz), 7.73 (dd, 1H, *J* = 1.5, 8.2 Hz), 7.55 (ddd, 1H, *J* = 1.5, 6.9, 8.2 Hz), 7.50 (ddd, 1H, *J* = 1.5, 6.9, 8.2 Hz), 7.37 (d, 1H, *J* = 2.9 Hz), 3.94 (s, 3H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 153.1 (q*C*-O), 144.6 (*C*H), 143.5 (q*C*), 129.2 (*C*H), 128.8 (q*C*), 127.1 (*C*H), 126.7 (*C*H), 126.6 (*C*H), 112.2 (*C*H), 55.5 ($CH_3$) ppm; **HRMS** (ESI-TOF positive mode) *m/z*: $[M + H]^+$ calcd. for: $[C_{10}H_{10}NO]^+$: 160.0757, found: 160.0756.

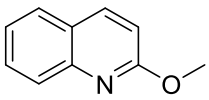
**3-Phenylquinoline (13)**



To a mixture of degassed THF (8 mL) and water (8 mL) was added 3-bromoquinoline (1.0 g, 4.81 mmol, 1 eq.), phenyl boronic acid (0.665 g, 5.29, 1.1 eq.), $K_2CO_3$ (1.33 g, 9.62 mmol, 2 eq.) and $Pd(PPh_3)_4$ (0.556 g, 0.481 mmol, 10 mol %). The reaction mixture was heated to 80 °C and stirred for 24 hours. The cooled reaction mixture was purified by column chromatography in DCM (100%) to yield **13**.

Light brown solid; 82% (0.820 g); **m.p.** 49 - 51 °C (lit. m.p. 50 – 51 °C)[33]; **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 9.19 (d, 1H, *J* = 2.1 Hz), 8.29 (d, 1H, *J* = 2.1 Hz), 8.14 (d, 1H, *J* = 8.4 Hz), 7.87 (d, 1H, *J* = 8.4 Hz), 7.76 – 7.66 (m, 3H), 7.61 – 7.48 (m, 3H), 7.43 (t, 1H, *J* = 7.4 Hz) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 150.0 (*C*H), 147.4 (q*C*), 137.9 (q*C*), 133.9 (q*C*), 133.2 (*C*H), 129.4 (*C*H), 129.3 (*C*H), 129.2 (2 × *C*H), 128.1 (*C*H), 128.04 (q*C*), 128.01 (*C*H), 127.4 (2 × *C*H), 127.0 (*C*H) ppm; **HRMS** (ESI-TOF positive mode) *m/z*: $[M + H]^+$ calcd. for: $[C_{15}H_{12}N]^+$: 206.0964; found: 206.0966.

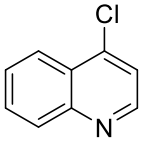
**2-Methoxyquinoline (S8)[34]**



To MeOH (10 mL) at 0 °C was added sodium metal (0.500 g, 45.0 mmol, 15 eq.) and let stir until the sodium metal was consumed. To the resulting sodium methanolate was added 2-chloroquinoline (0.500 g, 3.06 mmol, 1 eq) and the mixture was heated to 80 °C and let stir for 16 hours. Water was added to the mixture and was extracted with $Et_2O$. The organic layer was washed with water and brine, dried over $MgSO_4$ and evaporated under vacuum. The crude mixture was purified by column chromatography in $Et_2O$ (100%) to yield **S8**.

Colourless oil; 83% (0.404 g); **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 7.85 (d, 1H, *J* = 8.9 Hz), 7.77 (d, 1H, *J* = 8.5 Hz), 7.59 (dd, 1H, *J* = 1.4, 8.0 Hz), 7.51 (ddd, 1H, *J* = 1.4, 7.0, 8.5 Hz), 7.26 (ddd, 1H, *J* = 1.4, 7.0, 8.0 Hz), 6.79 (d, 1H, *J* = 8.9 Hz), 3.98 (s, 3H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 162.4 (q*C*-O), 146.6 (q*C*), 138.6 (*C*H), 129.5 (*C*H), 127.4 (*C*H), 127.3 (*C*H), 125.1 (q*C*), 124.0 (*C*H), 113.1 (*C*H), 53.4 (*C*$H_3$) ppm; **HRMS** (ESI-TOF positive mode) *m/z*: $[M + H]^+$ calcd. for: $[C_{10}H_{10}NO]^+$: 160.0757; found: 160.0755.

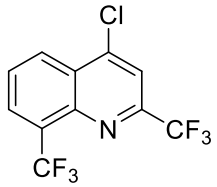
**4-Chloroquinoline (S9)**[35]



A mixture of 4-quinolinol (2.00 g, 13.8 mmol, 1 eq.) and phosphoryl chloride (6.40 mL, 69.0 mmol, 5 eq.) was stirred at 110 °C for 4 hours. The crude mixture was poured onto ice and neutralised with solid sodium bicarbonate. The neutralised aqueous mix was extracted with DCM. The organic layers were combined and washed with aqueous sodium bicarbonate, water, and brine, dried over $MgSO_4$, filtered, and concentrated *in vacuo* to yield the final product **S9**.

Yellow solid, 80% (1.80 g); **m.p.** 27 – 28 °C (lit. m.p. 27 – 28 °C)[24c]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.79 (d, 1H, *J* = 4.6 Hz), 8.25 (dd, 1H, *J* = 1.0, 8.4 Hz), 8.14 (dd, 1H, *J* = 0.6, 8.4 Hz), 7.79 (ddd, 1H, *J* = 1.4, 6.9, 8.4 Hz), 7.66 (ddd, 1H, *J* = 1.4, 6.9, 8.4 Hz), 7.50 (d, 1H, *J* = 4.6 Hz) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 149.8 (*C*H), 149.1 (q*C*), 142.6 (*C*-Cl), 130.4 (*C*H), 129.8 (*C*H), 127.6 (*C*H), 126.5 (q*C*), 124.1 (*C*H), 121.2 (*C*H) ppm; **HRMS** (ESI-TOF positive mode) *m/z*: $[M+H]^+$ calcd. for: $[C_9H_7ClN]^+$: 164.0267; found: 164.0261.

**4-Chloro-2,8-bis(trifluoromethyl)quinoline (S10)**[36]



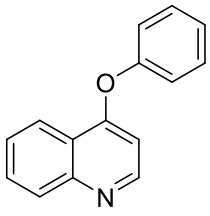

A mixture of 2,8-bis(trifluoromethyl)-4-quinolinol (1.50 g, 6.88 mmol, 1 eq.) and phosphoryl chloride (3.21 mL, 34.38 mmol, 5 eq.) was stirred at 110 °C for 4 hours. The crude mixture was poured onto ice and neutralised with solid sodium bicarbonate. The neutralised aqueous mix was extracted with DCM. The organic layers were combined and washed with aqueous sodium bicarbonate, water, and brine, dried over $MgSO_4$, filtered, and concentrated in vacuo to yield the final product **S10**.

Off-white solid; 75% (1.53 g); **m.p.** 47 – 49 °C (lit. m.p. 49 – 51 °C)[36]; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.50 (dd, 1H, *J* = 1.0, 8.2 Hz), 8.23 (d, 1H, *J* = 8.2 Hz), 7.92 (s, 1H), 7.83 (t, 1H, *J* = 8.2 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 148.3 (q, $^2J_{(C,\,F)}$ = 36 Hz, q*C*), 145.0 (*C*-Cl), 144.3 (q*C*), 130.1 (q, $^3J_{(C,\,F)}$ = 5 Hz, *C*H), 129.3 (q, $^2J_{(C,\,F)}$ = 31 Hz, q*C*), 128.4 (*C*H), 128.3 (*C*H), 127.5 (q*C*), 123.2 (q, $^1J_{(C,\,F)}$ = 275 Hz, *C*-$F_3$), 120.6 (q, $^1J_{(C,\,F)}$ = 275 Hz, *C*-$F_3$), 118.2 (q, $^3J_{(C,\,F)}$ = 2 Hz, *C*H) ppm; **$^{19}$F NMR (471 MHz, $CDCl_3$)** δ = –60.3 (C$F_3$), –68.0 (C$F_3$) ppm; **HRMS** (ESI-TOF positive mode) *m/z*: $[M + H]^+$ calcd. for: $[C_{11}H_5ClF_6N]^+$: 300.0009; found: 300.0007.

## Synthesis of Phenoxyquinoline Intermediates

**4-phenoxyquinoline (10)**

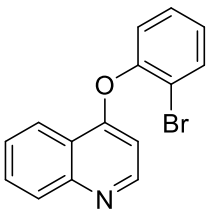
Synthesis of substrate **10** as per general procedure 1 using 4-chloroquinoline **S9** (0.500 g, 3.06 mmol), phenol (1.0 g, 10.7 mmol) and NaOH (0.184 g, 4.59 mmol).




Orange oil; 90% (0.609 g); **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.65 (d, 1H, *J* = 5.2 Hz), 8.36 (dd, 1H, *J* = 1.2, 8.4 Hz), 8.10 (d, 1H, *J* = 8.4 Hz), 7.73 (overlapping ddd, 1H, *J* = 1.5, 6.9, 8.4 Hz), 7.55 (overlapping ddd, 1H, *J* = 1.2, 6.9, 8.4 Hz), 7.48 – 7.40 (m, 2H), 7.31 – 7.23 (m, 1H), 7.20 – 7.14 (m, 2H), 6.53 (d, 1H, *J* = 5.2 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 161.9 (q*C*), 154.4 (q*C*), 151.1 (*C*H), 149.8 (q*C*), 130.3 (2 × *C*H), 130.1 (*C*H), 129.1 (*C*H), 126.1 (*C*H), 125.6 (*C*H), 121.8 (*C*H), 121.5 (q*C*), 121.1 (2 × *C*H), 104.4 (*C*H) ppm; **LRMS**: *m/z* (ESI+): 222 [$(M + H)^+$, 100%].

**4-(2-Bromophenoxy)quinoline (S11)**

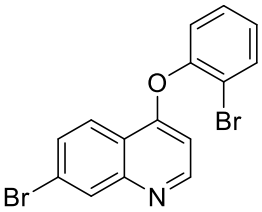
Synthesis of substrate **S11** as per general procedure 1 using 4-chloroquinoline **S9** (1.0 g, 6.12 mmol), 2-bromophenol (3.71 g, 21.4 mmol) and NaOH (0.367 g, 9.2 mmol).




Off-white solid; 85% (1.56 g); **m.p.** 63 – 64 °C (lit. m.p. 62 – 64 °C)[24a]; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.67 (d, 1H, *J* = 5.1 Hz), 8.42 (dd, 1H, *J* = 1.2, 8.3 Hz), 8.12 (d, 1H, *J* = 8.3 Hz), 7.77 (overlapping ddd, 1H, *J* = 1.3, 6.9, 8.3 Hz), 7.71 (dd, 1H, *J* = 1.5, 8.1 Hz), 7.60 (overlapping ddd, 1H, *J* = 1.3, 6.9, 8.3 Hz), 7.40 (ddd, 1H, *J* = 1.5, 7.4, 8.1 Hz), 7.25 – 7.17 (m, 2H), 6.41 (d, 1H, *J* = 5.1 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 160.7 (q*C*), 151.2 (q*C*), 151.0 (*C*H), 149.8 (q*C*), 134.3 (*C*H), 130.2 (*C*H), 129.2 (*C*H), 129.1 (*C*H), 127.3 (*C*H), 126.3 (*C*H), 123.2 (*C*H), 121.9 (*C*H), 121.1 (q*C*), 116.3 (*C*-Br), 103.7 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{11}BrNO]^+$: 300.0019; found: 300.0016.

**7-Bromo-4-(2-bromophenoxy)quinoline (S12)**

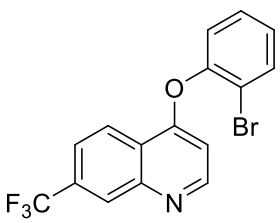
Synthesis of substrate **S12** as per general procedure 1 using 4-chloro-7-bromoquinoline (0.291 g, 1.19 mmol), 2-bromophenol (0.720 g, 4.17mmol) and NaOH (0.714 g, 1.79 mmol).




Brown solid; 90% (0.409 g); **m.p.** 72 – 73 °C (lit. m.p. 73 – 74 °C)[24b]; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.65 (d, 1H, *J* = 5.2 Hz), 8.29 (s, 1H, overlapping with doublet), 8.28 (d, 1H, *J* = 7.5 Hz, overlapping with singlet), 7.71 (dd, 1H, *J* = 1.5, 8.0 Hz), 7.68 (dd, 1H, *J* = 2.0, 8.9 Hz), 7.42 (ddd, 1H, *J* = 1.5, 7.5, 8.9 Hz), 7.26 – 7.19 (m, 2H), 6.40 (d, 1H, *J* = 5.2 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 160.8 (q*C*), 152.1 (*C*H), 150.8 (q*C*), 150.5 (q*C*), 134.4 (*C*H), 131.4 (*C*H), 129.8 (*C*H), 129.3 (*C*H), 127.5 (*C*H), 124.6 (*C*-Br), 123.5 (*C*H), 123.3 (*C*H), 119.7 (q*C*), 116.3 (*C*-Br), 103.9 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{10}Br_2NO]^+$: 377.9129; found: 377.9119.

**4-(2-Bromophenoxy)-7-(trifluoromethyl)quinoline (S13)**

Synthesis of substrate **S13** as per general procedure 1 using 4-chloro-7-trifluoromethylquinoline (1.06 g, 4.58 mmol), 2-bromophenol (2.77 g, 16.03 mmol) and NaOH (0.275 g, 6.87 mmol).

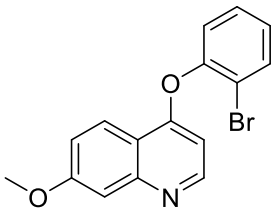



Orange viscous oil; 85% (1.44 g); **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 8.75 (d, 1H, *J* = 5.1 Hz), 8.55 (d, 1H, *J* = 8.7 Hz), 8.42 (s, 1H), 7.77 (dd, 1H, *J* = 1.2, 8.7 Hz), 7.72 (dd, 1H, *J* = 1.3, 8.0 Hz), 7.47–7.38 (m, 1H), 7.31–7.17 (m, 2H), 6.50 (d, 1H, *J* = 5.1 Hz) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 160.7 (q*C*), 152.5 (*C*H), 150.7 (q*C*), 148.9 (q*C*), 134.5 (*C*H), 132.1 (q, $^2J_{(C,\,F)}$ = 33 Hz, q*C*), 129.4 (*C*H),

127.8 (*C*H), 127.0 (q, $^{3}J_{(C, F)}$ = 4 Hz, *C*H), 124.0 (q, $^{1}J_{(C, F)}$ = 273 Hz, *C*-$F_3$), 123.5 (*C*H), 123.4 (*C*H), 122.7 (q*C*), 122.0 (q, $^{3}J_{(C, F)}$ = 3 Hz, *C*H), 116.4 (*C*-Br), 105.06 (*C*H) ppm; **$^{19}$F NMR (376 MHz, $CDCl_3$)** δ = –62.7 (C*F*$_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{10}BrF_3NO]^+$: 367.9892; found: 367.9895.

**4-(2-Bromophenoxy)-7-methoxyquinoline (S14)**

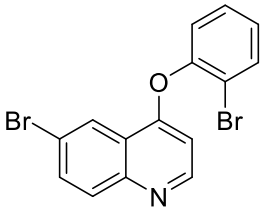
Synthesis of substrate **S14** as per general procedure 1 using 4-chloro-7-methoxyquinoline (0.950 g, 14.9 mmol), 2-bromophenol (9.02 g, 9.02 mmol) and NaOH (0.294 g, 7.36 mmol).




Brown solid; 94% (0.1.53 g); **m.p.** 101 – 102 °C (lit. m.p. 99 – 100 °C)[24a]; **$^{1}$H NMR (300 MHz, $CDCl_3$)** δ = 8.59 (d, 1H, *J* = 5.2 Hz), 8.29 (d, 1H, *J* = 9.2 Hz), 7.71 (dd, 1H, *J* = 1.5, 8.0 Hz), 7.45–7.36 (m, 2H), 7.28–7.15 (m, 3H), 6.29 (d, 1H, *J* = 5.2 Hz), 3.97 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 161.5 (q*C*), 160.8 (q*C*), 151.9 (q*C*), 151.6 (*C*H), 151.3 (q*C*), 134.4 (*C*H), 129.2 (*C*H), 127.3 (*C*H) 123.3 (*C*H), 123.2 (*C*H), 119.3 (*C*H), 116.4 (*C*-Br), 115.9 (q*C*), 107.4 (*C*H), 102.5 (*C*H), 55.6 (*C*-$H_3$) ppm; **LRMS:** *m/z* (ESI+): 330 [(M + H)+, 100%].

**6-Bromo-4-(2-bromophenoxy)quinoline (S15)**

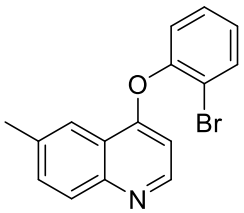
Synthesis of substrate **S15** as per general procedure 1 using 4-chloro-6-bromoquinoline (0.804 g, 3.32 mmol), 2-bromophenol (2.01 g, 11.62 mmol) and NaOH (0.199 g, 4.97 mmol).




Orange solid; 97% (1.21 g); **m.p.** 95 – 97 °C (lit. m.p. 97 – 98 °C)[24b]; **$^{1}$H NMR (400 MHz, $CDCl_3$)** δ = 8.67 (br s, 1H), 8.58 (d, 1H, *J* = 2.1 Hz), 7.97 (d, 1H, *J* = 9.0 Hz), 7.83 (dd, 1H, *J* = 2.1, 9.0 Hz), 7.75–7.71 (m, 1H), 7.46–7.40 (m, 1H), 7.28–7.20 (m, 2H), 6.40 (d, 1H, *J* = 5.1 Hz) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 160.0 (q*C*), 151.5 (*C*H), 150.9 (q*C*), 148.5 (q*C*), 134.5 (*C*H), 133.8 (*C*H), 131.0 (*C*H), 129.4 (*C*H), 127.7 (*C*H), 124.5 (*C*H), 123.4 (*C*H), 122.3 (q*C*), 120.5 (*C*-Br), 116.5 (*C*-Br), 104.3 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{10}Br_2NO]^+$: 377.9124; found: 377.9122.

**4-(2-Bromophenoxy)-6-methylquinoline (S16)**

Synthesis of substrate **S16** as per general procedure 1 using 4-chloro-6-methylquinoline (0.469 g, 2.64 mmol), 2-bromophenol (1.60 g, 9.24 mmol) and NaOH (0.166 g, 4.15 mmol).

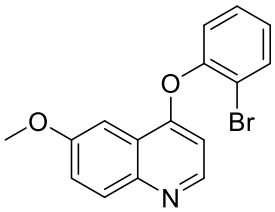



Yellow viscous oil; 84% (0.694 g); **$^{1}$H NMR (300 MHz, $CDCl_3$)** δ = 8.61 (d, 1H, *J* = 4.6 Hz), 8.18 (s, 1H), 8.00 (d, 1H, *J* = 8.6 Hz), 7.72 (dd, 1H, *J* = 1.6, 7.9 Hz), 7.60 (dd, 1H, *J* = 2.0, 8.6 Hz), 7.41 (ddd, 1H, *J* = 1.6, 7.3, 8.1 Hz), 7.24–7.14 (m, 2H), 6.37 (d, 1H, *J* = 5.1 Hz), 2.59 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 160.4

(q*C*), 151.42 (q*C*), 150.2 (*C*H), 148.6 (q*C*), 136.4 (q*C*), 134.4 (*C*H), 132.6 (*C*H), 129.3 (*C*H), 129.0 (*C*H), 127.3 (*C*H), 123.3 (*C*H), 121.1 (q*C*), 120.7 (*C*H), 116.5 (*C*-Br), 104.0 (*C*H), 22.0 (*C*-$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{13}BrNO]^+$: 314.0175; found: 314.0177.

**4-(2-Bromophenoxy)-6-methoxyquinoline (S17)**

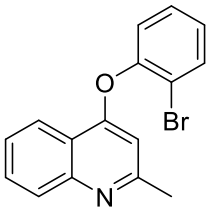
Synthesis of substrate **S17** as per general procedure 1 using 4-chloro-6-methoxyquinoline (1.75 g, 9.03 mmol), 2-bromophenol (7.82 g, 45.2 mmol) and NaOH (0.540 g, 13.5 mmol).



Brown oil; 91% (2.70 g); **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.54 (d, 1H, *J* = 5.1 Hz), 8.01 (d, 1H, *J* = 9.2 Hz), 7.72 (dd, 1H, *J* = 1.5, 8.0 Hz), 7.64 (d, 1H, *J* = 2.8 Hz), 7.45–7.38 (m, 2H), 7.26–7.16 (m, 2H), 6.40 (d, 1H, *J* = 5.1 Hz), 3.98 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 159.8 (q*C*), 157.9 (q*C*), 151.4 (q*C*), 148.5 (*C*H), 146.0 (q*C*), 134.4 (*C*H), 130.8 (*C*H), 129.3 (*C*H), 127.3 (*C*H), 123.3 (*C*H), 123.0 (*C*H), 121.9 (q*C*), 116.5 (*C*-Br), 104.3 (*C*H), 99.5 (*C*H), 55.8 (*C*-$H_3$) ppm**; LRMS:** *m/z* (ESI+): 330, [(M + H)+, 100%];

**4-(2-Bromophenoxy)-2-methylquinoline (S18)**

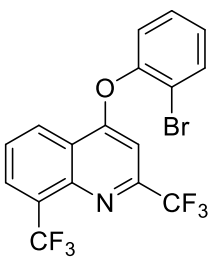
Synthesis of substrate **S18** as per general procedure 1 using 4-chloro-2-methylquinoline (0.500 g, 2.81 mmol), 2-bromophenol (1.70 g, 9.85 mmol) and NaOH (0.169 g, 4.20 mmol).



Off-white solid; 79% (0.667 g); **m.p.** 94 – 96 °C (lit. m.p. 98 – 101 °C)[24a]; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.34 (d, 1H, *J* = 8.5 Hz), 8.02 (d, 1H, *J* = 8.5 Hz), 7.77 – 7.68 (m, 2H), 7.53 (t, 1H, *J* = 7.5 Hz), 7.42 (t, 1H, *J* = 8.1 Hz), 7.25 – 7.17 (m, 2H), 6.28 (s, 1H), 2.59 (s, 3H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 160.8 (q*C*), 159.9 (q*C*), 151.3 (q*C*), 149.4 (q*C*), 134.3 (*C*H), 130.2 (*C*H), 129.1 (*C*H), 128.3 (*C*H), 127.1 (*C*H), 125.4 (*C*H), 123.2 (*C*H), 121.7 (*C*H), 119.5 (q*C*), 116.3 (*C*-Br), 104.2 (*C*H), 25.7 (*C*$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{13}BrNO]^+$: 314.0175; found: 314.0183.

**4-(2-Bromophenoxy)-2,8-bis(trifluoromethyl)quinoline (S19)**

Synthesis of substrate **S19** as per general procedure 1 using quinoline **S10** (1.40 g, 4.67 mmol), 2-bromophenol (4.04 g, 23.4 mmol) and NaOH (0.280 g, 7 mmol).

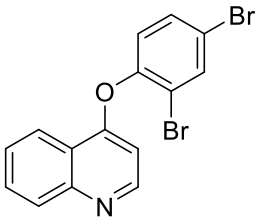


White solid; 59% (1.20 g); **m.p**. 77 – 79 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2982, 2867, 1591, 1313, 1238, 1133, 1108, 708; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.70 (dd, 1H, *J* = 0.8, 8.4 Hz), 8.22 (d, 1H, *J* = 7.4 Hz), 7.80 – 7.74 (m, 2H), 7.49 (dt, 1H, *J* = 1.6, 7.8 Hz), 7.32 – 7.27 (m, 2H), 6.75 (s, 1H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 162.3 (q*C*), 150.1 (q*C*), 149.5 (q, $^2J_{(C, F)}$ = 35 Hz, q*C*), 145.1 (q*C*), 134.7 (*C*H), 129.8 (q, $^3J_{(C, F)}$ = 6 Hz, *C*H), 129.6 (*C*H), 128.6 (q, $^2J_{(C, F)}$ = 28 Hz, q*C*), 128.3 (*C*H), 126.8 (*C*H), 126.3 (*C*H), 123.5 (q, $^1J_{(C, F)}$ = 274 Hz, *C*-

$F_3$), 123.2 (*C*H), 121.9 (q*C*) 120.9 (q, $^1J_{(C, F)}$ = 275 Hz, *C*-$F_3$), 116.1 (*C*-Br), 100.1 (q, $^3J_{(C, F)}$ = 2 Hz, *C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –60.4 (C*F*$_3$), –68.1 (C*F*$_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{17}H_9BrF_6NO]^+$: 435.9766; found: 439.9765.

**4-(2,4-Dibromobenzyl)quinoline (S20)**

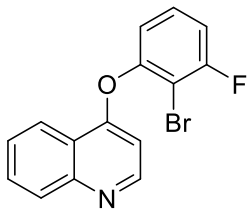
Synthesis of substrate **S20** as per general procedure 1 using 4-chloroquinoline **S9** (1.00 g, 6.14 mmol), 2,4-dibromophenol (5.41 g, 21.48 mmol) and NaOH (0.37 g, 9.21 mmol).




White solid; 95%, (2.21 g); **m.p.** 123 – 125 °C (lit: 125 – 126 °C)[24b] ; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.69 (d, 1H, *J* = 5.1 Hz), 8.38 (dd, 1H, *J* = 0.9 Hz, 8.4 Hz), 8.12 (d, 1H, *J* = 8.4 Hz), 7.88 (d, 1H, J = 2.3 Hz), 7.79 (ddd, 1H, *J* = 1.4, 6.9, 8.4 Hz), 7.62 (ddd, 1H, *J* = 1.4, 6.9, 8.4 Hz), 7.54 (dd, 1H, *J* = 2.3, 8.6 Hz), 7.12 (d, 1H, *J* = 8.6 Hz), 6.43 (d, 1H, *J* = 5.1 Hz) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 160.3 (q*C*), 150.9 (*C*H), 150.6 (q*C*), 149.8 (q*C*), 136.6 (*C*H), 132.3 (*C*H), 130.4 (*C*H), 129.2 (*C*H), 126.5 (*C*H), 124.2 (*C*H), 121.7 (*C*H), 120.9 (q*C*), 119.3 (*C*-Br), 117.3 (*C*-Br), 103.8 (*C*H) ppm; **LRMS** *m*/*z* (ESI+ ) 378, 380, 372 $[(M+H)^+$ , 100%]

**4-(2-Bromo-3-fluorophenoxy)quinoline (S21)**

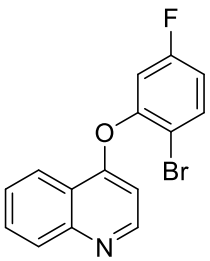
Synthesis of substrate **S21** as per general procedure 1 using 4-chloroquinoline **S9** (1.20 g, 7.33 mmol), 2-bromo3-fluorophenol (5.0 g, 25.7 mmol) and NaOH (0.440 g, 11.0 mmol).




Green oil; 95% (2.22 g); **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 3071 , 1501, 1460 , 1306 , 1237, 1097, 699; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.70 (d, 1H, *J* = 5.2 Hz), 8.38 (dd, 1H, *J* = 1.5, 8.4 Hz), 8.12 (d, 1H, *J* = 8.4 Hz), 7.78 (overlapping ddd, 1H, *J* = 1.5, 6.9, 8.4 Hz), 7.61 (overlapping ddd, 1H, *J* = 1.1, 6.9, 8.4 Hz), 7.37 (overlapping dt, 1H, *J* = 6.0, 8.2 Hz), 7.10 (td, 1H, *J* = 1.4, 8.2 Hz), 7.03 (dt, 1H, *J* = 1.4, 8.2 Hz), 6.46 (d, 1H, *J* = 5.2 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 160.6 (d, $^1J_{(C, F)}$ = 250 Hz, *C*-F), 160.3 (q*C*), 152.8 (d, $^3J_{(C, F)}$ = 3 Hz, qC), 151.0 (*C*H), 149.9 (q*C*), 130.3 (*C*H), 129.2 (*C*H), 129.1 (*C*H), 126.5 (*C*H), 121.7 (*C*H), 121.0 (q*C*), 118.2 (d, $^4J_{(C, F)}$ = 3 Hz, *C*H), 113.6 (d, $^2J_{(C, F)}$ = 22 Hz, *C*H), 104.6 (d, $^2J_{(C, F)}$ = 23 Hz, *C*-Br), 104.1 (*C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –103.3 (C*F*); **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{10}BrFNO]^+$: 317.9924; found: 317.9921.

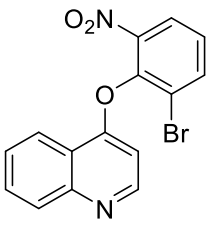
**4-(2-Bromo-5-fluorophenoxy)quinoline (S22)**

Synthesis of substrate **S22** as per general procedure 1 using 4-chloroquinoline **S9** (0.700 g, 4,27 mmol), 2-bromo-5-fluorophenol (2.86 g, 15.0 mmol) and NaOH (0.264 g, 6.60 mmol).




White solid; 90% (1.26 g); **m.p.** 71 – 73 °C (lit. m.p. 77 – 78 °C)[24a]; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.72 (d, 1H, *J* = 5.2 Hz), 8.36 (dd, 1H, *J* = 0.9, 8.4 Hz), 8.13 (d, 1H, *J* = 8.4 Hz), 7.79 (overlapping ddd, 1H, *J* = 1.5, 6.9, 8.4 Hz), 7.72 – 7.56 (m, 2H), 7.02 – 6.91 (m, 2H), 6.49 (d, 1H, *J* = 5.2 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 162.4 (d, $^1J_{(C,\ F)}$ = 250 Hz, *C*-F), 160.1 (q*C*), 152.1 (d, $^3J_{(C,\ F)}$ = 11 Hz, qC), 151.0 (*C*H), 149.9 (q*C*), 134.8 (d, $^3J_{(C,\ F)}$ = 9 Hz, *C*H), 130.4 (*C*H), 129.2 (*C*H), 126.5 (*C*H), 121.7 (*C*H), 121.0 (q*C*), 114.5 (d, $^2J_{(C,\ F)}$ = 22 Hz, *C*H), 110.8 (d, $^2J_{(C,\ F)}$ = 25 Hz, *C*H), 110.7 (*C*-Br), 104.2 (*C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –111.0 (C*F*); **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{10}BrFNO]^+$: 317.9924; found: 317.9922.

**4-(2-Bromo-6-nitrophenoxy)quinoline (S23)**

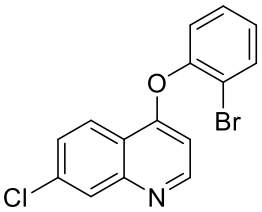



Synthesis of substrate **S23** as per general procedure 1 with the addition of 1,2-dichlorobenzene as solvent and stirred at 150 °C for 3 days. From 4-chloroquinoline **S9** (1.0 g, 6.11 mmol), 2-bromo-6-nitrophenol (0.666 g, 30.6 mmol) and NaOH (0.367 g, 9.16 mmol).

White solid; 85% (1.80 g); **m.p.** 107 – 109 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 3058, 2894, 1564, 1535, 1306, 1254, 1231, 715; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.69 (d, 1H *J* = 5.2 Hz), 8.39 (dd, 1H, *J* = 1.5, 8.4 Hz), 8.13 (d, 1H, *J* = 8.4 Hz), 8.05 (dd, 1H, *J* = 1.6, 8.2 Hz), 7.97 (dd, 1H, *J* = 1.6, 8.2 Hz), 7.80 (overlapping ddd, 1H, 1.5, 6.9, 8.4 Hz), 7.63 (overlapping ddd, 1H, *J* = 1.2, 6.9, 8.4 Hz), 7.39 (t, 1H, *J* = 8.2 Hz), 6.35 (d, 1H, *J* = 5.2 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 159.5 (q*C*), 150.7 (*C*H), 149.9 (q*C*), 144.5 (*C*-$NO_2$), 144.4 (q*C*), 138.7 (*C*H), 130.4 (*C*H), 129.1 (*C*H), 127.5 (*C*H), 126.6 (*C*H), 125.2 (*C*H), 121.8 (*C*H), 120.4 (q*C*), 120.0 (*C*-Br), 102.9 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{10}BrN_2O_3]^+$: 344.9870; found: 344.9868.

**4-(2-Bromophenoxy)-7-chloroquinoline (S24)**

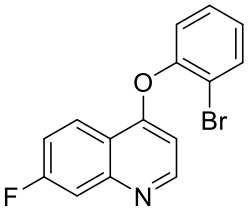
Synthesis of substrate **S24** as per general procedure 1 using 4,7-dichloroquinoline (3.01 g, 15.1 mmol), 2-bromophenol (9.14 g, 52.9 mmol) and NaOH (0.910 g, 22.8 mmol).



Yellow solid; 97% (4.91 g); **m.p.** 70 – 73 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2981–2844, 1614, 1590, 1562, 1487, 1469, 1419, 1377, 1302, 1262, 1220, 1099, 1052, 1033, 1013, 858; **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 8.66 (d, 1H, *J* = 4.5 Hz), 8.35 (d, 1H, *J* = 8.9 Hz), 8.10 (d, 1H, *J* = 1.9 Hz), 7.71 (dd, 1H, *J* = 1.4, 8.0 Hz), 7.54 (dd, 1H, *J* = 1.9, 8.9 Hz), 7.44 – 7.39 (m, 1H), 7.26 – 7.18 (m, 2H), 6.39 (d, 1H, *J* = 5.2 Hz) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 160.8 (q*C*), 152.3 (*C*H), 150.9 (q*C*), 150.3 (q*C*), 136.3 (q*C*), 134.5 (*C*H), 129.3 (*C*H), 128.2 (*C*H), 127.6 (*C*H), 127.3 (*C*H), 123.5 (*C*H), 123.3 (*C*H), 119.5 (q*C*), 116.4 (*C*-Br), 103.9 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{10}BrClNO]^+$: 333.9629; found: 333.9626.

**4-(2-Bromophenoxy)-6-fluoroquinoline (S25)**

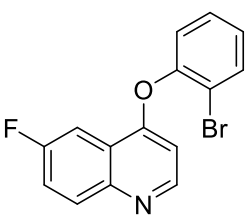
Synthesis of substrate **S25** as per general procedure 1 using 4-chloro-7-fluoroquinoline (0.525 g, 2.89 mmol), 2-bromophenol (1.75 g, 10.11 mmol) and NaOH (0.173 g, 4.34 mmol).



Orange solid; 91% (0.835 g); **m.p.** 77 - 79 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2981–2844, 1629, 1571, 1508, 1469, 1427, 1379, 1308, 1224, 1135, 1051, 875, 780, 741; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.66 (d, 1H, *J* = 5.2 Hz), 8.43 (dd, 1H, *J* = 6.1, 9.2 Hz), 7.76 – 7.70 (m, 2H), 7.47 – 7.34 (m, 2H), 7.28 – 7.18 (m, 2H), 6.37 (d, 1H, *J* = 5.2 Hz) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 163.8 (d, $^1J_{(C, F)}$ = 251 Hz, q*C*-F), 161.0 (d, $^5J_{(C, F)}$ = 1 Hz, q*C*), 152.5 (CH), 151.2 (d, $^3J_{(C, F)}$ = 13 Hz, q*C*), 151.0 (q*C*), 134.5 (*C*H), 129.4 (*C*H), 127.6 (*C*H), 124.5 (d, $^3J_{(C, F)}$ = 10 Hz, *C*H), 123.4 (*C*H), 118.1 (d, $^4J_{(C, F)}$ = 1 Hz, q*C*), 116.7 (d, $^2J_{(C, F)}$ = 25 Hz, *C*H), 116.5 (*C*-Br), 113.0 (d, $^2J_{(C, F)}$ = 21 Hz, *C*H), 103.3 (d, $^6J_{(C, F)}$ = 2 Hz, CH) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –108.9 (C*F*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{10}BrFNO]^+$: 317.9924; found: 317.9929.

**4-(2-Bromophenoxy)-6-fluoroquinoline (S26)**

Synthesis of substrate **S26** as per general procedure 1 using 4-chloro-6-fluoroquinoline (0.262 g, 1.44 mmol), 2-bromophenol (0.872 g, 5.04 mmol) and NaOH (0.086 g, 2.16 mmol).



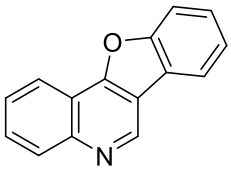
Orange solid; 78% (0.358 g); **m.p.** 81 - 83 °C (lit. m.p. 75 – 79 °C)[24a]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.64 (br s, 1H), 8.11 (dd, 1H, *J* = 5.2, 9.3 Hz), 8.01 (dd, 1H, *J* = 2.8, 9.3 Hz), 7.73 (dd, 1H, *J* = 1.4, 7.9 Hz), 7.54 (ddd, 1H, *J* = 2.8, 8.3, 9.3 Hz), 7.47 – 7.39 (m, 1H), 7.27 – 7.17 (m, 2H), 6.42 (d, 1H, *J* = 5.0 Hz) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 160.6 (d, $^1J_{(C, F)}$ = 248 Hz, *C*-F), 160.4 (d, $^4J_{(C, F)}$ = 5 Hz, q*C*), 151.0 (q*C*), 150.4 (d, $^6J_{(C,}$

$_{F)}$ = 1 Hz, CH), 147.0 (q*C*), 134.5 (*C*H), 131.8 (d, $^{3}J_{(C, F)}$ = 9 Hz, *C*H), 129.38 (*C*H), 127.6 (*C*H), 123.4 (*C*H), 121.9 (d, $^{3}J_{(C, F)}$ = 11 Hz, q*C*), 120.5 (d, $^{2}J_{(C, F)}$ = 26 Hz, *C*H), 116.5 (*C*-Br), 105.8 (d, $^{2}J_{(C, F)}$ = 24 Hz, *C*H), 104.2 (*C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –112.7 (C*F*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for $[C_{15}H_{10}BrFNO]^+$: 317.9924; found: 317.9925.

## Synthesis of Benzofuroquinolines

**Benzofuro[3,2-*c*]quinoline (1a)**

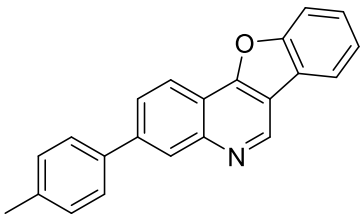
Synthesis of substrate **1a** as per general procedure 2 using **S11** (1.0 g, 3.33 mmol), TBABr (2.15 g, 6.66 mmol), $Pd(OAc)_2$ (0.037 g, 5 mol%), $K_2CO_3$ (0.921 g, 6.66 mmol) and *i*PrOAc (5 mL).



Off-white solid; 88% yield (1.42 g); **m.p.** 133 - 135 °C; (lit. m.p. 132 – 135 °C)[24a]; **$^{1}$H NMR (300 MHz, $CDCl_3$)** δ = 9.46 (br s, 1H), 8.38 (d, 1H, *J* = 7.6 Hz), 8.25 (d, 1H, *J* = 8.8 Hz), 8.06 (d, 1H, *J* = 7.6 Hz), 7.82 – 7.62 (m, 3H), 7.56 – 7.40 (m, 2H) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 157.5 (q*C*), 156.0 (q*C*), 147.4 (q*C*), 144.4 (*C*H), 129.9 (*C*H), 129.3 (*C*H), 127.2 (*C*H), 127.0 (*C*H), 124.0 (*C*H), 122.7 (q*C*), 120.8 (*C*H), 120.6 (*C*H), 117.2 (q*C*), 116.3 (q*C*), 112.1 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for $[C_{15}H_{10}NO]^+$: 220.0757; found: 220.0763.

**3-(*p*-Tolyl)benzofuro[3,2-*c*]quinoline (1b)**

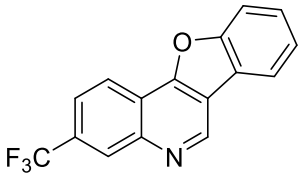
Synthesis of substrate **1b** as per general procedure 4 using **S12** (0.617 g, 1.63 mmol), $Pd(OAc)_2$ (0.018 g, 0.082 mmol), *p*-tolylboronic acid (0.244 g, 1.80 mmol), $K_2CO_3$ (0.450 g, 3.26 mmol) in NMP (2.44 mL).



Pale-yellow solid; 73% yield (0.366 g); **m.p.** 205 – 207 °C (lit. m.p. 200 – 202 °C)[24b]; **$^{1}$H NMR (400 MHz, $CDCl_3$)** δ = 9.49 (s, 1H), 8.47 (d, 1H, *J* = 1.6 Hz), 8.44 (d, 1H, *J* = 8.5 Hz), 8.08 (dd, 1H, *J* = 0.8, 7.6 Hz), 7.94 (dd, 1H, *J* = 1.6, 8.5 Hz), 7.75 (d, 1H, *J* = 8.0 Hz), 7.69 (d, 2H, *J* = 8.1 Hz), 7.56 – 7.51 (m, 1H), 7.47 (td, 1H, *J* = 0.8, 7.6 Hz), 7.33 (d, 2H, *J* = 8.0 Hz), 2.44 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 157.6 (q*C*), 156.1 (q*C*), 148.0 (q*C*), 144.9 (*C*H), 142.2 (q*C*), 138.0 (q*C*), 137.5 (q*C*), 129.9 (2 × *C*), 127.4 (2 × *C*), 127.3 (*C*H), 127.3 (*C*H), 126.6 (*C*H), 124.2 (*C*H), 122.9 (q*C*), 121.3 (*C*H), 120.7 (*C*H), 116.3 (q*C*), 116.0 (q*C*), 112.2 (*C*H), 21.3 (*C*-$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for $[C_{22}H_{16}NO]^+$: 310.1226; found: 310.1229.

**3-(Trifluoromethyl)benzofuro[3,2-*c*]quinoline (1c)**

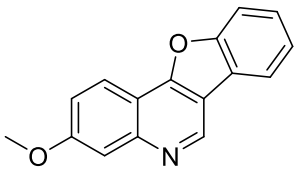
Synthesis of substrate **1c** as per general procedure 3 using **S13** (1.34 g, 3.63 mmol), $Pd(OAc)_2$ (0.041 g, 0.182 mmol), $K_2CO_3$ (1.00 g, 7.27 mmol) in NMP (5.50 mL).



Pale-yellow solid; 91% yield (0.951 g); **m.p.** 182 – 184 °C (lit. m.p. 182 – 185 °C)[37]; **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 9.57 (s, 1H), 8.56 (s, 1H), 8.51 (d, 1H, *J* = 8.6 Hz), 8.14– 8.08 (m, 1H), 7.87 (dd, 1H, *J* = 1.6, 8.6 Hz), 7.78 (d, 1H, *J* = 8.3 Hz), 7.63– 7.57 (m, 1H), 7.51 (td, 1H, *J* = 1.0, 7.5 Hz) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 156.8 (q*C*), 156.3 (q*C*), 146.3 (q*C*), 145.8 (*C*H), 131.1 (q, $^2J_{(C, F)}$ = 33 Hz, q*C*), 128.1 (*C*H), 127.8 (q, $^3J_{(C, F)}$ = 4 Hz, *C*H), 124.6 (*C*H), 124.1 (q, $^1J_{(C, F)}$ = 272 Hz, *C*$F_3$), 122.8 (q, $^3J_{(C, F)}$ = 3 Hz, *C*H), 122.3 (q*C*), 122.1 (*C*H), 121.0 (*C*H), 118.9 (q*C*), 117.9 (q*C*), 112.4 (*C*H) ppm; **$^{19}$F NMR (376 MHz, $CDCl_3$)** δ = –62.5 (C*$F_3$*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_9F_3NO]^+$: 288.0631; found: 288.0630.

**3-Methoxybenzofuro[3,2-*c*]quinoline (1d)**

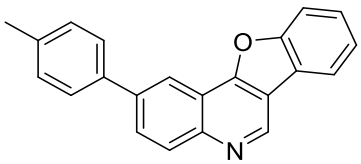
Synthesis of substrate **1d** as per general procedure 3 using **S14** (0.797 g, 2.41 mmol), $Pd(OAc)_2$ (0.028 g, 0.125 mmol), $K_2CO_3$ (0.671 g, 4.86 mmol) in NMP (3.62 mL).



Off-white solid; 86% yield (0.520 g); **m.p.** 150 – 151 °C (lit. m.p. 146 – 147 °C)[24a]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.34 (s, 1H), 8.21 (d, 1H, *J* = 9.0 Hz), 7.98 (dd, 1H, *J* = 1.0, 7.6 Hz), 7.66 (d, 1H, *J* = 7.6 Hz), 7.55 (d, 1H, *J* = 2.5 Hz), 7.50–7.37 (m, 2H), 7.29 (dd, 1H, *J* = 2.5, 9.0 Hz), 3.96 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 160.8 (q*C*), 157.9 (q*C*), 155.9 (q*C*), 149.4 (q*C*), 144.7 (*C*H), 126.9 (*C*H), 124.1 (*C*H), 123.0 (q*C*), 122.0 (*C*H), 120.4 (*C*H), 119.9 (*C*H), 115.1 (q*C*), 112.1 (*C*H), 111.8 (*C*H), 108.5 (*C*H), 55.7 (*C*-$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{12}NO_2]^+$: 250.0863; found: 250.0866.

**2-(*p*-Tolyl)benzofuro[3,2-*c*]quinoline (1f)**

Synthesis of substrate **1f** as per general procedure 4 using **S15** (1.06 g, 2.79 mmol), $Pd(OAc)_2$ (0.031 g, 0.138 mmol), *p*-tolylboronic acid (0.417 g, 3.07 mmol), $K_2CO_3$ (0.771 g, 5.57 mmol) in NMP (4.20 mL).

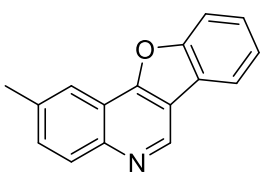


Off-white solid; 22% yield (0.188 g); **m.p.** 180 – 182 °C (lit. m.p. 183 – 185 °C)[24b]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.47 (s, 1H), 8.59 (d, 1H, *J* = 2.0 Hz), 8.31 (d, 1H, *J* = 8.8 Hz), 8.11 (d, 1H, *J* = 7.4 Hz), 8.04 (dd, 1H, *J* = 2.0, 8.8 Hz), 7.80–7.69 (m, 3H), 7.60–7.44 (m, 2H), 7.34 (d, 2H, *J* = 7.9 Hz), 2.45 (s, 3H) ppm**; $^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 157.7 (q*C*), 156.1 (q*C*), 146.7 (q*C*), 144.2 (*C*H),

139.8 (q*C*), 138.0 (q*C*), 137.3 (q*C*), 130.3 (*C*H), 129.9 (2 × *C*), 128.9 (*C*H), 127.5 (2 × *C*), 127.4 (*C*H), 124.2 (*C*H), 122.9 (q*C*), 120.8 (*C*H), 118.1 (*C*H), 117.5 (q*C*), 116.7 (q*C*), 112.2 (*C*H), 21.3 (*C*$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{22}H_{16}NO]^+$: 310.1226; found: 310.1225.

**2-Methylbenzofuro[3,2-*c*]quinoline (1g)**

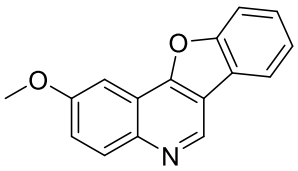
Synthesis of substrate **1g** as per general procedure 3 using **S16** (0.670 g, 2.13 mmol), $Pd(OAc)_2$ (0.024 g, 0.109 mmol), $K_2CO_3$ (0.589 g, 4.27 mmol) in NMP (3.30 mL).



Off-white solid; 79% yield (0.392 g); **m.p.** 159 – 160 °C (lit. m.p. 157 – 159 °C)[37]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.38 (s, 1H), 8.15–8.10 (m, 2H), 8.04 (d, 1H, *J* = 7.5 Hz), 7.70 (d,1H, *J* = 8.1 Hz), 7.60–7.39 (m, 3H), 2.60 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 157.2 (q*C*), 156.0 (q*C*), 146.1 (q*C*), 143.5 (*C*H), 137.2 (q*C*), 131.6 (*C*H), 129.7 (*C*H), 127.2 (*C*H), 124.1 (*C*H), 122.9 (q*C*), 120.7 (*C*H), 119.8 (*C*H), 117.2 (q*C*), 116.4 (q*C*), 112.2 (*C*H), 21.9 (*C*-$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{12}NO]^+$: 234.0913; found: 234.0915.

**2-Methoxybenzofuro[3,2-*c*]quinoline (1h)**

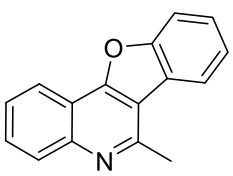
Synthesis of substrate **1h** as per general procedure 2 using **S17** (1.0 , 3.03 mmol), TBABr (1.95 g, 6.06 mmol), $Pd(OAc)_2$ (0.034 g, 5 mol%), $K_2CO_3$ (0.838 g, 6.06 mmol) and *i*PrOAc (4.5 mL).



White solid; 83% yield (0.094 g); **m.p.** 151 – 153 °C (lit. m.p. 150 – 152 °C)[24a]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.31 (s, 1H), 8.13 (d, 1H, *J* = 9.2 Hz), 8.05 (d, 1H, *J* = 7.5 Hz), 7.71 (d, 1H, *J* = 8.1 Hz), 7.61–7.34 (m, 4H), 4.01 (s, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 158.4 (q*C*), 157.0 (q*C*), 156.0 (q*C*), 143.5 (q*C*), 141.8 (*C*H), 131.5 (*C*H), 127.3 (*C*H), 124.1 (*C*H), 123.0 (q*C*), 121.9 (*C*H), 120.8 (*C*H), 118.0 (q*C*), 116.6 (q*C*), 112.1 (*C*H), 98.8 (*C*H), 55.9 (*C*-$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{12}NO_2]^+$: 250.0863; found: 250.0860.

**6-Methylbenzofuro[3,2-*c*]quinoline (1i)**

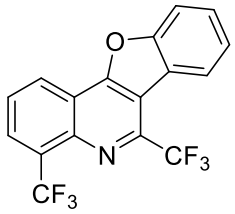
Synthesis of substrate **1i** as per general procedure 2 using **S18** (0.200 g, 0.636 mmol), TBABr (0.409 g, 1.27 mmol), $Pd(OAc)_2$ (0.007 g, 5 mol%), $K_2CO_3$ (0.176 g, 1.27 mmol) and *i*PrOAc (0.95 mL).



Off-white solid; 91% yield (0.271 g); **m.p.** 128 – 130 °C (lit. m.p. 132 – 134 °C)[24a]; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.38 (d, 1H, *J* = 7.7 Hz), 8.18 (d, 1H. *J* = 8.4 Hz), 8.09 (d, 1H, *J* = 7.5 Hz), 7.80 – 7.71 (m, 2H), 7.63 (t, 1H, *J* = 7.7 Hz), 7.54 (dt, 1H, *J* = 1.2, 7.5 Hz), 7.48 (t, 1H, *J* = 7.5 Hz), 3.15 (s, 3H) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 157.4 (q*C*), 155.9 (q*C*), 154.8 (q*C*), 146.9 (q*C*), 129.4 (*C*H), 128.9 (*C*H), 126.8 (*C*H), 126.1 (*C*H),

124.0 (*C*H), 123.5 (q*C*), 121.8 (*C*H), 120.7 (*C*H), 116.2 (q*C*), 115.4 (q*C*), 112.1 (*C*H), 24.3 (*C*-$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{12}NO]^+$: 234.0913; found: 234.0916.

**4,6-bis(Trifluoromethyl)benzofuro[3,2-*c*]quinoline** (**1j**)

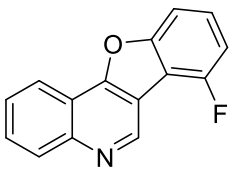


Synthesis of substrate **1j** as per general procedure 2 using **S19** (1.20 g, 2.75 mmol), TBABr (1.77 g, 5.50 mmol), $Pd(OAc)_2$ (0.031 g, 5 mol%), $K_2CO_3$ (0.760 g, 5.50 mmol) and *i*PrOAc (4.1 mL).

White solid; 64% (0.626 g); **m.p.** 164 – 165 °C; **IR $\tilde{\nu}_{max}$ cm$^{-1}$**: 2922, 2855, 1579, 1429, 1305, 1125, 1105, 964, 746; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.66 (d, 1H, *J* = 6.4 Hz), 8.26 (d, 1H, *J* = 7.8 Hz), 8.20 (d, 1H, *J* = 7.4 Hz), 7.90 – 7.75 (m, 2H), 7.64 (dt, 1H, *J* = 1.2, 7.4 Hz), 7.54 (dt, 1H, *J* = 0.9, 7.8 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 158.5 (q*C*), 156.1 (q*C*), 142.1 (d, $^2J_{(C, F)}$ = 38 Hz, q*C*), 141.2 (q*C*), 129.2 ($^2J_{(C, F)}$ =30 Hz, q*C*), 128.7 (*C*H), 128.5 (d, $^3J_{(C, F)}$ = 6 Hz, *C*H), 127.5 (*C*H), 125.1 (*C*H), 124.9 (*C*H), 123.5 (q, $^1J_{(C, F)}$ = 275 Hz, q*C*-$F_3$), 123.3 (q, $^4J_{(C, F)}$ = 4 Hz, *C*H), 121.4 (q, $^1J_{(C, F)}$ = 275 Hz, q*C*-$F_3$), 120.2 (q*C*), 118.2 (q*C*), 113.9 (q*C*), 112.1 (*C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –60.4 (C*F*$_3$), –67.6 (C*F*$_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for: $[C_{17}H_8F_6NO]^+$; 356.0505; found: 356.0507.

**7-Fluorobenzofuro[3,2-*c*]quinoline (1m)**

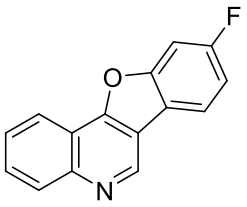
Synthesis of substrate **1m** as per general procedure 2 using **S21** (1.0 g, 3.14 mmol), TBABr (2.03 g, 6.29 mmol), $Pd(OAc)_2$ (0.035 g, 5 mol%), $K_2CO_3$ (0.869 g, 6.29 mmol) and *i*PrOAc (4.7 mL).



White solid; 91% yield (0.679 g); **m.p.** 153 – 155 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2973, 1509, 1441, 1344, 1171, 1018; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 9.53 (s, 1H), 8.38 (dd, 1H, *J* = 1.1, 8.3 Hz), 8.28 (d, 1H, *J* = 8.3 Hz), 7.80 (overlapping ddd, 1H, *J* = 1.5, 7.0, 8.3 Hz), 7.70 (overlapping ddd, 1H, *J* = 1.1, 7.0, 8.3 Hz), 7.54 (dd, 1H, *J* = 0.8, 8.5 Hz), 7.48 (overlapping dt, 1H, *J* = 5.1, 7.9 Hz), 7.17 (overlapping ddd, 1H, *J* = 1.0, 7.9, 9.0 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 157.2 (d, $^1J_{(C, F)}$ = 250 Hz, *C*-F), 157.4 (d, $^3J_{(C, F)}$ = 10 Hz, q*C*), 157.1 (q*C*), 147.4 (q*C*), 145.4 (d, $^4J_{(C, F)}$ = 2 Hz, *C*H), 130.0 (*C*H), 129.6 (*C*H), 127.9 (d, $^3J_{(C, F)}$ = 8 Hz, *C*H), 127.2 (*C*H), 120.8 (*C*H), 116.8 (q*C*), 114.2 (q*C*), 112.0 (d, $^2J_{(C, F)}$ = 22 Hz, q*C*), 110.3 (d, $^2J_{(C, F)}$ = 20 Hz, *C*H), 108.1 (d, $^4J_{(C, F)}$ = 4 Hz, *C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –116.5 (C*F*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for: $[C_{15}H_9FNO]^+$; 238.0663; found: 238.0663.

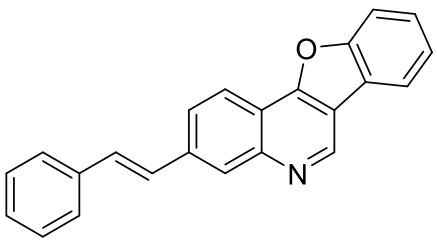
**9-Fluorobenzofuro[3,2-*c*]quinoline (1n)**

Synthesis of substrate **1n** as per general procedure 2 using **S22** (0.200 g, 0.629 mmol), TBABr (0.406 g, 1.26 mmol), $Pd(OAc)_2$ (0.007 g, 5 mol%), $K_2CO_3$ (0.174 g, 1.26 mmol) and *i*PrOAc (0.94 mL).




White solid; 93% yield (0.555 g); **m.p.** 134 – 136 °C **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.46 (s, 1H), 8.40 (d, 1H, *J* = 8.1 Hz), 8.27 (d, 1H, *J* = 8.4 Hz), 8.03 (overlapping dd, 1H, *J* = 5.4, 8.6 Hz), 7.80 (ddd, 1H, *J* = 1.5, 7.0, 8.4 Hz), 7.71 (t, 1H, *J* = 7.8 Hz), 7.48 (dd, 1H, *J* = 2.2, 8.6 Hz), 7.24 (dt, 1H, *J* = 2.2, 9.1 Hz) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 161.2 (d, $^1J_{(C, F)}$ = 247 Hz, *C*-F), 157.1 (d, $^5J_{(C, F)}$ = 2 Hz, q*C*), 155.2 (d, $^3J_{(C, F)}$ = 13 Hz, q*C*), 146.2 (q*C*), 143.0 (*C*H), 128.9 (*C*H), 128.3 (*C*H), 126.2 (*C*H), 120.1 (d, $^3J_{(C, F)}$ = 10 Hz, *C*H), 119.6 (*C*H), 118.0 (d, $^4J_{(C, F)}$ = 2 Hz, q*C*), 116.0 (q*C*), 114.8 (q*C*), 111.3 (d, $^2J_{(C, F)}$ = 24 Hz, *C*H), 99.3 (d, $^2J_{(C, F)}$ = 27 Hz, *C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –112.2 (C*F*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_9FNO]^+$: 238.0663; found: 238.0662.

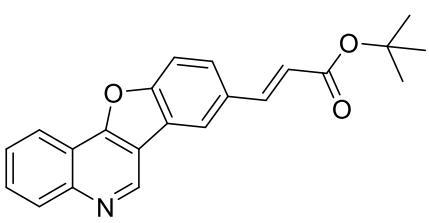
**(*E*)-3-Styrylbenzofuro[3,2-*c*]quinoline (3b)** [24c]




To a screw capped vial was added the quinoline **S12** substrate (0.114 g, 0.30 mmol, 1 eq.), styrene (0.04 mL, 0.33 mmol, 1.1 eq.), $Pd(OAc)_2$ (3.4 mg, 5 mol%) and tetrabutylammonium acetate (0.484 g, 1.5 mmol, 5 eq.) which was stirred at 100 °C for 24 hours. The crude reaction mixture was loaded directly onto silica gel for purification by column chromatography and eluted in DCM:EtOAc (100:0 – 95:5) to yield **3b.**

Off-white solid; 75% (0.072 g); **m.p.** 178–180 °C (lit. m.p. 179 – 182 °C)[24b]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.46 (s, 1H), 8.36 (d, 1H, *J* = 8.6 Hz), 8.27 (d, 1H, *J* = 1.4 Hz), 8.07 (dd, 1H, *J* = 0.9, 7.5 Hz), 7.91 (dd, 1H, *J* = 1.4, 8.6 Hz), 7.74 (d, 1H, *J* = 7.9 Hz), 7.65–7.20 (m, 9H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 157.4 (q*C*), 156.1 (q*C*), 147.9 (q*C*), 144.8 (*C*H), 138.5 (q*C*), 137.0 (q*C*), 130.7 (*C*H), 128.8 (2 × *C*H), 128.1 (2 × *C*H), 128.0 (*C*H), 127.2 (*C*H), 126.8 (2 × *C*H), 124.9 (*C*H), 124.1 (*C*H), 122.7 (q*C*), 121.1 (*C*H), 120.6 (*C*H), 116.3 (2 × q*C*), 112.1 (*C*H) ppm; **HRMS** (ESI-TOF positive mode) *m/z*: $[M+H]^+$ calcd. for $[C_{23}H_{16}NO]^+$: 322.1226; found: 322.1227.

***tert*-Butyl (*E*)-3-(benzofuro[3,2-*c*]quinolin-8-yl)acrylate (3c)[24c]**

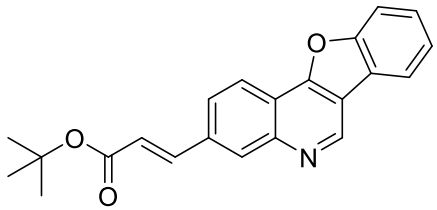


To a screw capped vial was added the quinoline **S20** substrate (0.076 g, 0.20 mmol, 1 eq.), *tert*-butylacrylate (0.08 mL, 0.55 mmol, 1.1 eq.), $Pd(OAc)_2$ (2.2 mg, 5 mol%) and tetrabutylammonium acetate (0.322g, 1.0 mmol, 5 eq.) which was stirred at 100 °C for 24 hours. The crude reaction mixture was loaded directly onto silica gel for purification by column chromatography and eluted in DCM:EtOAc (100:0 – 95:5) to yield **3c**.

White solid, 88% yield (0.802 g); **m.p.** 155–157 °C (lit. m.p. 157 – 158 °C)[24b]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.45 (s, 1H), 8.36 (dd, 1H, *J* = 1.1, 8.1 Hz), 8.25 (d, 1H, *J* = 8.4 Hz), 8.17 (s, 1H), 7.83–7.62 (m, 5H), 6.47 (d, 1H, *J* = 15.9 Hz), 1.58 (s, 9H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = : 166.2 (q*C*), 158.2 (q*C*), 156.7 (q*C*), 147.7 (q*C*), 144.3 (*C*H), 143.0 (*C*H), 131.2 (q*C*), 130.0 (*C*H), 129.6 (*C*H), 127.24 (*C*H), 127.21 (*C*H), 123.5 (q*C*), 120.8 (*C*H), 120.3 (*C*H), 120.2 (*C*H), 117.1 (q*C*), 115.9 (q*C*), 112.5 (*C*H), 80.7 (q*C*), 28.2 (3 × *C*$H_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M+H]^+$ calcd. for $[C_{22}H_{20}NO_3]^+$: 346.1438; found: 346.1430.

***tert*-Butyl (*E*)-3-(benzofuro[3,2-*c*]quinolin-3-yl)acrylate (3d)[24c]**

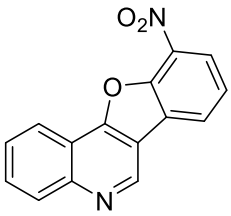
To a screw capped vial was added the quinoline **S12** substrate (0.190 mg, 0.50 mmol, 1 eq.), *tert*-butylacrylate (0.08 mL, 0.55 mmol, 1.1 eq.), $Pd(OAc)_2$ (2.2 mg, 5 mol%) and tetrabutylammonium acetate (0.806 g, 2.5 mmol, 5 eq.) which was stirred at 100 °C for 24 hours. The crude reaction mixture was loaded directly onto silica gel for purification by column chromatography and eluted in DCM:EtOAc (100:0 – 95:5) to yield **3c**.



White solid; 79% (0.137 g); **m.p.** 165– 166 °C (lit. m.p. 164 – 165);[24b] **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.49 (s, 1H), 8.55–8.24 (m, 2H), 8.09 (dd, 1H, *J* = 0.8, 7.6 Hz), 7.93–7.69 (m, 3H), 7.64–7.35 (m, 2H), 6.58 (d, 1H, *J* = 16.0 Hz), 1.58 (s, 9H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 166.0 (q*C*), 157.1 (q*C*), 156.2 (q*C*), 147.4 (q*C*), 145.1 (*C*H), 142.8 (*C*H), 135.6 (q*C*), 130.7 (*C*H), 127.6 (*C*H), 125.1 (*C*H), 124.3 (*C*H), 122.5 (q*C*), 122.0 (*C*H), 121.5 (*C*H), 120.8 (*C*H), 117.7 (q*C*), 117.1 (q*C*), 112.2 (*C*H), 80.9 (q*C*), 28.2 (3 × *C*$H_3$) ppm; **LRMS** *m/z* (ESI+ ) 346 [$(M+H)^+$ , 100%].

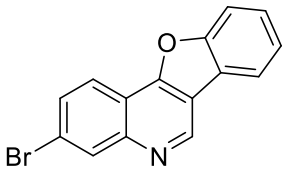
**10-Nitrobenzofuro[3,2-*c*]quinoline (5)**

Synthesis of substrate **5** as per general procedure 2 using **S23** (0.500 g, 1.45 mmol), TBABr (0.935 g, 2.90 mmol), $Pd(OAc)_2$ (16.3 mg, 5 mol%), $K_2CO_3$ (0.401 g, 2.90 mmol) and *i*PrOAc (2.2 mL).



White solid; 91% yield (0.701 g); **m.p.** 255 – 257 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 3086, 2922, 1561, 1519, 1341, 1284, 1227, 1192; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 9.53 (s, 1H), 8.57 (ddd, 1H, *J* = 0.6, 1.4, 8.2 Hz), 8.41 (dd, 1H, *J* = 1.1, 7.8 Hz), 8.37 (dd, 1H, *J* = 1.1, 8.2 Hz), 8.31 (d, 1H, *J* = 8.5 Hz), 7.87 (overlapping ddd, 1H, *J* = 1.4, 7.0, 8.3 Hz), 7.78 (overlapping ddd, 1H, *J* = 1.1, 7.0, 8.3 Hz), 7.63 (dd, 1H, *J* = 7.8 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 158.6 (q*C*), 148.1 (*C*-$NO_2$), 148.0 (q*C*), 143.8 (*C*H), 134.6 (q*C*), 130.4 (*C*H), 129.9 (*C*H), 127.8 (*C*H) 126.9 (*C*H), 126.8 (q*C*), 124.2 (*C*H), 123.1 (*C*H), 121.2 (*C*H), 116.7 (q*C*), 114.7 (q*C*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for: $[C_{15}H_9N_2O_3]^+$; 265.0608; found: 265.0605.

**3-Bromobenzofuro[3,2-*c*]quinoline (S2)**

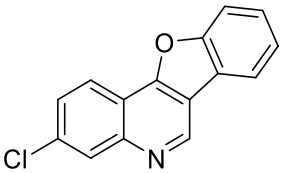


A 15 mL Schlenk was flame-dried and cooled to r.t. under vacuum. The Schlenk was refilled with nitrogen and **S12** (0.030 g, 0.08 mmol, 1.0 equiv.), QPhos (5.6 mg, 0.008 mmol, 10 mol%), $Pd(QPhos)_2$ (6.1 mg, 0.004 mmol, 5 mol%) and $K_2CO_3$ (0.022 g, 0.16 mmol, 2.0 equiv.) were added and the Schlenk placed under vacuum once more for ~10 min. The Schlenk was evacuated and refilled with nitrogen three times and distilled 1,4-dioxane (0.5 mL) was added *via* septum. The Schlenk was sealed, and the resulting mixture stirred at 125 °C for 24 h. The cooled reaction mixture was diluted with DCM, filtered through a short plug of Celite, rinsed with DCM and the filtrate concentrated under reduced pressure. Purification *via* column chromatography (DCM;EtOAc 100:0 – 99:1) yielded **S2**.

White solid; 30% (0.070 g); **m.p.** 165 – 166 °C (lit. m.p. 166 – 167 °C)[24b]; **IR $\tilde{\nu}_{max}$ cm$^{-1}$**: 1615, 1559, 1273, 1101, 755; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 9.46 (s, 1H), 8.44 (d, 1H, *J* = 1.8 Hz), 8.26 (d, 1H, *J* = 8.7 Hz), 8.08 (d, 1H, *J* = 7.7 Hz), 7.77 (dd, 1H, *J* = 1.9, 8.7 Hz), 7.74 (d, 1H, *J* = 8.2 Hz), 7.56 (overlapping ddd, 1H, *J* = 1.3, 7.3, 8.5 Hz), 7.48 (ddd, 1H, *J* = 0.9, 7.7, 8.4 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 157.3 (q*C*), 156.0 (q*C*), 147.9 (q*C*), 145.4 (*C*H), 132.3 (*C*H), 130.5 (*C*H), 127.6 (*C*H), 124.3 (*C*H), 123.4 (q*C*-Br), 122.4 (q*C*), 122.1 (*C*H), 120.7 (*C*H), 116.7 (q*C*), 115.8 (q*C*), 112.2 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_9BrNO]^+$: 297.9862; found: 297.9859.

**3-Chlorobenzofuro[3,2-*c*]quinoline (S3)**

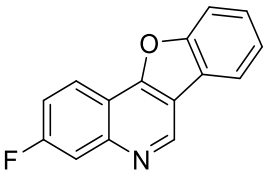
Synthesis of substrate **S3** as per general procedure 3 using **S24** (0.407 g, 1.22 mmol), $Pd(OAc)_2$ (13.9 mg, 0.0619 mmol), $K_2CO_3$ (0.340 g, 2.46 mmol) in NMP (1.82 mL).



Pale yellow solid; 80% (0.247 g); **m.p**. = 149–151 °C (lit. m.p. 155–157 °C)[24a]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.45 (s, 1H), 8.31 (d, 1H, *J* = 8.8 Hz), 8.24 (d, 1H, *J* = 1.9 Hz), 8.07 (dd, 1H, *J* = 0.8, 7.6 Hz), 7.73 (d, 1H, *J* = 8.2 Hz), 7.63 (dd, 1H, *J* = 1.9, 8.8 Hz), 7.58–7.52 (m, 1H), 7.47 (td, 1H, *J* = 1.0, 7.5 Hz) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 157.3 (q*C*), 156.1 (q*C*), 147.8 (q*C*), 145.5 (*C*H), 135.3 (q*C*-Cl), 129.1 (*C*H), 128.0 (*C*H), 127.6 (*C*H), 124.4 (*C*H), 122.5 (q*C*), 122.2 (*C*H), 120.8 (*C*H), 116.7 (q*C*), 115.6 (q*C*), 112.3 (*C*H) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_9ClNO]^+$: 254.0367; found: 254.0361.

**3-Fluorobenzofuro[3,2-*c*]quinoline (S4)**

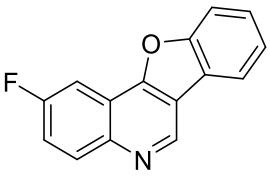
Synthesis of substrate **S4** as per general procedure 3 using **S25** (0.746 g, 2.35 mmol), $Pd(OAc)_2$ (26.8 mg, 0.119 mmol), $K_2CO_3$ (0.649 g, 4.70 mmol) in NMP (3.50 mL).



Off-white solid; 77% (0.427 g); **m.p**. 149–151 °C (lit. m.p. 150–151 °C)[38]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.46 (s, 1H), 8.39 (dd, 1H, *J* = 6.0, 9.1 Hz), 8.07 (ddd, 1H, *J* = 0.6, 1.5, 7.5 Hz), 7.89 (dd, 1H, *J* = 2.5, 10.3 Hz), 7.75–7.71 (m, 1H), 7.58–7.43 (m, 3H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 163.1 (d, $^1J_{(C\text{-}F)}$ = 250 Hz, q*C*-F), 157.5 (q*C*), 155.9 (q*C*), 148.5 (d, $^3J_{(C\text{-}F)}$ = 12.5 Hz, q*C*), 145.6 (*C*H), 127.4 (*C*H), 124.3 (*C*H), 123.0 (d, $^3J_{(C\text{-}F)}$ = 10 Hz, *C*H), 122.5 (q*C*), 120.7 (*C*H), 117.3 (d, $^2J_{(C\text{-}F)}$ = 26 Hz, *C*H), 116.0 (d, $^6J_{(C\text{-}F)}$ = 2 Hz, q*C*), overlapping signals: 114.1 (q*C*), 114.0 (d, $^2J_{(C\text{-}F)}$ = 21 Hz, *C*H), 112.2 (*C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –109.3 (C*F*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_9FNO]^+$: 238.0663; found: 238.0665.

**2-Fluorobenzofuro[3,2-*c*]quinoline (S5)**

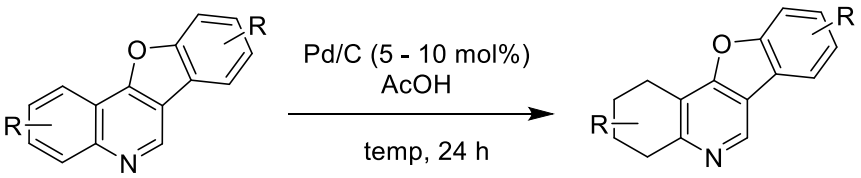
Synthesis of substrate **S5** as per general procedure 3 using **S26** (0.319 g, 1.00 mmol), $Pd(OAc)_2$ (11.2 mg, 0.0501 mmol), $Cs_2CO_3$ (0.652 g, 2.00 mmol) in NMP (1.50 mL). $Cs_2CO_3$ used in place of $K_2CO_3$.



Off-white solid; 86% (0.205 g); **m.p**. 149–151 °C (lit. m.p. 146–148 °C)[24a]; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.39 (s, 1H), 8.23 (dd, 1H, *J* = 5.2, 9.2 Hz), 8.05 (d, 1H, *J* = 7.5 Hz), 7.94 (dd, 1H, *J* = 2.8, 8.6 Hz), 7.71 (d, 1H, *J* = 8.2 Hz), 7.57–7.42 (m, 3H) ppm; **$^{13}$C NMR** (75 MHz, $CDCl_3$) δ 160.9 (d, $^1J_{(C\text{-}F)}$ = 249 Hz, q*C*-F), 157.1 (d, $^4J_{(C\text{-}F)}$ = 5 Hz, q*C*), 156.1 (q*C*), 144.5 (q*C*), 143.7 (d, $^6J_{(C\text{-}F)}$ = 3 Hz, *C*H), 132.6 (d, $^3J_{(C\text{-}F)}$ = 9 Hz, *C*H), 127.7

(*C*H), 124.3 (*C*H), 122.6 (q*C*), 120.9 (*C*H), 119.3 (d, $^{2}J_{(C\text{-}F)}$ = 26 Hz, *C*H), 117.9 (d, $^{3}J_{(C\text{-}F)}$ = 11 Hz, q*C*), 116.9 (q*C*), 112.3 (*C*H), 104.8 (d, $^{2}J_{(C\text{-}F)}$ = 24 Hz, *C*H) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –111.5 (C*F*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_9FNO]^+$: 238.0663; found: 238.0672.

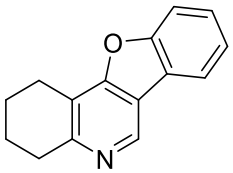
Synthesis of Reduced Products




**Note:** reactions were carried out for a reaction time of 24 hours unless otherwise stated.

**1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinoline (2a)**

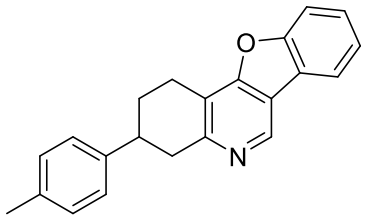
Synthesis of substrate **2a** as per general procedure 5 using **1a** (0.050 g, 0.23 mmol), Pd/C (12.1 mg, 0.011 mmol, 5 mol%), AcOH (1.10 mL) and $H_2$ balloon at 50 °C.




White solid; 96% (0.049 g); **m.p.** 151 – 152 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2936, 1600, 1570, 1462, 1446, 1410, 1192, 1123, 849, 760; **$^{1}$H NMR (300 MHz, $CDCl_3$)** δ = 8.96 (s, 1H), 7.94 (d, 1H, *J* = 7.5), 7.57 (d, 1H, *J* = 8.2 Hz), 7.50–7.42 (m, 1H), 7.36 (td, 1H, *J* = 1.0, 7.5 Hz), 3.05 (m, 4H), 2.05–1.86 (m, 4H) ppm; **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 156.1 (q*C*), 155.8 (q*C*), 140.1 (*C*H), 127.5 (*C*H), 123.6 (*C*H), 122.5 (q*C*), 121.0 (*C*H), 118.8 (q*C*), 116.9 (q*C*), 111.9 (*C*H), 32.6 ($CH_2$), 23.2 ($CH_2$), 22.4 ($CH_2$), 22.0 ($CH_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{14}NO]^+$: 224.2070; found: 224.1068.

**3-(*p*-Tolyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2b)**

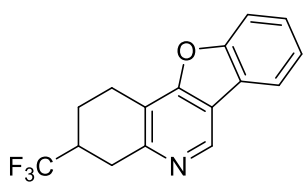
Synthesis of substrate **2b** as per general procedure 5 using **1b** (0.062 g, 0.20 mmol), Pd/C (21 mg, 0.020mmol), AcOH (1.20 mL) and $H_2$ balloon at 80 °C for 30 hours.




Pale-yellow solid; 92% (0.058 g), **m.p.** 128 – 132 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 2927, 1574, 1513, 1444, 1192, 1020, 822, 753; **$^{1}$H NMR (400 MHz, $CDCl_3$)** δ = 9.02 (s, 1H), 7.98 (d, 1H, *J* = 7.5 Hz), 7.60 (d, 1H, *J* = 8.1 Hz), 7.52–7.45 (m, 1H), 7.39 (t, 1H, *J* = 7.5 Hz), 7.21 (d, 2H, *J* = 8.1 Hz), 7.16 (d, 2H, *J* = 8.1 Hz), 3.43–3.00 (m, 5H), 2.35 (s, 3H), 2.32–2.25 (m, 1H), 2.08–1.94 (m, 1H) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 156.2 (q*C*), 155.5 (q*C*), 142.7 (q*C*), 140.4 (*C*H), 136.1 (q*C*), 129.4 (2 × *C*H), 127.7 (*C*H), 126.9 (2 × *C*H), 123.8 (*C*H), 122.5 (q*C*), 121.1 (*C*H), 119.0 (q*C*), 116.3 (q*C*), 112.0 (*C*H), 40.2 ($CH_2$), 40.1 (*C*H), 29.4 ($CH_2$), 22.5 ($CH_2$), 21.1 ($CH_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{22}H_{20}NO]^+$: 314.1539; found: 314.1543.

**3-(Trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2c)**

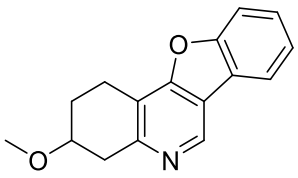
Synthesis of substrate **2c** as per general procedure 5 using **1c** (0.115 g, 0.40 mmol), Pd/C (43 mg, 0.040 mmol), AcOH (2.40 mL) and $H_2$ balloon at 80 °C for 30 hours.



White solid; 54% (0.063 g); **m.p.** 158 – 159 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2936, 1576, 1450, 1417, 1391, 1277, 1252, 1160, 1118, 1055, 1004, 770, 753; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 9.03 (s, 1H), 7.99 (d, 1H, *J* = 7.6 Hz), 7.61 (d, 1H, *J* = 8.2 Hz), 7.55– 7.45 (m, 1H), 7.40 (td, 1H, *J* = 0.9, 7.6 Hz), 3.43–3.31 (two overlapping doublets, 2H, *J* = 4.5, 17.3 Hz), 3.19 – 2.90 (m, 2H), 2.75 – 2.58 (m, 1H), 2.43 – 2.31 (m, 1H), 1.93 – 1.75 (m, 1H) ppm: **$^{13}$C NMR (75 MHz, $CDCl_3$)** δ = 159.8 (q*C*), 156.2 (q*C*), 152.3 (q*C*), 141.0 (*C*H), 128.0 (*C*H), 127.6 (q, $^1J_{(C, F)}$ = 278 Hz, *C*$F_3$), 124.0 (*C*H), 122.2 (q*C*), 121.2 (*C*H), 119.4 (q*C*), 115.6 (q*C*), 112.1 (*C*H), 39.5 (q, $^2J_{(C, F)}$ = 28 Hz, *C*H), 31.4 (q, $^3J_{(C, F)}$ = 3 Hz, *C*$H_2$), 21.3 (*C*$H_2$), 21.1 (q, $^3J_{(C, F)}$ = 3 Hz, *C*$H_2$) ppm**; $^{19}$F NMR (376 MHz, $CDCl_3$)** δ = –62.5 ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{13}F_3NO]^+$: 292.0932; found: 292.0944.

**3-Methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2d)**

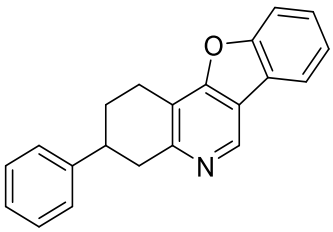
Synthesis of substrate **2d** as per general procedure 5 using **1d** (0.050 g, 0.20 mmol), Pd/C (21 mg, 0.020 mmol), AcOH (1.20 mL) and $H_2$ balloon at 80 °C.



Pale-yellow oil; 91% (0.046 g); **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2929, 1603, 1574, 1445, 1192, 1101, 750; **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 9.00 (s, 1H), 7.96 (d, 1H, *J* = 7.4 Hz), 7.59 (d, 1H, *J* = 8.2 Hz), 7.48 (t, 1H, *J* = 7.7 Hz), 7.38 (t, 1H, *J* = 7.4 Hz), 3.91– 3.84 (m, 1H), 3.47 (s, 3H), 3.45–2.99 (m, 4H), 2.17–1.81 (m, 2H) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 159.8 (q*C*), 156.2 (q*C*), 153.2 (q*C*), 140.7 (*C*H), 127.8 (*C*H), 123.8 (*C*H), 122.3 (q*C*), 121.1 (*C*H), 119.2 (q*C*), 116.2 (q*C*), 112.0 (*C*H), 75.2 (*C*H), 56.2 (*C*$H_3$), 37.9 (*C*$H_2$), 26.3 (*C*$H_2$), 19.1 (*C*$H_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{16}NO_2]^+$: 254.1176; found: 254.1173.

**3-Phenyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2e)**

Synthesis of substrate **2e** as per general procedure 5 using **1e** (0.037 g, 0.12 mmol), Pd/C (13 mg, 0.012 mmol), AcOH (0.75 mL) and $H_2$ balloon at 80 °C for 30 hours.

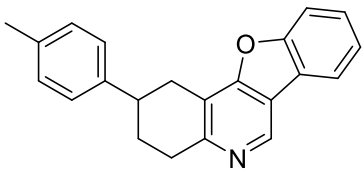


Off-white solid; 73% (0.023 g); **m.p.** 133 – 135 °C**; IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2923, 1599, 1572, 1444, 1411, 1191, 1017, 745, 700; **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 9.01 (s, 1H), 7.97 (d, 1H, *J* = 7.7 Hz), 7.59 (d, 1H, *J* = 8.2 Hz), 7.47 (t, 1H, *J* = 7.7 Hz), 7.41–7.30 (m, 5H), 7.25 (t, 1H, *J* = 6.9 Hz), 3.46

– 3.00 (m, 5H), 2.34–2.26 (m, 1H), 2.10–1.96 (m, 1H) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 156.2 (q*C*), 155.4 (q*C*), 145.7 (q*C*), 140.5 (*C*H), 128.7 (2 × *C*H), 127.7 (*C*H), 127.0 (2 × *C*H), 126.5 (*C*H), 123.8 (*C*H), 122.4 (q*C*), 121.1 (*C*H), 119.0 (q*C*), 116.2 (q*C*), 112.0 (*C*H), 40.5 (*C*H), 40.1 ($CH_2$), 29.3 ($CH_2$), 22.5 ($CH_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{21}H_{18}NO]^+$: 300.1383; found: 300.1389.

**2-(*p*-Tolyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2f)**

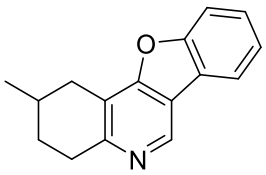
Synthesis of substrate **2f** as per general procedure 5 using **1f** (0.078 g, 0.25 mmol), Pd/C (27 mg,0.025 mmol), AcOH (1.50 mL) and $H_2$ balloon at 100 °C for 72 hours.



Pale-yellow solid; 9% (0.007 g); **m.p.** 58 – 60 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 2924, 1605, 1572, 1445, 1192, 1122, 748; **$^1$H NMR (600 MHz, $CDCl_3$)** δ = 9.05 (s, 1H), 8.00 (d, 1H, *J* = 7.4 Hz), 7.58 (d, 1H, *J* = 8.1 Hz), 7.49 (t, 1H, *J* = 7.8 Hz), 7.41 (t, 1H, *J* = 7.4 Hz), 7.24 (d, 2H, *J* = 7.8 Hz), 7.18 (d, 2H, *J* = 7.8 Hz), 3.55–3.42 (m, 1H), 3.36– 3.18 (m, 2H), 3.17–3.03 (m, 2H), 2.37 (s, 3H), 2.37– 2.30 (m, 1H), 2.18–2.10 (m, 1H) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 156.2 (q*C*), 154.9 (q*C*), 142.6 (q*C*), 139.8 (*C*H), 136.2 (q*C*), 129.5 (2 × *C*H), 127.9 (*C*H), 126.9 (2 × *C*H), 123.9 (*C*H), 122.3 (q*C*), 121.2 (*C*H), 118.7 (q*C*), 116.9 (q*C*), 112.1 (*C*H), 39.1 (*C*H), 32.7 ($CH_2$), 30.5 ($CH_2$), 30.3 ($CH_2$), 21.2 ($CH_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{22}H_{20}NO]^+$: 314.1539; found: 314.1540.

**2-Methyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2g)**

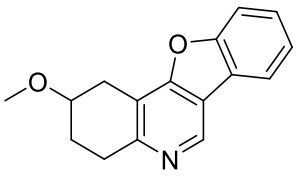
Synthesis of substrate **2g** as per general procedure 5 using **1g** (0.047 g, 0.20 mmol), Pd/C (22 mg, 0.020 mmol), AcOH (1.20 mL) and $H_2$ balloon at 80 °C.



Off-white solid; 78% (0.037 g); **m.p.** 97 – 99 °C**; IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 2925, 1606, 1572, 1446, 1192, 1122, 996, 864, 835, 748; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.98 (s, 1H), 7.96 (ddd, 1H, *J* = 0.6, 1.2, 7.7 Hz), 7.60–7.57 (m, 1H), 7.49–7.45 (m, 1H), 7.38 (td, 1H, *J* = 1.2, 7.7 Hz), 3.25 (dd, 1H, *J* = 4.3, 16.8 Hz), 3.17 (ddd, 1H, *J* = 3.4, 5.5, 17.6 Hz), 3.12–3.03 (m, 1H), 2.57 (dd, 1H, *J* = 10.3, 16.8 Hz), 2.10–1.97 (m, 2H), 1.62 (dtd, *J* = 5.5, 11.0, 12.8 Hz), 1.19 (d, 3H, *J* = 6.6 Hz) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 156.1 (q*C*), 155.5 (q*C*), 140.1 (*C*H), 127.6 (*C*H), 123.7 (*C*H), 122.5 (q*C*), 121.1 (*C*H), 118.8 (q*C*), 116.6 (q*C*), 112.0 (*C*H), 32.3 ($CH_2$), 31.4 ($CH_2$), 30.7 ($CH_2$), 28.3 (*C*H), 21.8 ($CH_3$), ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{16}NO]^+$: 238.1226; found: 238.1232.

**2-Methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2h)**

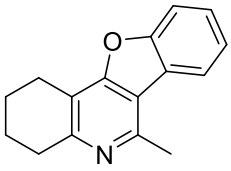
Synthesis of substrate **2h** as per general procedure 5 using **1h** (0.051 g, 0.20 mmol), Pd/C (22 mg, 0.020 mmol), AcOH (1.20 mL) and $H_2$ balloon at 80 °C.



Yellow oil; 28% (0.014 g); **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2928, 1604, 1572, 1445, 1343, 1191, 1100, 960, 880, 835, 749; **$^1$H NMR (600 MHz, $CDCl_3$)** δ = 8.99 (s, 1H), 7.97 (d, 1H, *J* = 7.6 Hz), 7.60 (d, 1H, *J* = 8.2 Hz), 7.48 (t, 1H, *J* = 7.6 Hz), 7.39 (t, 1H, *J* = 7.6 Hz), 3.88–3.83 (m, 1H), 3.49 (s, 3H), 3.35 (dd, 1H, *J* = 4.5, 16.8 Hz), 3.28–3.21 (m, 1H), 3.15–3.05 (m, 2H), 2.21–2.09 (m, 2H) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 160.4 (q*C*), 156.1 (q*C*), 154.7 (q*C*), 140.4 (*C*H), 127.7 (*C*H), 123.8 (*C*H), 122.4 (q*C*), 121.1 (*C*H), 119.0 (q*C*), 114.3 (q*C*), 112.0 (*C*H), 74.1 (*C*H), 56.2 ($CH_3$), 29.4 ($CH_2$), 28.1 ($CH_2$), 27.4 ($CH_2$), ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{16}NO_2]^+$: 254.1176; found: 254.1177.

**6-Methyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2i)**

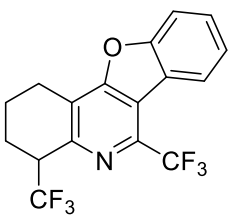
Synthesis of substrate **2i** as per general procedure 5 using **1i** (0.050 g, 0.21 mmol), Pd/C (24.3 mg, 0.023 mmol, 10 mol%), AcOH (1.10 mL) and $H_2$ balloon at 100 °C for 48 h.



White solid; 91% (0.041 g); **m.p.** 81 – 83 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2941, 2918, 2853, 1578, 1443, 1197, 1076; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 7.96 (dd, 1H, *J* = 0.7, 7.7 Hz), 7.57 (ddd, 1H, *J* = 0.7, 0.9, 8.2 Hz), 7.50–7.42 (ddd, 1H, *J* = 1.3, 7.4, 8.2 Hz), 7.36 (dt, 1H, *J* = 1.0, 7.7 Hz), 3.02 (m, 4H), 2.92 (s, 3H), 2.01–1.88 (m, 4H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 155.9 (q*C*), 154.7 (q*C*), 150.3 (q*C*), 126.8 (*C*H), 123.5 (*C*H), 123.3 (q*C*), 121.9 (*C*H), 116.7 (q*C*), 114.4 (q*C*), 111.7 (*C*H), 32.4 ($CH_2$), 23.2 ($CH_2$), 22.8 ($CH_3$), 22.1 ($CH_2$), 22.0 ($CH_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{16}H_{16}NO]^+$: 238.1226; found: 238.1227.

**4,6-Bis(trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2j)**

Synthesis of substrate **2j** as per general procedure 5 using **1j** (0.050 g, 0.14 mmol), Pd/C (15.0 mg, 0.014 mmol), AcOH (1.10 mL) and $H_2$ balloon at 80 °C.

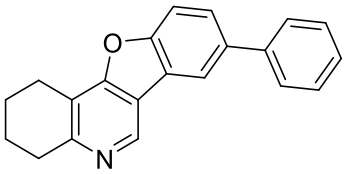


White solid; 87% (0.044 mg); **m.p.** 150 – 152 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 2958, 2927, 1570, 1470, 1237, 1173, 1113, 1098; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.19 (dd, 1H, *J* = 0.8, 8.0 Hz), 7.67 (ddd, 1H, *J* = 0.8, 1.0, 8.3 Hz), 7.60 (overlapping ddd, 1H, *J* = 1.3, 7.3, 8.3 Hz), 7.47 (overlapping ddd, 1H, *J* = 1.0, 7.3, 8.3 Hz), 3.94 – 3.84 (m, 1H), 3.25 (dt, 1H, *J* = 5.6, 17.7 Hz), 3.13 (dt, 1H, *J* = 7.3, 17.7 Hz), 2.40 – 2.31 (m, 1H), 2.23 – 2.12 (m, 2H), 2.01 – 1.92 (m, 1H) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 159.7 (q*C*), 155.5 (q*C*),

145.6 (q*C*), 137.6 (q, $^{2}J_{(C, F)}$ = 38 Hz, q*C*), 128.3 (*C*H), 125.6 (q, $^{1}J_{(C, F)}$ = 280 Hz, *C*-$F_3$), 123.5 (*C*H), 123.0 (q, $^{5}J_{(C, F)}$ = 4 Hz, *C*H), 121.2 (q*C*), 120.8 (q, $^{1}J_{(C, F)}$ = 175 Hz, *C*-$F_3$), 118.8 (q*C*), 116.6 (q*C*), 111.0 (*C*H), 43.2 (q, $^{2}J_{(C, F)}$ = 26 Hz, aliphatic *C*H), 22.0 (q, $^{3}J_{(C, F)}$ = 2 Hz, *C*$H_2$), 20.1 (*C*$H_2$), 16.9 (*C*$H_2$) ppm; **$^{19}$F NMR (471 MHz, $CDCl_3$)** δ = –66.3 (C*F*$_3$), –66.4 (C*F*$_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for [$C_{17}H_{12}F_6NO$]$^+$: 360.0818; found: 360.0819.

**8-Phenyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2k)**

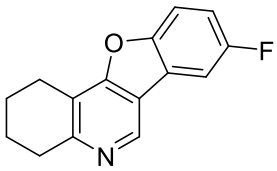
Synthesis of substrate **2k** as per general procedure 5 using **1k** (0.070 g, 0.24 mmol), Pd/C (25 mg, 0.024 mmol), AcOH (1.40 mL) and $H_2$ balloon at 80 °C.



White solid; 70% (0.050 g); **m.p.** 116 – 118 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2927, 1635, 1567, 1470, 1410, 1195, 1069, 1033, 767, 701; **$^{1}$H NMR (400 MHz, $CDCl_3$)** δ = 9.00 (s, 1H), 8.12 (d, 1H, *J* = 1.4 Hz), 7.69–7.58 (m, 4H), 7.46 (t, 2H, *J* = 7.4 Hz), 7.36 (t, 1H, *J* = 7.4 Hz), 3.17–3.00 (m, 4H), 2.05–1.88 (m, 4H) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$) δ** = 160.6 (q*C*), 156.0 (q*C*), 155.6 (q*C*), 141.0 (q*C*), 140.1 (*C*H), 137.4 (q*C*), 129.0 (2 × *C*H), 127.5 (2 × *C*H), 127.4 (*C*H), 127.0 (*C*H), 123.0 (q*C*), 119.5 (*C*H), 118.8 (q*C*), 117.0 (q*C*), 112.0 (*C*H), 32.6 (*C*$H_2$), 23.2 (*C*$H_2$), 22.4 (*C*$H_2$), 22.0 (*C*$H_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for [$C_{21}H_{18}NO$]$^+$: 300.1383; found: 300.1392.

**14-Fluoro-5,6,7,8-tetrahydrobenzofuro[3,2-*c*]quinoline (2l)**

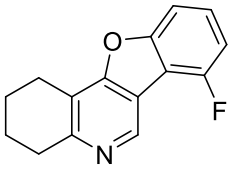
Synthesis of substrate **2l** as per general procedure 5 using **1l** (0.050 g, 0.21 mmol), Pd/C (22.4 mg, 0.021 mmol), AcOH (1.10 mL) and $H_2$ balloon at 80 °C.



White solid; 70% (0.047 g); **m.p.** = 141–144 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2935, 1635, 1599, 1573, 1476, 1423, 1343, 1168, 1156, 1115, 1091, 897, 862, 816, 798; **$^{1}$H NMR (400 MHz, $CDCl_3$)** δ = 8.92 (s, 1H), 7.58 (dd, 1H, *J* = 2.6, 8.0 Hz), 7.48 (dd, 1H, *J* = 4.0, 9.0 Hz), 7.15 (td, 1H, *J* = 2.6, 9.0 Hz), 3.06 (t, 2H, *J* = 6.1 Hz), 3.01 (t, 2H, *J* = 6.1 Hz), 2.03–1.87 (m, 4H) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ 161.0 (q*C*), 159.5 (d, $^{1}J_{(C, F)}$ = 241 Hz, q*C*-F), 156.4 (q*C*), 152.1 (q*C*), 140.3 (*C*H), 123.5 (d, $^{3}J_{(C, F)}$ = 10 Hz, q*C*), 118.6 (d, $^{4}J_{(C, F)}$ = 2 Hz, q*C*), 117.1 (q*C*), 114.8 (d, $^{2}J_{(C, F)}$ = 26 Hz, *C*H), 112.6 (d, $^{3}J_{(C, F)}$ = 9 Hz, *C*H), 107.2 (d, $^{2}J_{(C, F)}$ = 26 Hz, *C*H), 32.6 (*C*$H_2$), 23.1 (*C*$H_2$), 22.3 (C$H_2$), 21.9 (*C*$H_2$) ppm; **$^{19}$F NMR (376 MHz, $CDCl_3$)** δ = –119.1 ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for [$C_{15}H_{13}FNO$]$^+$: 242.0976; found: 242.0985.

**7-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2m)**

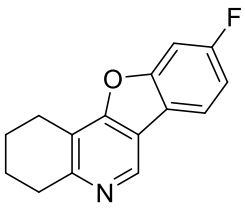
Synthesis of substrate **2m** as per general procedure 5 using **1m** (0.050 g, 0.21 mmol), Pd/C (22.4 mg, 0.021 mmol), AcOH (1.10 mL) and $H_2$ balloon at 80 °C.



White solid; 88% (0.045 g); **m.p.** 108 – 110 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 2929, 2860, 1570, 1492, 1243, 1222, 1015; **$^{1}$H NMR (500 MHz, $CDCl_3$)** δ = 9.03 (s, 1H), 7.44 – 7.36 (m, 2H), 7.08 (overlapping ddd, 1H, *J* = 1.0, 7.9, 9.0 Hz), 3.11 – 3.01 (m, 4H), 2.05 – 1.89 (m, 4H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 159.6 (q*C*), 157.4 (d, $^{1}J_{(C, F)}$ = 250 Hz, *C*-F), 157.4 (d, $^{3}J_{(C, F)}$ = 9 Hz, q*C*), 156.1 (q*C*), 141.5 (d, $^{4}J_{(C, F)}$ = 3 Hz, *C*H), 128.1 (d, $^{3}J_{(C, F)}$ = 8 Hz, *C*H), 116.7 (q*C*), 116.3 (d, $^{3}J_{(C, F)}$ = 3 Hz, q*C*), 111.5 (d, $^{2}J_{(C, F)}$ = 23 Hz, q*C*), 109.9 (d, $^{2}J_{(C, F)}$ = 19 Hz, *C*H), 107.8 (d, $^{4}J_{(C, F)}$ = 4 Hz, *C*H), 32.5 (*C*$H_2$), 23.0 (*C*$H_2$), 22.2 (*C*$H_2$), 21.8 (*C*$H_2$) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –115.9 ppm (C*F*); **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{13}FNO]^+$: 242.0976; found: 242.0974.

**9-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2n)**

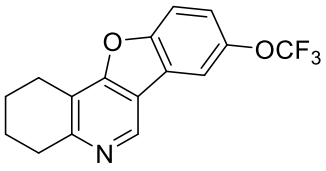
Synthesis of substrate **2n** as per general procedure 5 using **1n** (0.050 g, 0.21 mmol), Pd/C (22.4 mg, 0.021 mmol), AcOH (1.10 mL) and $H_2$ balloon at 80 °C.



White solid; 90% (0.046 g); **m.p.** 129 – 131 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 2922, 2851, 1571, 1408, 1120, 1091, 1026; **$^{1}$H NMR (500 MHz, $CDCl_3$)** δ = 8.94 (s, 1H), 7.89 (dd, 1H, *J* = 5.4, 8.6 Hz), 7.30 (dd, 1H, *J* = 2.3, 8.6 Hz), 7.12 (ddd, 1H, *J* = 2.3, 8.6, 9.3 Hz), 3.11 – 2.99 (m, 4H), 2.50 – 1.85 (m, 4H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 162.4 (d, $^{1}J_{(C, F)}$ = 244 Hz, *C*-F), 160.7 (q*C*), 156.3 (d, $^{3}J_{(C, F)}$ = 13 Hz, q*C*), 155.5 (q*C*), 139.6 (*C*H), 121.4 (d, $^{3}J_{(C, F)}$ = 10 Hz, *C*H), 118.7 (d, $^{4}J_{(C, F)}$ = 2 Hz, q*C*), 118.1 (q*C*), 116.8 (q*C*), 111.6 (d, $^{2}J_{(C, F)}$ = 24 Hz, *C*H), 100.0 (d, $^{2}J_{(C, F)}$ = 28 Hz, *C*H), 32.4 (*C*$H_2$), 23.1 (*C*$H_2$), 22.2 (*C*$H_2$), 21.9 (*C*$H_2$) ppm; **$^{19}$F NMR (282 MHz, $CDCl_3$)** δ = –112.2 ppm (C*F*); **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. For $[C_{15}H_{13}FNO]^+$: 242.0976; found: 242.0972.

**8-(Trifluoromethoxy)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (2o)**

Synthesis of substrate **2o** as per general procedure 5 using **1o** (0.085 g, 0.28 mmol), Pd/C (30 mg, 0.028 mmol), AcOH (1.70 mL) and $H_2$ balloon at 80 °C.

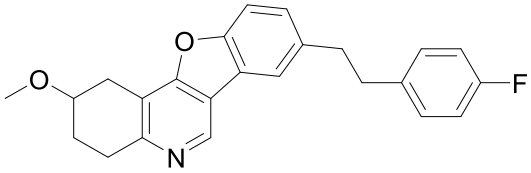


Off-white solid; 92% (0.080 g); **m.p.** 116 – 118 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2942, 1635, 1576, 1462, 1434, 1252, 1197, 1153; **$^{1}$H NMR (400 MHz, $CDCl_3$)** δ = 8.96 (s, 1H), 7.80 (s, 1H), 7.56 (d, 1H, *J* = 8.9 Hz), 7.32 (dd, 1H, *J* = 1.3, 8.9 Hz), 3.08 (t, 2H, *J* = 6.2 Hz), 3.04 (t, 2H, *J* = 6.2 Hz), 2.04–1.88 (m, 4H) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 161.0 (q*C*), 156.8 (q*C*), 154.0 (q*C*), 145.4 (q, $^{2}J_{(C, F)}$ = 2 Hz, q*C*-O), 140.4 (*C*H), 123.6 (q*C*), 120.9 (*C*H), 120.7 (q, $^{1}J_{(C, F)}$ = 257 Hz, *C*$F_3$), 118.2 (q*C*), 117.2 (q*C*), 113.9 (*C*H), 112.7 (*C*H), 32.6 (*C*$H_2$), 23.1 (*C*$H_2$), 22.3 (*C*$H_2$), 21.9 (*C*$H_2$) ppm; **$^{19}$F NMR (376 MHz, $CDCl_3$)** δ = –58.2

(C$F_3$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for [$C_{16}H_{13}F_3NO_2$]$^+$:308.0893; found: 308.0905.

**8-(4-fluorophenethyl)-2-methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (4a)**

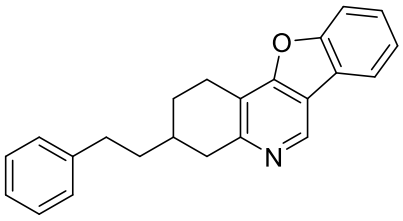
Synthesis of substrate **4a** as per general procedure 5 using **3a** (0.075 g, 0.20 mmol), Pd/C (22 mg, 0.020 mmol), AcOH (1.20 mL) and $H_2$ balloon at 80 °C. $^1$H NMR analysis showed a mixture of **4a** (7% conversion) and only alkene reduction (93% reduction). Isolated alkene-reduced substrate (0.030 g, 0.081 mmol, 1 eq.) was resubmitted with Pd/C (13 mg, 0.012 mmol, 15 mol%) in AcOH (0.60 mL) as per general procedure 5 at 80 °C for 48 hours. The product was then purified by preparative thin layer chromatography (DCM/EtOAc 1:1 + 1% $NEt_3$).




Colourless oil; 29% (0.009 g); **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2927, 1638, 1575, 1509, 1480, 1433, 1220, 1192, 1103, 825, 752; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.96 (s, 1H), 7.74 (d, 1H, *J* = 1.7 Hz), 7.48 (d, 1H, *J* = 8.4 Hz), 7.23 (dd, 1H, *J* = 1.7, 8.4 Hz), 7.13–7.08 (m, 2H), 6.95 (t, 2H, *J* = 8.7 Hz), 3.88–3.81 (m, 1H), 3.48 (s, 3H), 3.34 (dd, 1H, *J* = 4.8, 16.9 Hz), 3.24 (m, 1H), 3.12–3.03 (m, 4H), 3.00–2.95 (m, 2H), 2.22–2.09 (m, 2H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 161.5 (d, $^1J_{(C, F)}$ = 244 Hz, *C*-F), 160.8 (q*C*), 154.8 (q*C*), 154.7 (q*C*), 140.4 (*C*H), 137.2 (q*C*), 137.1 (q*C*), 130.0 (d, $^3J_{(C, F)}$ = 8 Hz, 2 × *C*H), 128.3 (*C*H), 122.5 (q*C*), 120.7 (*C*H), 119.0 (q*C*), 115.3 (d, $^2J_{(C, F)}$ = 21 Hz, 2 × *C*H), 114.3 (q*C*), 111.7 (*C*H), 74.2 (*C*H), 56.2 (*C*$H_3$), 38.1 (*C*$H_2$), 37.7 (*C*$H_2$), 29.5 (*C*$H_2$), 28.2 (*C*$H_2$), 27.5 (*C*$H_2$) ppm; **$^{19}$F NMR (376 MHz, $CDCl_3$)** δ = –117.4 (C*F*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for [$C_{24}H_{23}FNO_2$]$^+$: 376.1707; found: 376.1706.

**3-Phenethyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline (4b)**

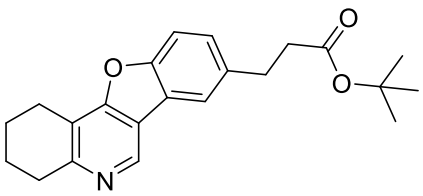
Synthesis of substrate **4b** as per general procedure 5 using **3b** (0.078 g, 0.24 mmol), Pd/C (26 mg, 0.024 mmol), AcOH (1.50 mL) and $H_2$ balloon for 30 hours.




Off-white solid; 67% (0.053 g); **m.p.** 114 – 118 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2921, 1602, 1573, 1427, 1343, 1195, 1016, 919, 747, 696; **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 8.99 (s, 1H), 7.95 (d, 1H, *J* = 7.4 Hz), 7.58 (d, 1H, *J* = 8.0 Hz), 7.46 (t, 1H, *J* = 7.4 Hz), 7.37 (t, 1H, *J* = 7.4 Hz), 7.32–7.16 (m, 5H), 3.34–3.12 (m, 2H), 3.01–2.87 (m, 1H), 2.84–2.71 (m, 3H), 2.21–1.16 (m, 5H) ppm**; $^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 160.1 (q*C*), 156.1 (q*C*), 155.4 (q*C*), 142.6 (q*C*), 140.3 (*C*H), 128.5 (4 × *C*H), 127.6 (*C*H), 125.9 (*C*H), 123.7 (*C*H), 122.5 (q*C*), 121.1 (*C*H), 118.9 (q*C*), 116.6 (q*C*), 112.0 (*C*H), 39.1 (*C*$H_2$), 38.2 (*C*$H_2$), 33.9 (*C*H), 33.3 (*C*$H_2$), 28.2 (*C*$H_2$), 22.0 (*C*$H_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for [$C_{23}H_{22}NO$]$^+$: 328.1696; found: 328.1683.

***tert*-Butyl 3-(1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinolin-8-yl)propanoate (4c)**

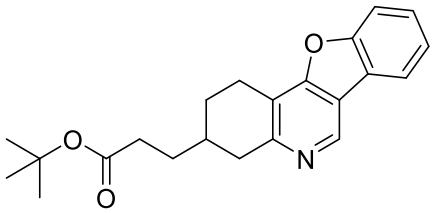
Synthesis of substrate **4c** as per general procedure 5 using **3c** (0.050 g, 0.20 mmol), Pd/C (21.7 mg, 0.020 mmol), AcOH (1.10 mL) and $H_2$ balloon at 80 °C.



White solid; 88% (0.54 mg); **m.p.** 58 – 60 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 3071, 3018, 1620, 1568, 1501, 1392, 1238, 1159; **$^1$H NMR (300 MHz, $CDCl_3$)** δ = 8.88 (s, 1H), 7.73 (d, 1H, *J* = 1.7 Hz), 7.41 (d, 1H, *J* = 8.5 Hz), 7.23 (dd, 1H, *J* = 1.7, 8.5 Hz), 3.06 – 2.92 (m, 6H), 2.55 (t, 2H, *J* = 7.7 Hz), 1.98 – 1.78 (m, 4H), 1.34 (s, 9H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 171.1 (*C*=O), 159.3 (q*C*), 154.5 (q*C*), 153.7 (q*C*), 138.9 (*C*H), 135.3 (q*C*), 126.9 (*C*H), 121.4 (q*C*), 119.4 (*C*H), 117.6 (q*C*), 115.8 (q*C*), 110.5 (*C*H), 79.5 (q*C*), 36.5 ($CH_2$), 31.4 ($CH_2$), 30.0 ($CH_2$), 27.1 (3 × $CH_3$), 22.1 ($CH_2$), 21.2 ($CH_2$), 20.9 ($CH_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. For $[C_{22}H_{26}NO_3]^+$: 352.1913; found: 352.1911.

***tert*-Butyl 3-(1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinolin-3-yl)propanoate (4d)**

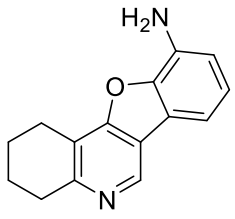
Synthesis of substrate **4d** as per general procedure 5 using **3d** (0.057 g, 0.17 mmol), Pd/C (18 mg, 0.017 mmol), AcOH (1.0 mL) and $H_2$ balloon for 30 hours.



White solid; 86% (0.050 g); **m.p.** 91 – 94 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2926, 1724, 1573, 1445, 1366, 1190, 1141, 1017, 747; **$^1$H NMR (400 MHz, $CDCl_3$)** δ = 8.98 (s, 1H), 7.96 (d, 1H, *J* = 7.5 Hz), 7.58 (d, 1H, *J* = 8.2 Hz), 7.47 (t, 1H, *J* = 7.5 Hz), 7.38 (t, 1H, *J* = 7.5 Hz), 3.28–3.18 (m, 2H), 3.03 – 2.88 (m, 1H), 2.70 (dd, 1H, *J* = 10.4, 17.2 Hz), 2.39 (t, 2H, *J* = 7.7 Hz), 2.16 – 2.07 (m, 1H), 1.99 – 1.91 (m, 1H), 1.81 – 1.74 (m, 2H), 1.59 – 1.49 (m, 1H), 1.46 (s, 9H) ppm; **$^{13}$C NMR (100 MHz, $CDCl_3$)** δ = 173.2 (*C*=O), 160.0 (q*C*), 156.1 (q*C*), 155.1 (q*C*), 140.3 (*C*H), 127.6 (*C*H), 123.7 (*C*H), 122.4 (q*C*), 121.0 (*C*H), 118.9 (q*C*), 116.5 (q*C*), 112.0 (*C*H), 80.4 (q*C*), 38.9 ($CH_2$), 33.9 (*C*H), 33.2 ($CH_2$), 31.4 ($CH_2$), 28.3 (3 × $CH_3$), 27.9 ($CH_2$), 21.9 ($CH_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{22}H_{26}NO_3]^+$:352.1907; found: 352.1921.

**1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinolin-10-amine (6a)**

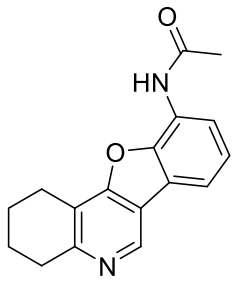
Synthesis of substrate **6a** as per general procedure 5. AcOH was replaced with MsOH (2M, 0.57 mL, 1.14 mmol, 3 eq.) in *i*PrOH (2.2 mL). From **5** (0.100 g, 0.38 mmol), Pd/C (40.2 mg, 0.038mmol) and $H_2$ balloon at 80 °C.



White solid; 90% (0.081 g); **m.p.** 202 – 204 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 3320, 3197, 2932, 1641, 1575, 1500, 1444, 1425, 1323, 1187, 1163, 1071, 893, 783, 753, 730; **$^1$H NMR (500 MHz, $CDCl_3$)** δ = 8.94 (s, 1H), 7.36 (dd, 1H, *J* = 1.0, 7.7 Hz), 7.18 (t, 1H, *J* = 7.7 Hz), 6.83 (dd, 1H, *J* = 1.0, 7.7 Hz), 4.07 (br s, 2H), 3.10 – 3.02 (m, 4H), 2.02 – 1.90 (m, 4H) ppm; **$^{13}$C NMR (125 MHz, $CDCl_3$)** δ = 159.8 (q*C*), 155.3 (q*C*), 144.6 (q*C*), 140.3 (*C*H), 132.0 (*C*-$NH_2$), 124.4 (*C*H), 122.8 (q*C*), 119.4 (q*C*), 116.8 (q*C*), 113.4 (*C*H), 110.6 (*C*H), 32.4 (*C*$H_2$), 23.1 (*C*$H_2$), 22.3 (*C*$H_2$), 21.9 (*C*$H_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{15}H_{15}N_2O]^+$: 239.1179; found: 239.1186.

***N*-(1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinolin-10-yl)acetamide (6b)**

Synthesis of substrate **6b** as per general procedure 5 using **5** (100 g, 0.38 mmol), Pd/C (40.2 mg, 0.038 mmol), AcOH (2.20 mL) and $H_2$ balloon at 80 °C for 72 h.

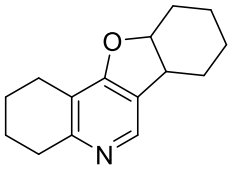


White solid; 68% (0.072 g); **m.p.** 233 – 234 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 3228, 2930, 1669, 1574, 1542, 1433, 1418, 1402, 1277, 1194, 1075, 792, 741, 734; **$^1$H NMR (600 MHz, $CDCl_3$)** δ = 8.97 (s, 1H), 8.34 (d, 1H *J* = 7.6 Hz), 7.80 (br s, 1H), 7.67 (d, 1H, *J* = 7.3 Hz), 7.35 (t, 1H, *J* = 7.6 Hz), 3.11–3.02 (m, 4H), 2.34 (s, 3H), 1.99 (d, 2H, *J* = 4.9 Hz), 1.93 (d, 2H, *J* = 4.9 Hz) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 168.6 (*C*=O), 159.7 (q*C*), 156.1 (q*C*), 145.3 (q*C*), 140.4 (*C*H), 124.5 (*C*H), 123.9 (*C*-NH), 122.7 (q*C*), 119.0 (q*C*), 118.8 (*C*H), 116.9 (q*C*), 116.1 (*C*H), 32.5 (*C*$H_2$), 24.9 (*C*$H_3$), 23.1 (*C*$H_2$), 22.5 (*C*$H_2$), 21.9 (*C*$H_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: $[M + H]^+$ calcd. for $[C_{17}H_{17}N_2O_2]^+$: 281.1285; found: 281.1297.

Synthesis of Extended Reduction Products:

**1,2,3,4,6b,7,8,9,10,10a-Decahydrobenzofuro[3,2-*c*]quinoline (7a)**

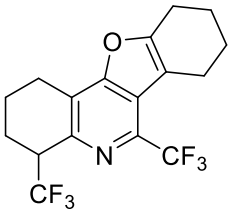
Synthesis of substrate **7a** as per general procedure 5 using **1a** (0.050 g, 0.23 mmol), Pd/C (22.4 mg, 0.023 mmol), AcOH (1.10 mL) and $H_2$ balloon with elevated temperature of 100 °C and reaction time of 48 hours.



White solid; 80% (0.042 g); **m.p.** 87 – 89 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$**: 2930, 2857, 1617, 1579, 1458, 1288, 1070, 937, 907; **$^{1}$H NMR (600 MHz, $CDCl_3$)** δ = 8.06 (s, 1H), 4.73 (dt, 1H, *J* = 7.1, 5.1 Hz), 3.25 (q, 1H, *J* = 7.1 Hz), 2.86 (t, 2H, *J*= 6.3 Hz), 2.64 (t, 2H, *J* = 6.3 Hz), 2.02–1.94 (m, 1H), 1.91– 1.75 (m, 6H), 1.55–1.47 (m, 4H), 1.40–1.32 (m, 1H) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 164.7 (q*C*), 157.5 (q*C*), 141.4 (Ar. *C*H), 126.7 (q*C*), 115.9 (q*C*), 84.2 (aliphatic *C*H), 38.7 (aliphatic *C*H), 32.5 (*C*H$_2$), 28.2 (*C*H$_2$), 27.5 (*C*H$_2$), 23.2 (*C*H$_2$), 22.4 (*C*H$_2$), 22.2 (*C*H$_2$), 21.7 (*C*H$_2$), 20.3 (*C*H$_2$) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. for [$C_{15}H_{20}NO$]$^+$: 230.1539; found: 230.1551.

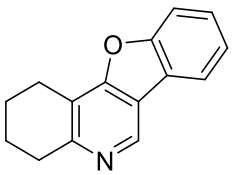
**4,6-Bis(trifluoromethyl)-1,2,3,4,6b,7,8,9,10,10a-decahydrobenzofuro[3,2-*c*]quinoline (7b)**

Synthesis of substrate **7b** as per general procedure 5 using **1j** (0.050 g, 0.14 mmol), Pd/C (15.0 mg, 0.014 mmol), AcOH (1.10 mL) and $H_2$ balloon with elevated temperature of 100 °C and reaction time of 48 hours.



White solid; 81% (0.041 mg); **m.p.** 106 – 108 °C; **IR $\tilde{\nu}_{max}$/cm$^{-1}$:** 2953, 2856, 1626, 1462, 1242, 1163, 1111, 1040; **$^{1}$H NMR (600 MHz, $CDCl_3$)** δ = 3.82 (m, 1H), 3.11 (dt, 1H, *J* = 5.5 Hz), 3.00 (dt, 1H, *J* = 7.7 Hz), 2.82 – 2.77 (m, 2H), 2.74 (t, 2H, *J* = 5.8 Hz), 2.34 – 2.26 (m, 1H), 2.15 – 2.04 (m, 2H), 1.97 – 1.92 (m, 2H), 1.91 – 1.83 (m, 3H) ppm; **$^{13}$C NMR (150 MHz, $CDCl_3$)** δ = 158.9 (q*C*), 157.4 (q*C*), 142.6 (q*C*), 136.8 (q, $^{2}J_{(C,\,F)}$ = 37 Hz, q*C*), 126.8 (q, $^{1}J_{(C,\,F)}$ = 282 Hz, *C*F$_3$), 121.9 (q*C*), 121.8 (q, $^{1}J_{(C,\,F)}$ = 272 Hz, *C*F$_3$), 121.2 (q*C*), 111.4 (q*C*), 43.9 (q, $^{2}J_{(C,\,F)}$ = 25 Hz, aliphatic *C*H), 23.7 (*C*H$_2$), 23.2 (q, $^{3}J_{(C,\,F)}$ = 2 Hz, *C*H$_2$), 22.6 (*C*H$_2$), 22.2 (*C*H$_2$), 21.7 (*C*H$_2$), 21.6 (q, $^{5}J_{(C,\,F)}$ = 4 Hz, *C*H$_2$), 18.0 (*C*H$_2$) ppm; **$^{19}$F NMR (471 MHz, $CDCl_3$)** δ = –63.5 (C*F$_3$*), –66.6 (C*F$_3$*) ppm; **HRMS** (ESI-TOF; positive mode) *m/z*: [M + H]$^+$ calcd. For [$C_{17}H_{16}F_6NO$]$^+$: 364.1131; found: 364.1138.

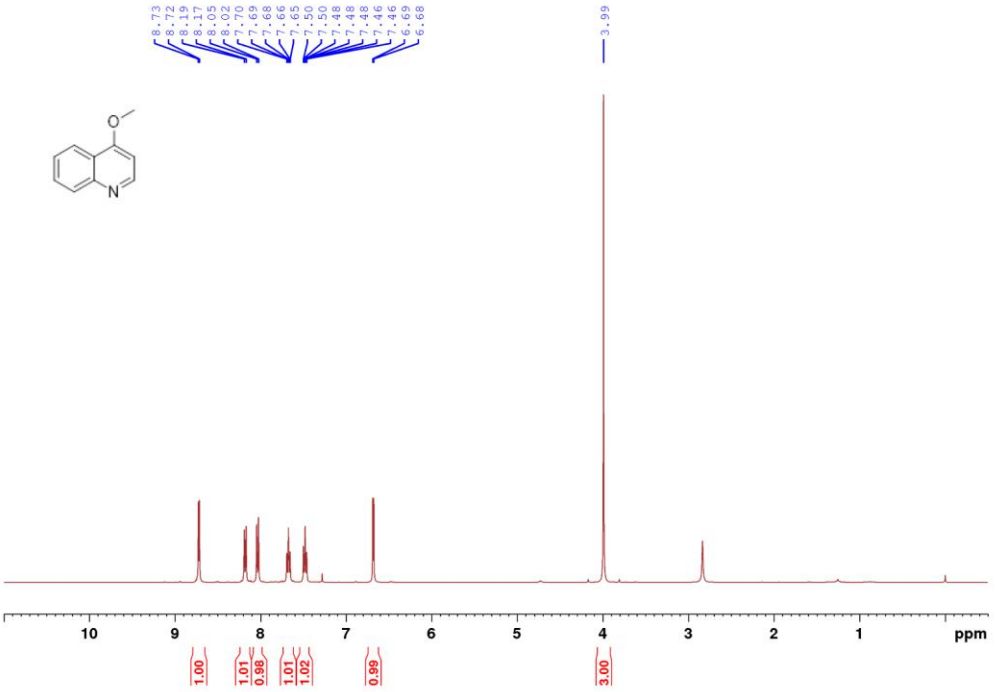
Scale up Synthesis of **2a**



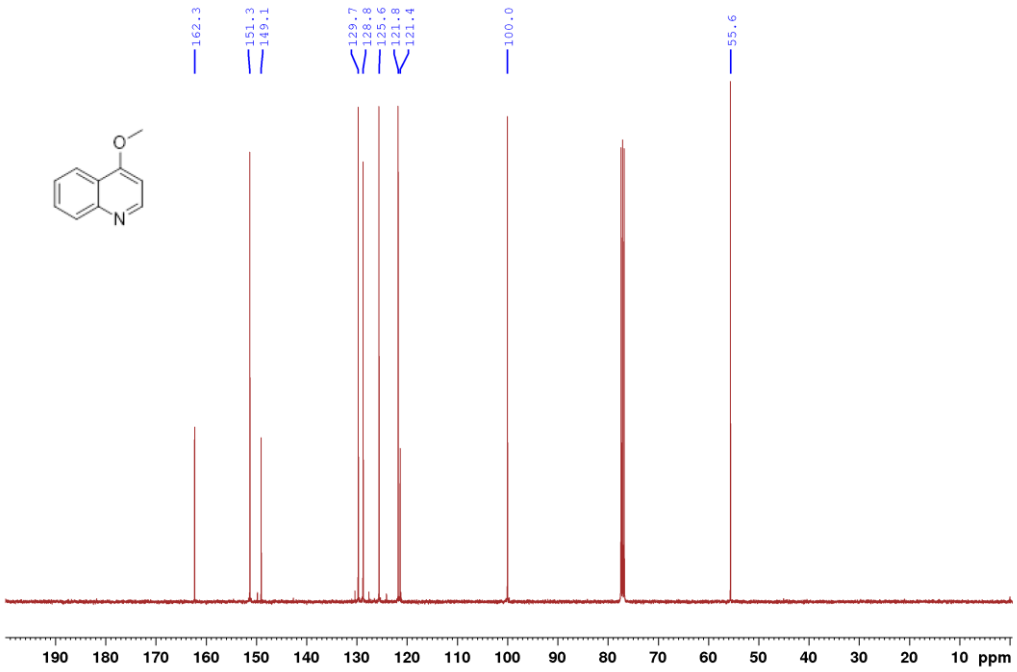
The scale up synthesis of **2a** was performed as per general procedure 5 using **1a** (1.10 g, 5.01 mmol), Pd/C (267 mg, 0.025 mmol, 5 mol%), AcOH (16.0 mL) and $H_2$ balloon in a 50 mL schlenk flask at 50 °C. yield: 91% (1.02 g) characterised as per **2a** above.

NMR Spectra of Substituted Quinolines

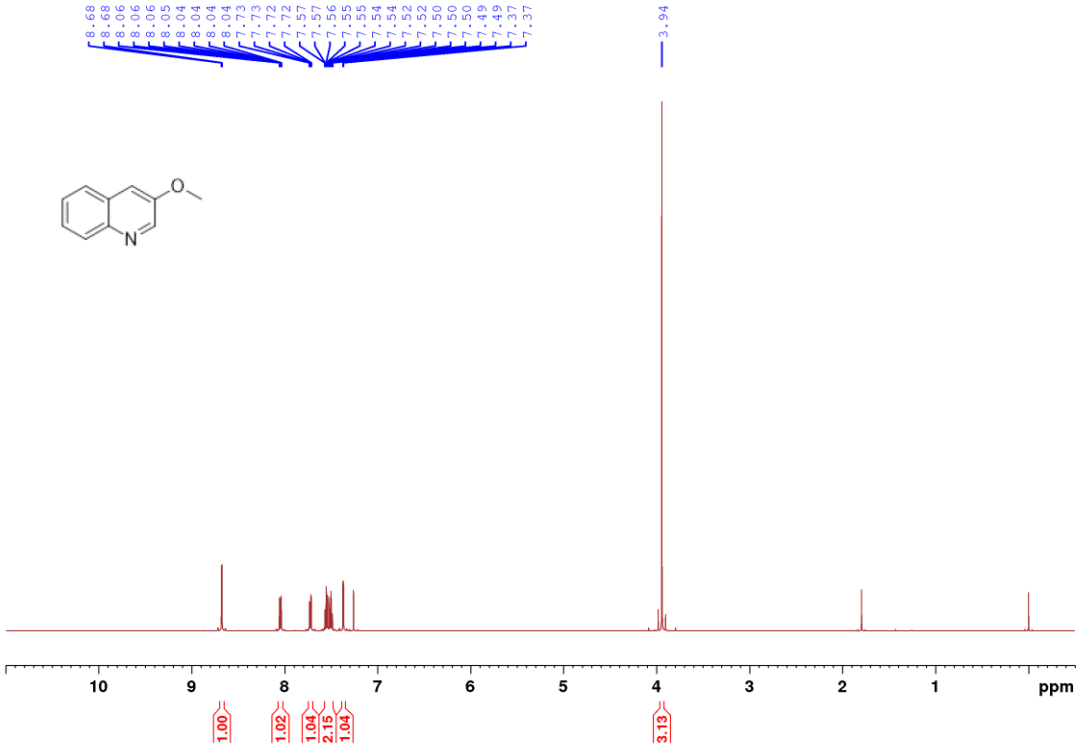
**4-Methoxyquinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (9)**



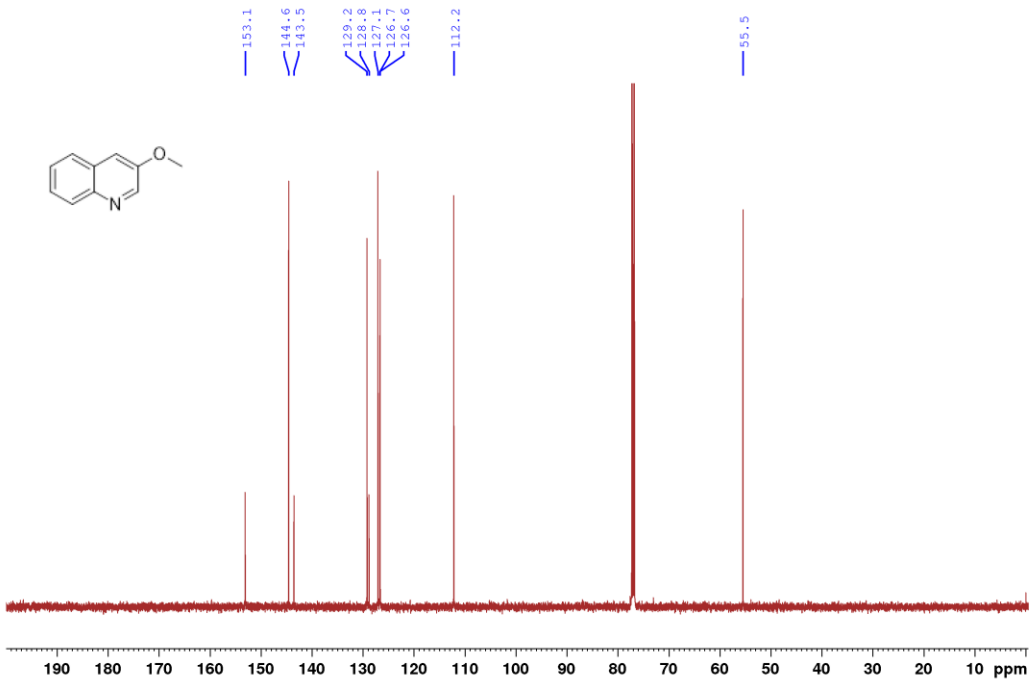

**4-Methoxyquinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (9)**



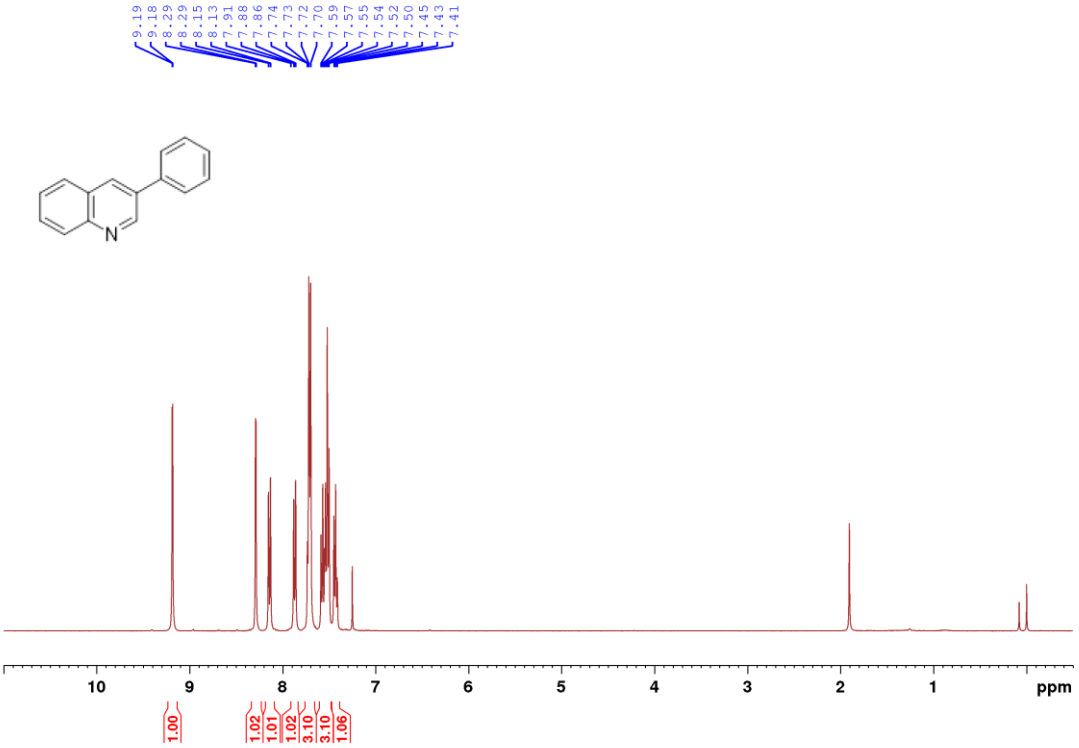
**3-Methoxyquinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (12)**



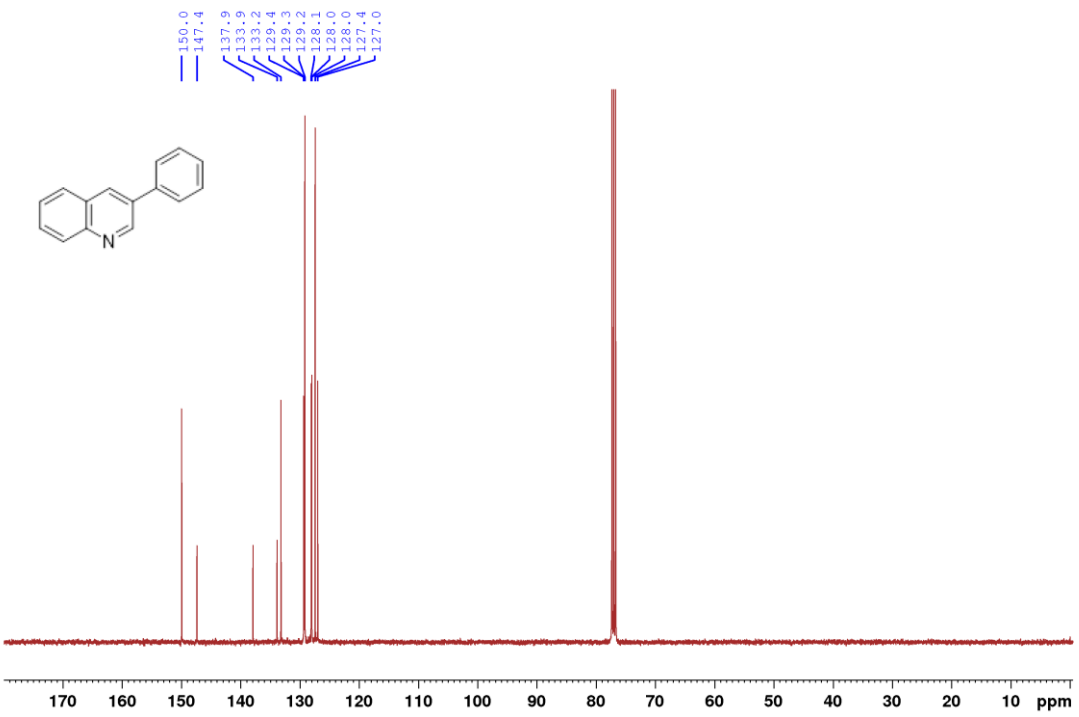

**3-Methoxyquinoline $^{13}$C NMR, 125 MHz, $CDCl_3$ (12)**



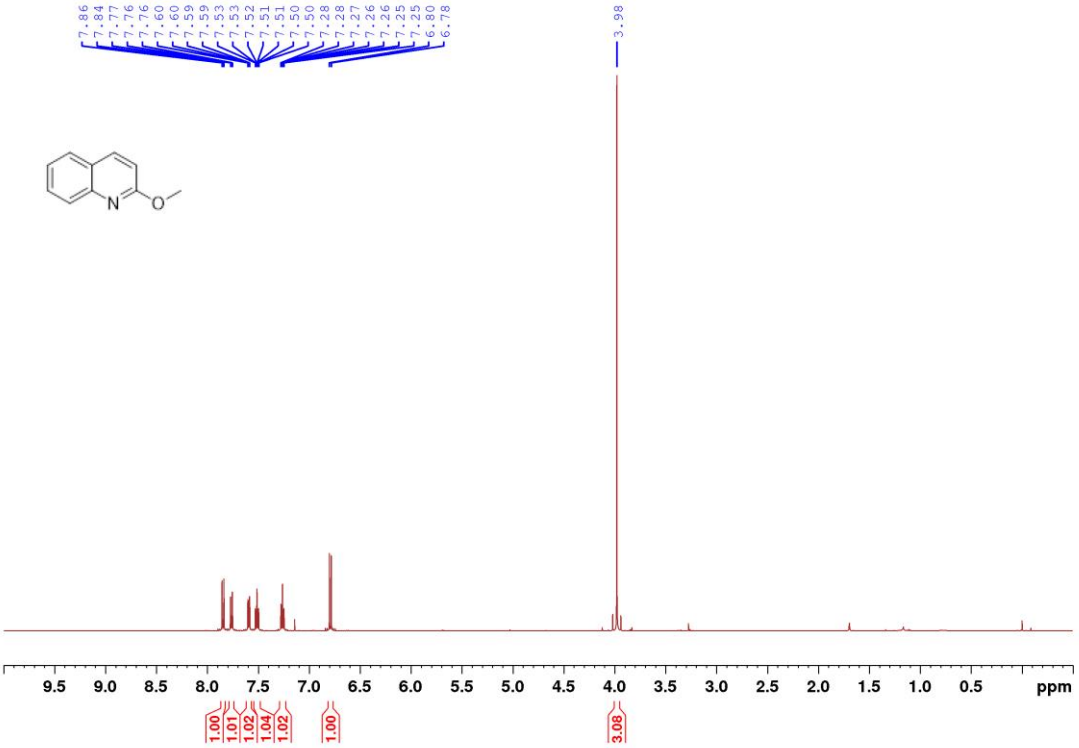
**3-Phenylquinoline $^{1}H$ NMR, 400 MHz, $CDCl_3$ (13)**



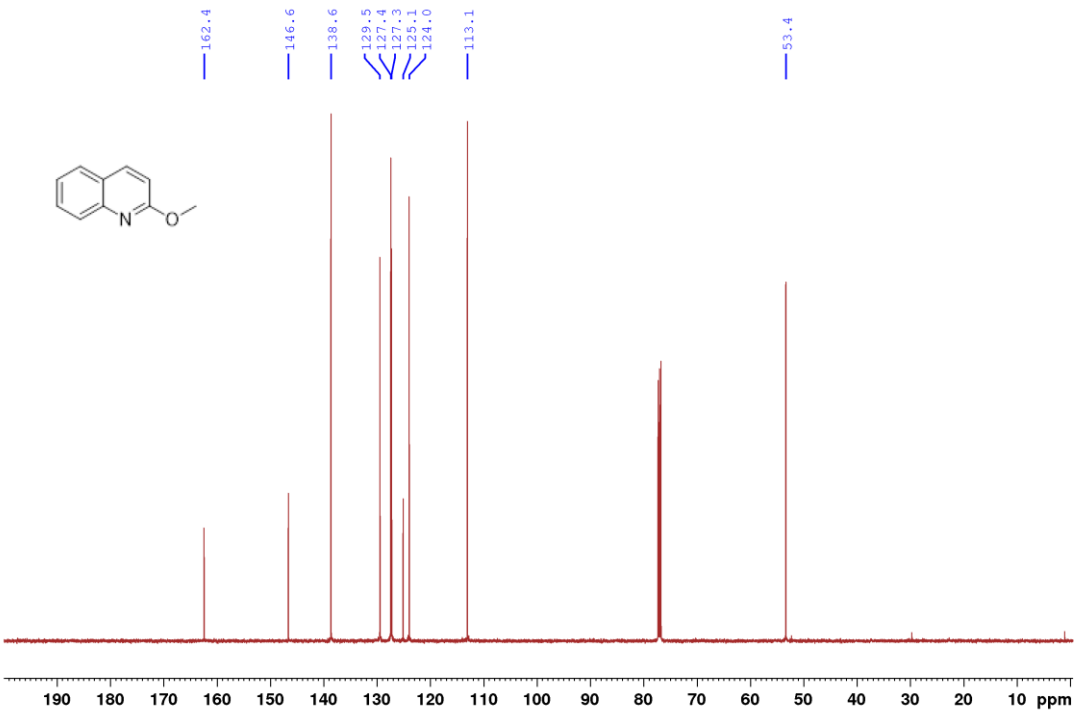

**3-Phenylquinoline $^{13}C$ NMR, 75 MHz, $CDCl_3$ (13)**



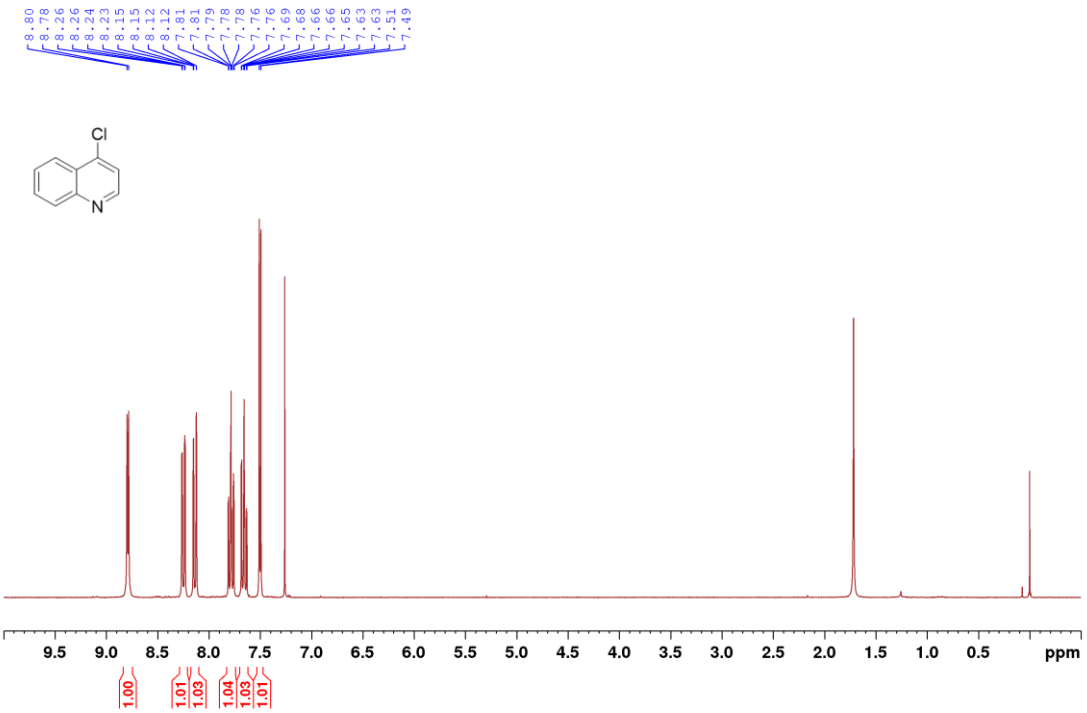
**2-Methoxyquinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (S8)**



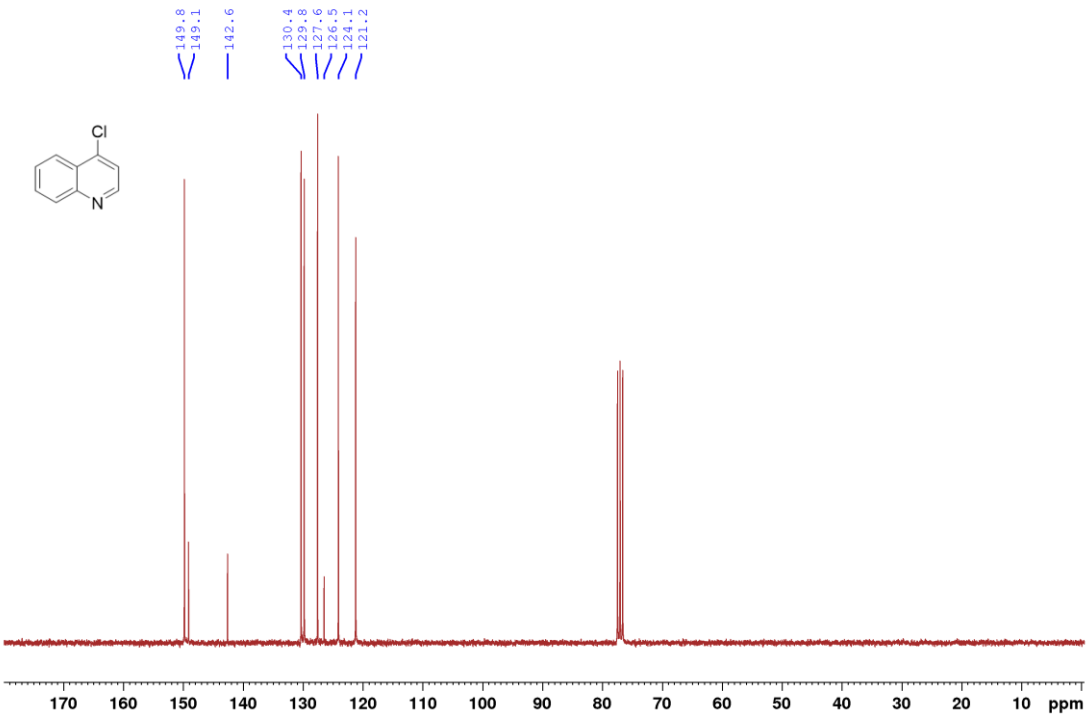

**2-Methoxyquinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (S8)**



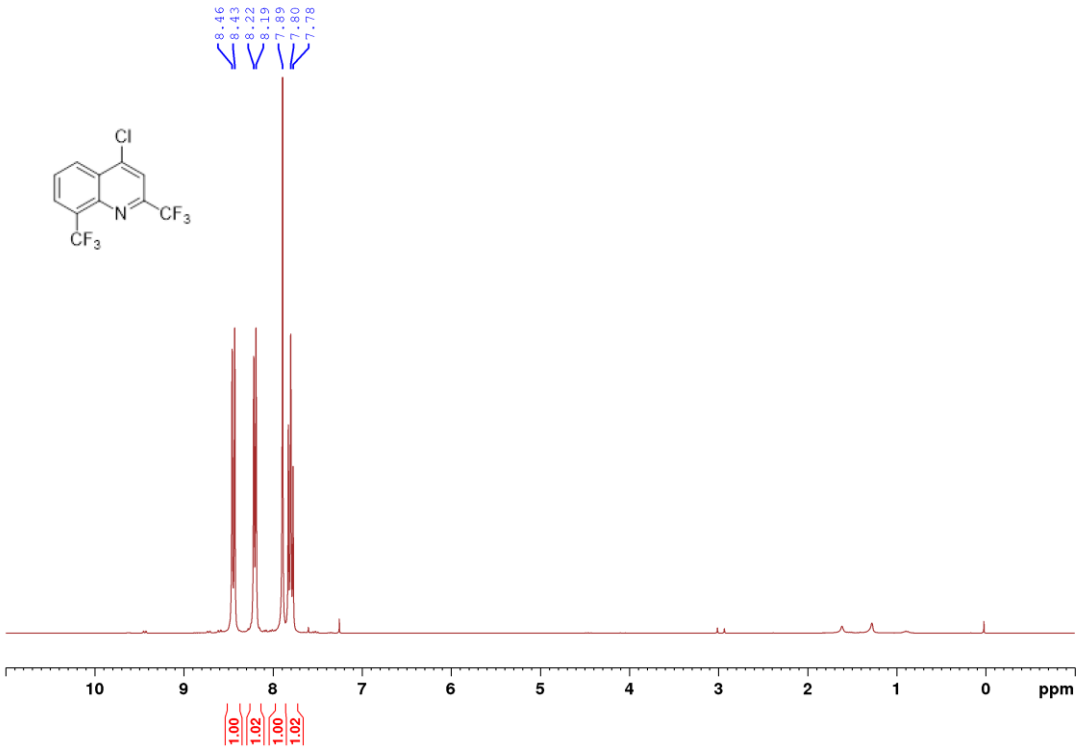
**4-Chloroquinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (S9)**



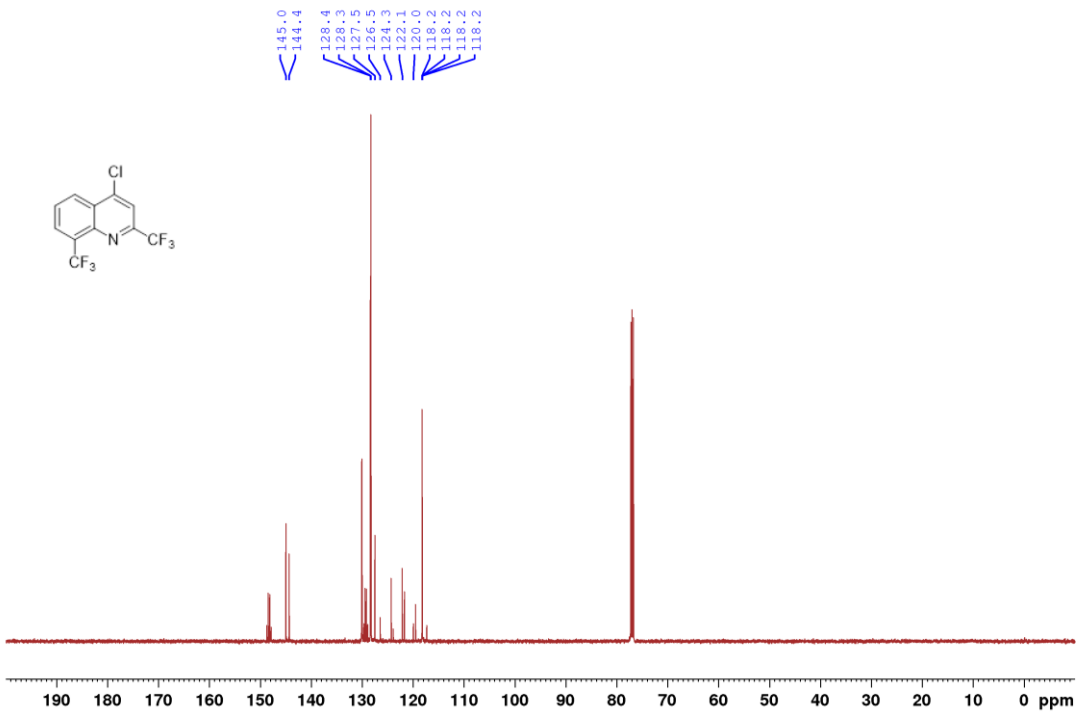

**4-Chloroquinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (S9)**



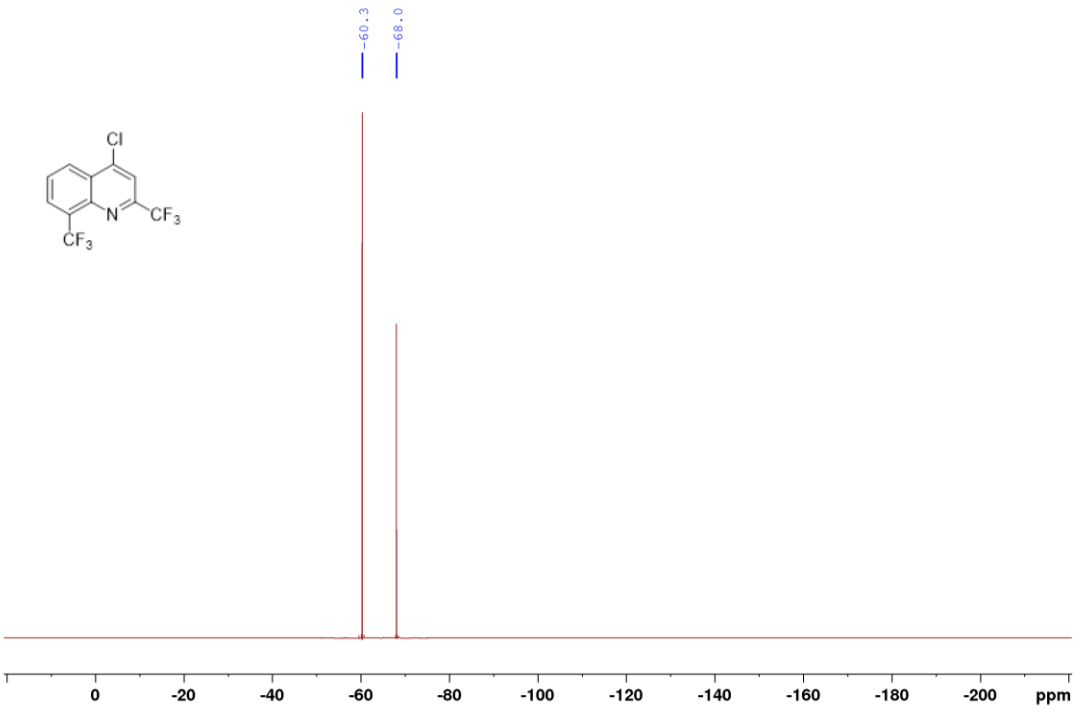
**4-Chloro-2,8-bis(trifluoromethyl)quinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (S10)**




**4-Chloro-2,8-bis(trifluoromethyl)quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (S10)**

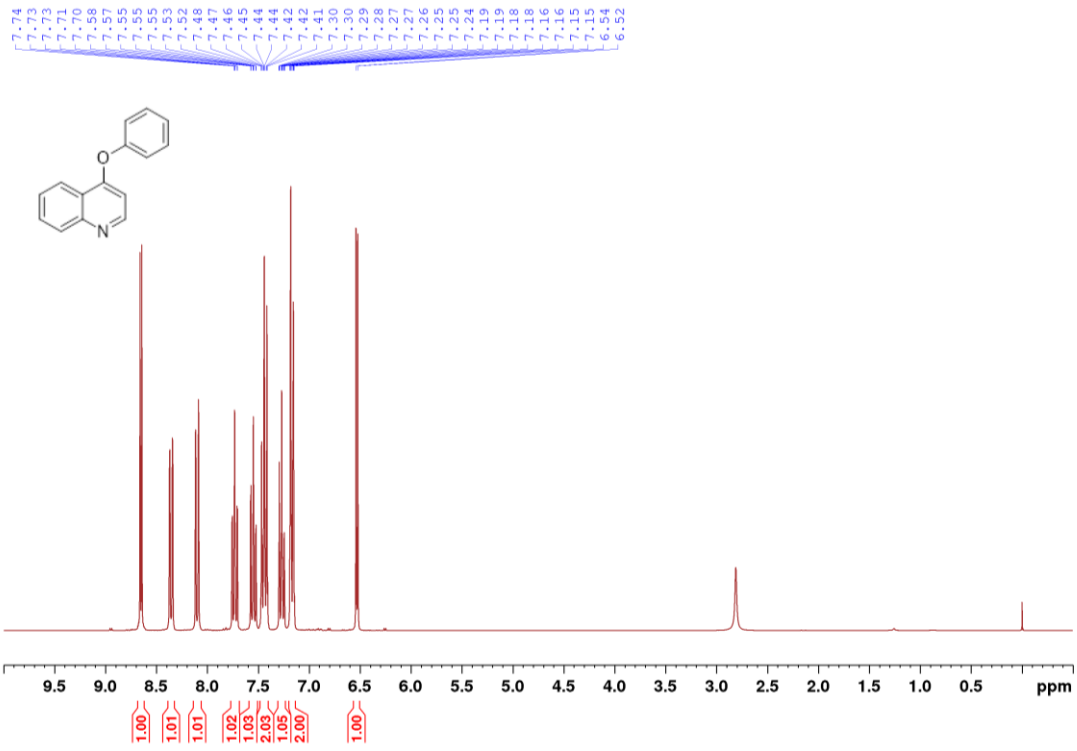


**4-Chloro-2,8-bis(trifluoromethyl)quinoline $^{19}F$ NMR, 471 MHz, $CDCl_3$ (S10)**

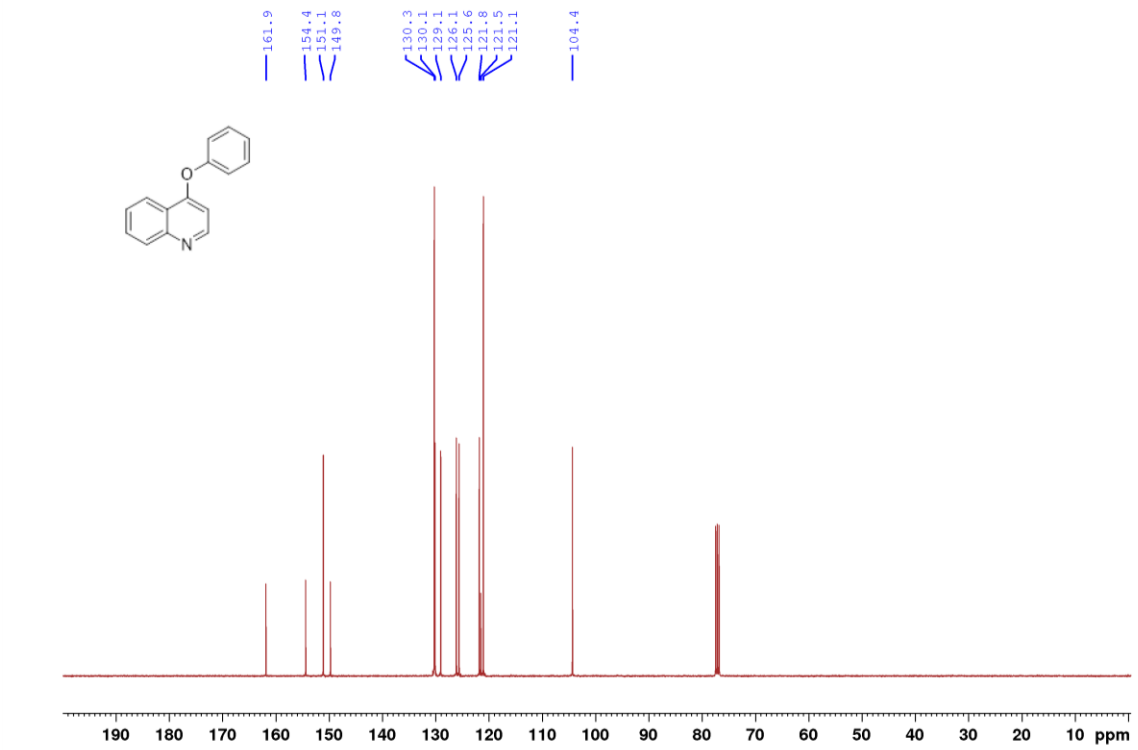



NMR Spectra of Phenoxyquinolines

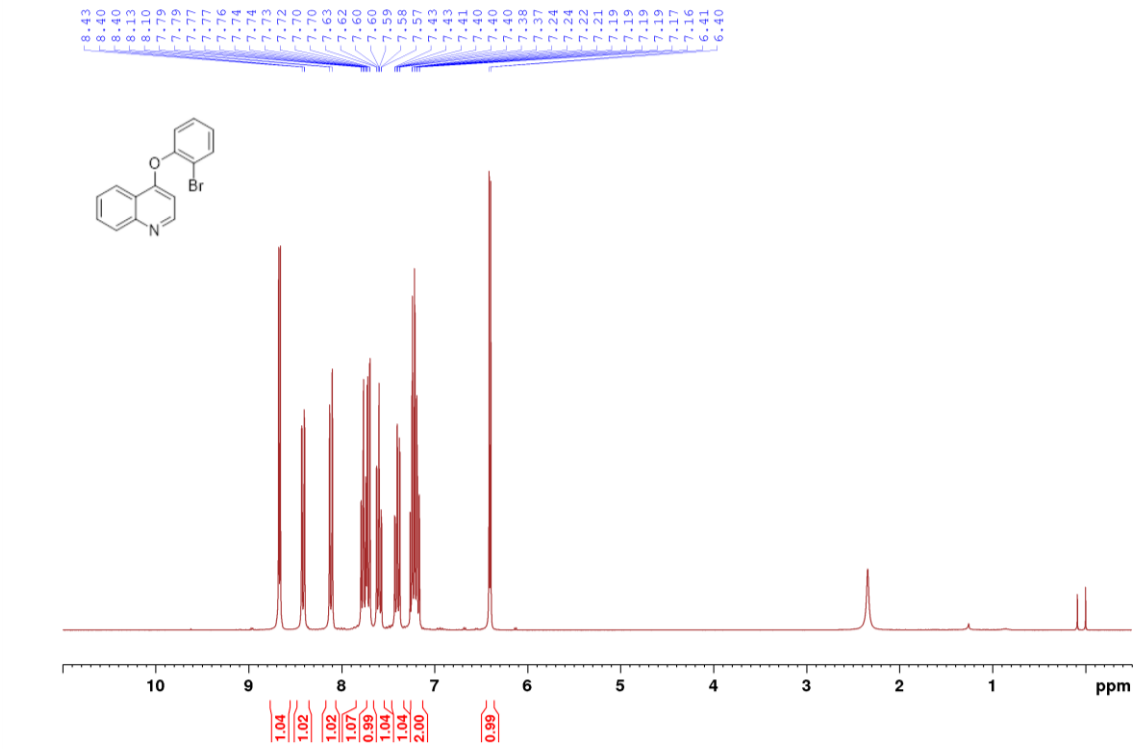
**4-Phenoxyquinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (10)**



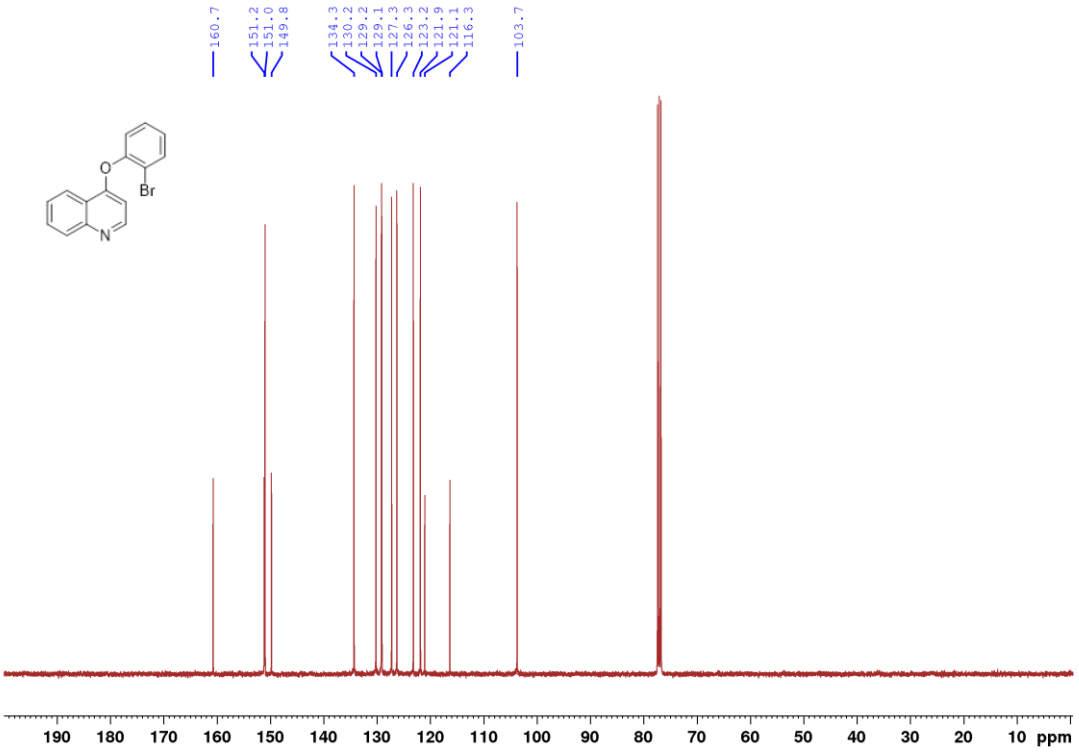
**4-Phenoxyquinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (10)**



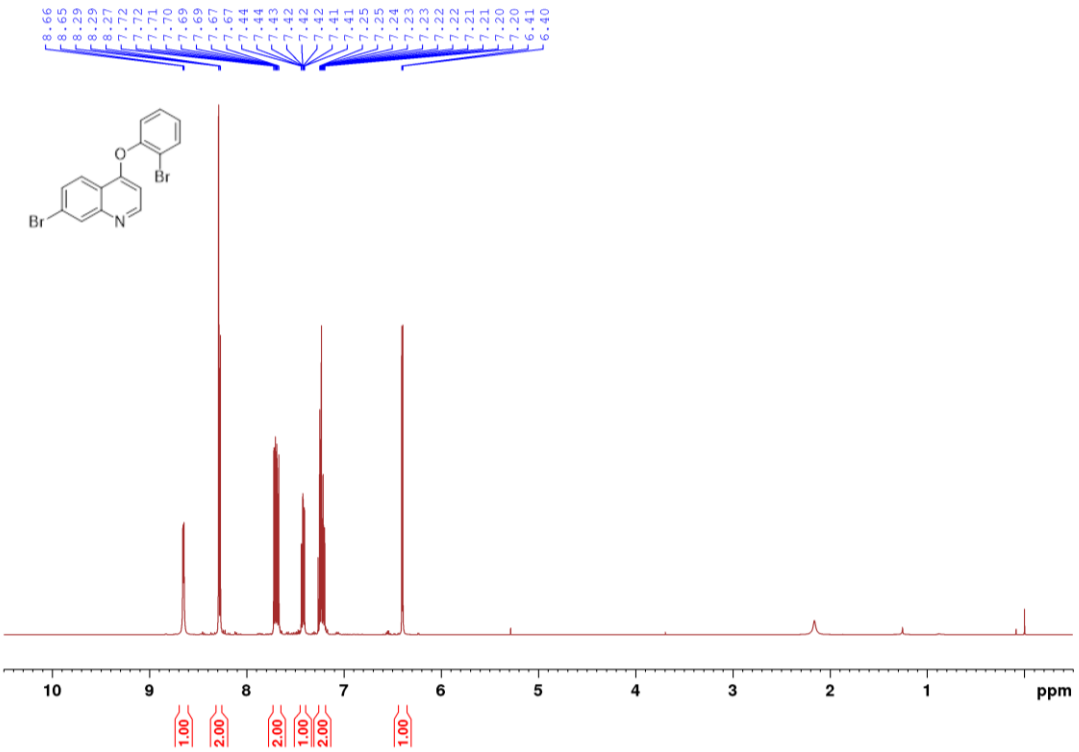

**4-(2-Bromophenoxy)quinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (S11)**



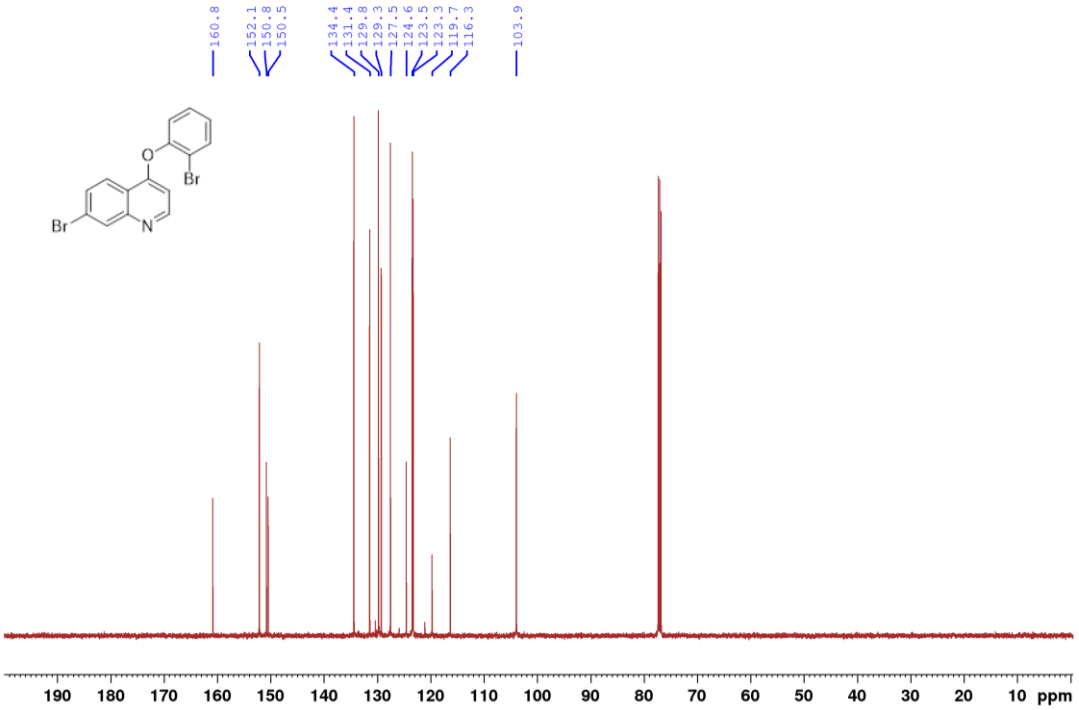
**4-(2-Bromophenoxy)quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (S11)**



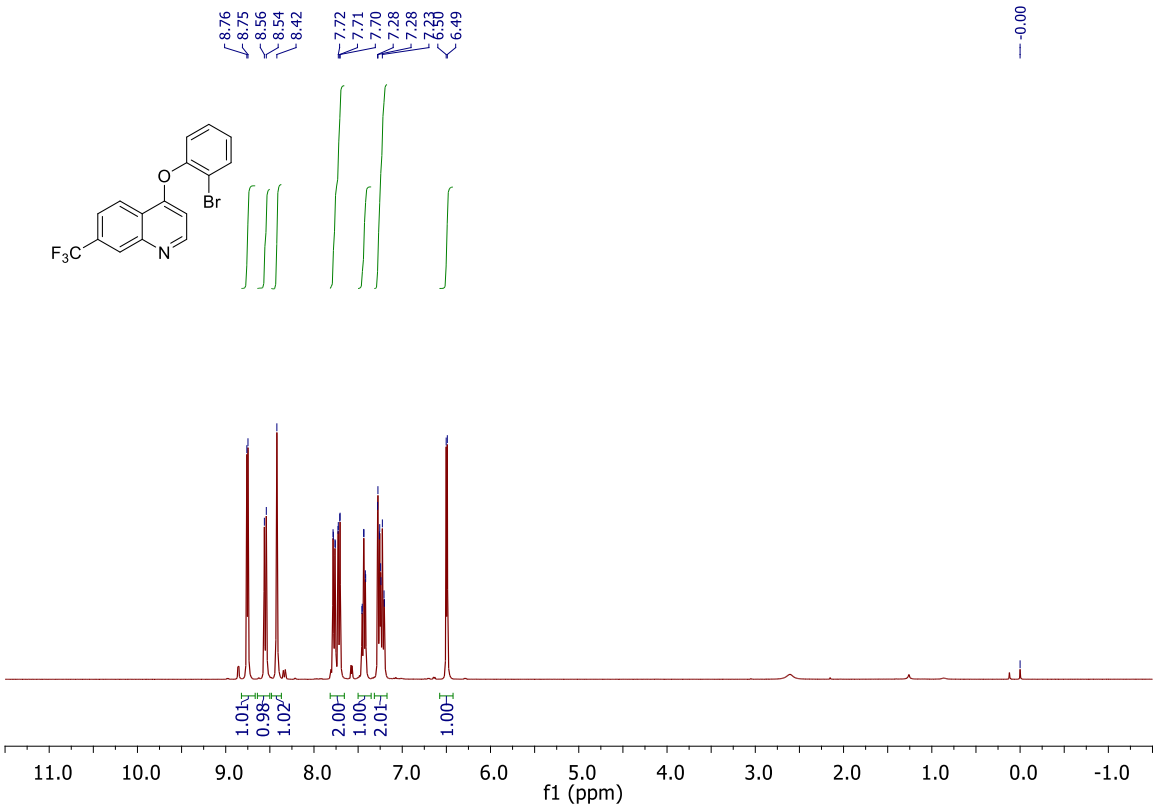

**7-Bromo-4-(2-bromophenoxy)quinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (S12)**



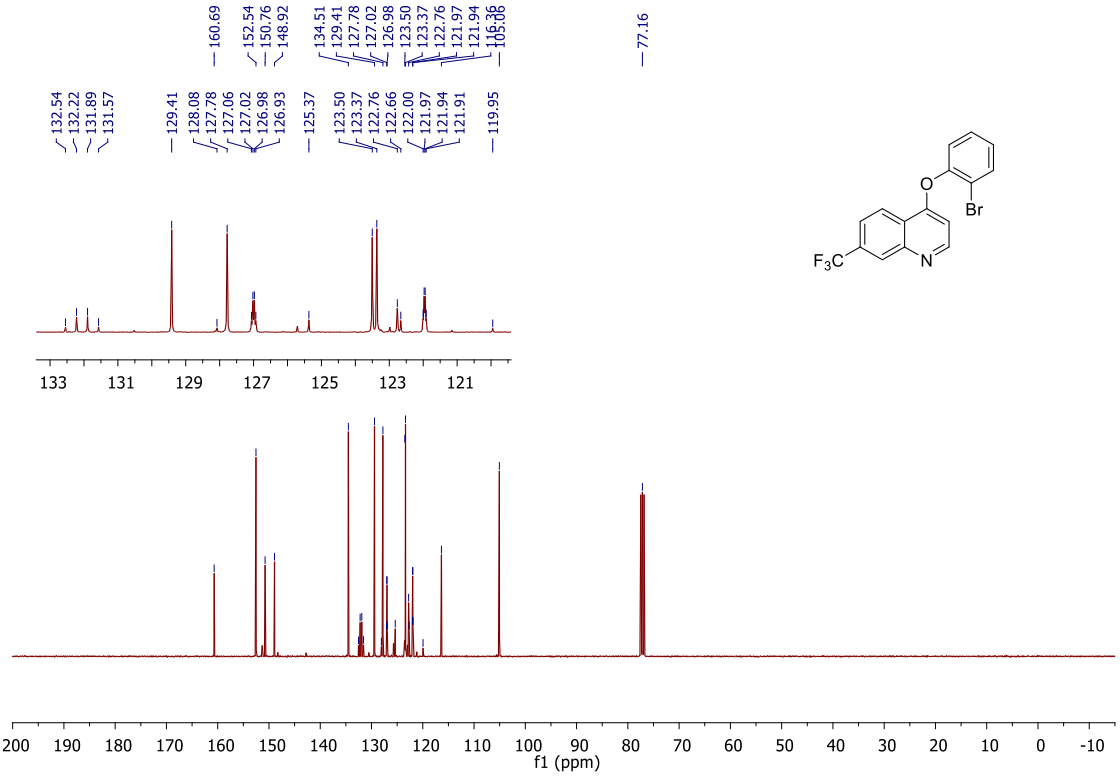
**7-Bromo-4-(2-bromophenoxy)quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (S12)**



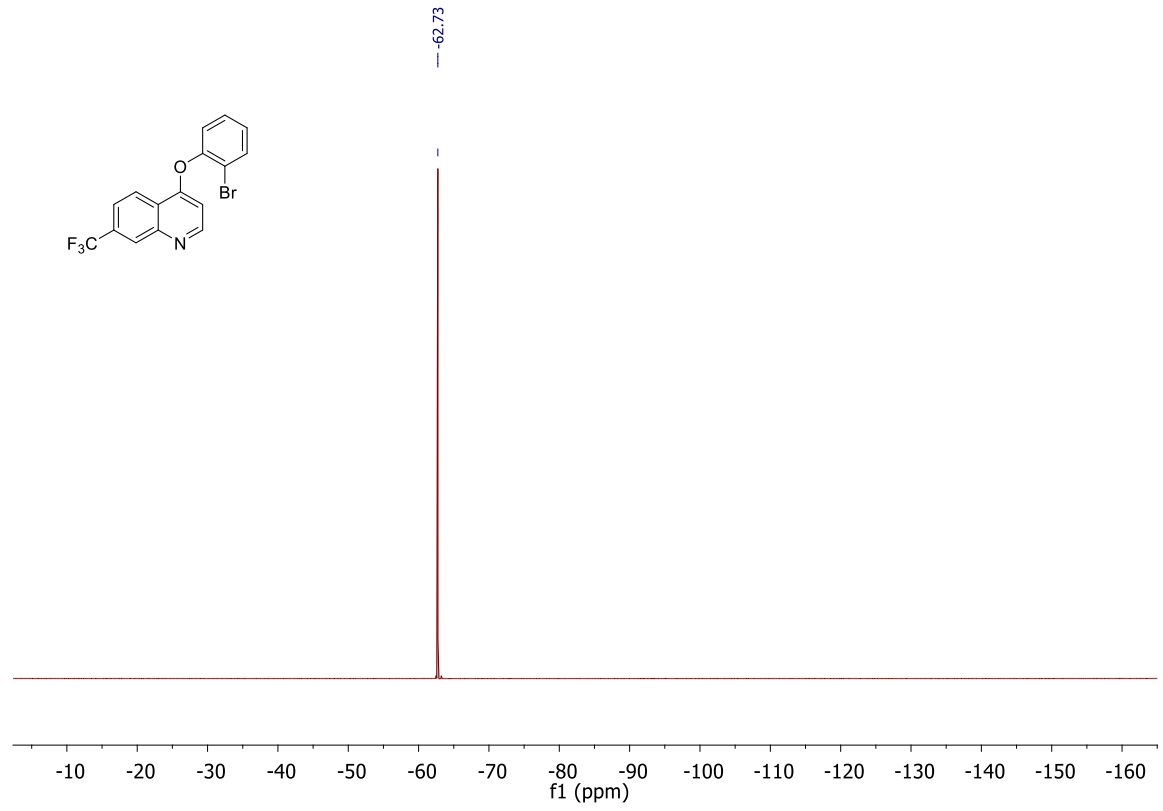

**4-(2-Bromophenoxy)-7-(trifluoromethyl)quinoline $^{1}H$ NMR, 400 MHz, $CDCl_3$ (S13)**



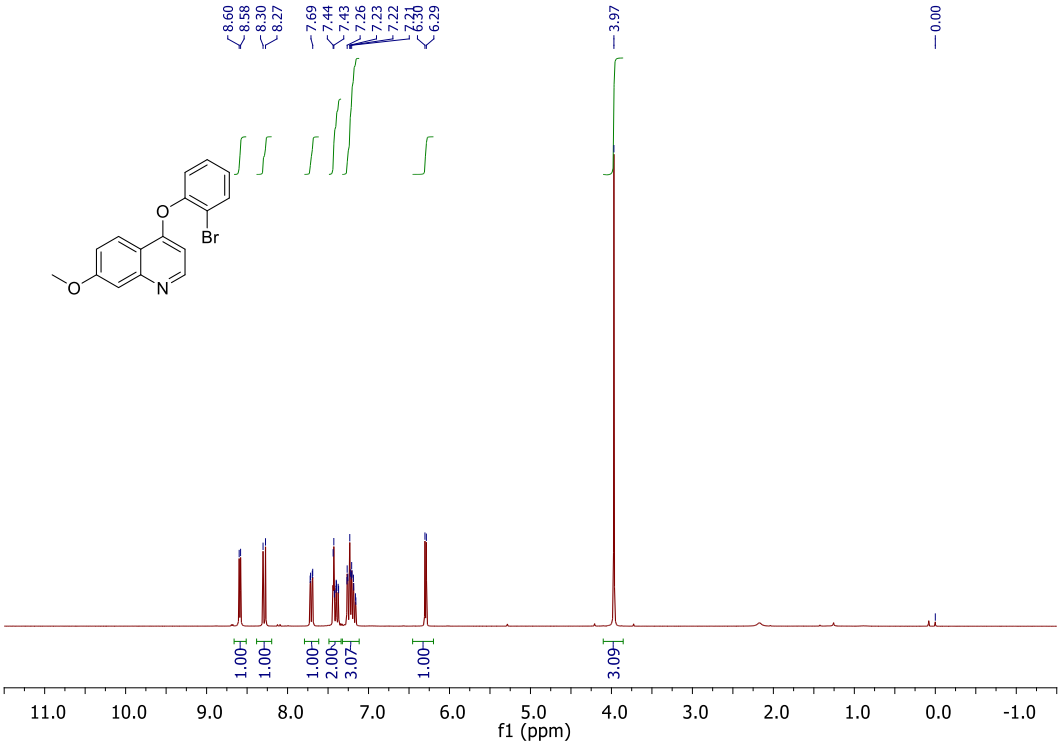
**4-(2-Bromophenoxy)-7-(trifluoromethyl)quinoline $^{13}C$ NMR, 100 MHz, $CDCl_3$ (S13)**



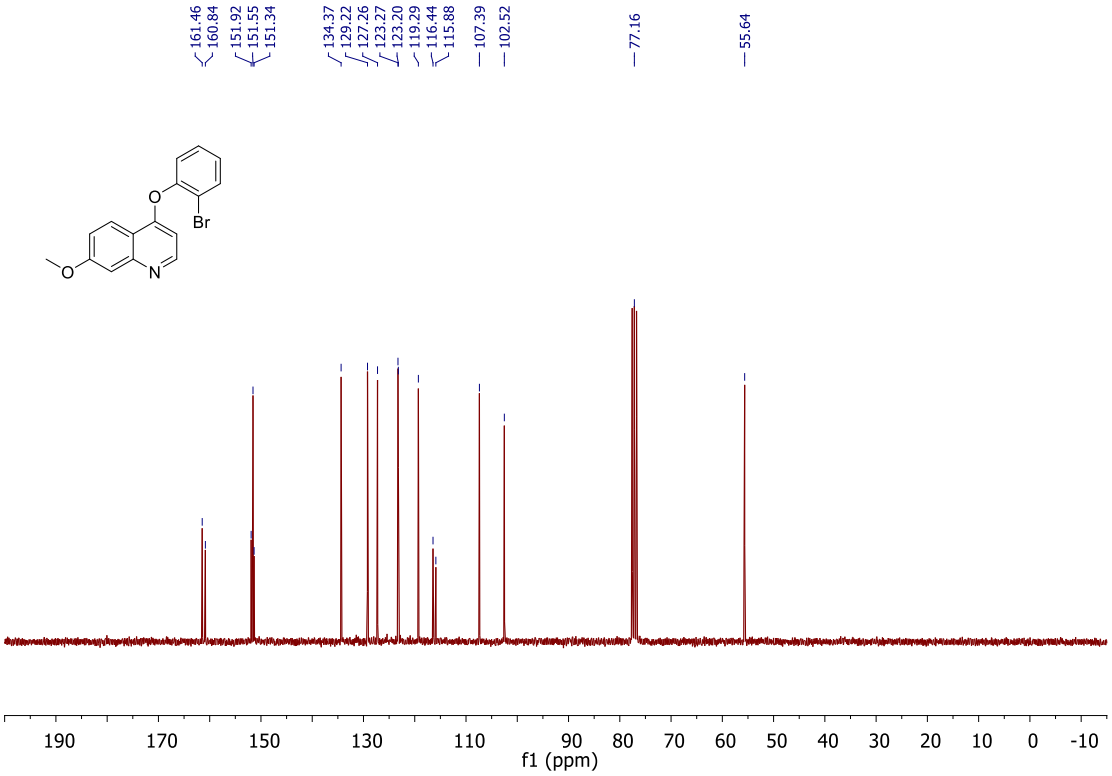

**4-(2-Bromophenoxy)-7-(trifluoromethyl)quinoline $^{19}F$ NMR, 376 MHz, $CDCl_3$ (S13)**



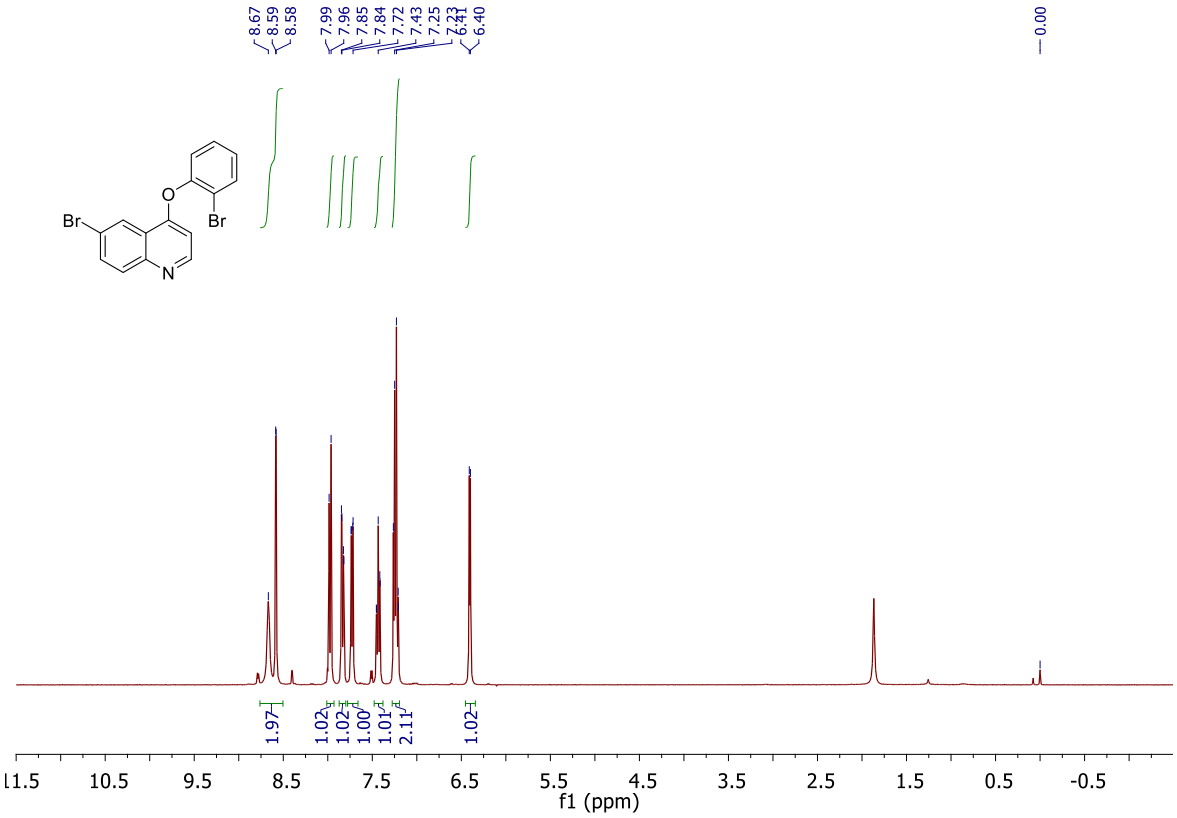
**4-(2-Bromophenoxy)-7-methoxyquinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (S14)**



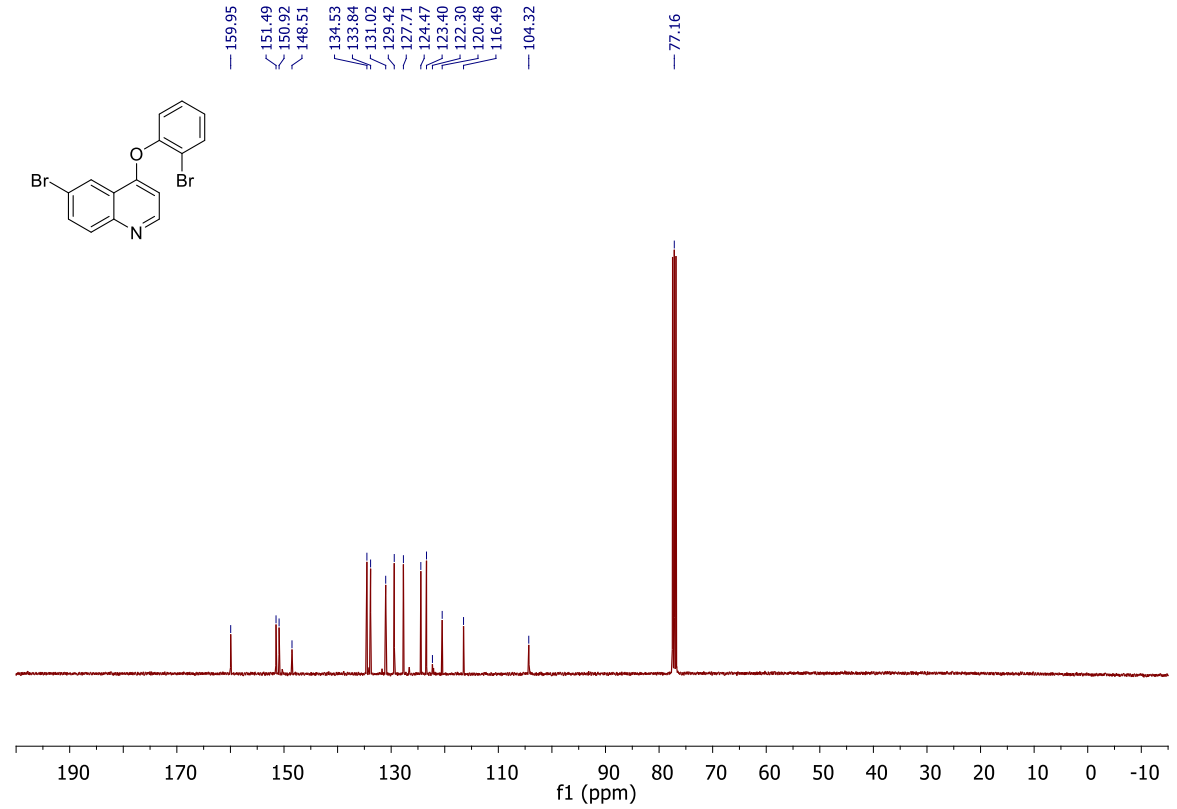

**4-(2-Bromophenoxy)-7-methoxyquinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (S14)**



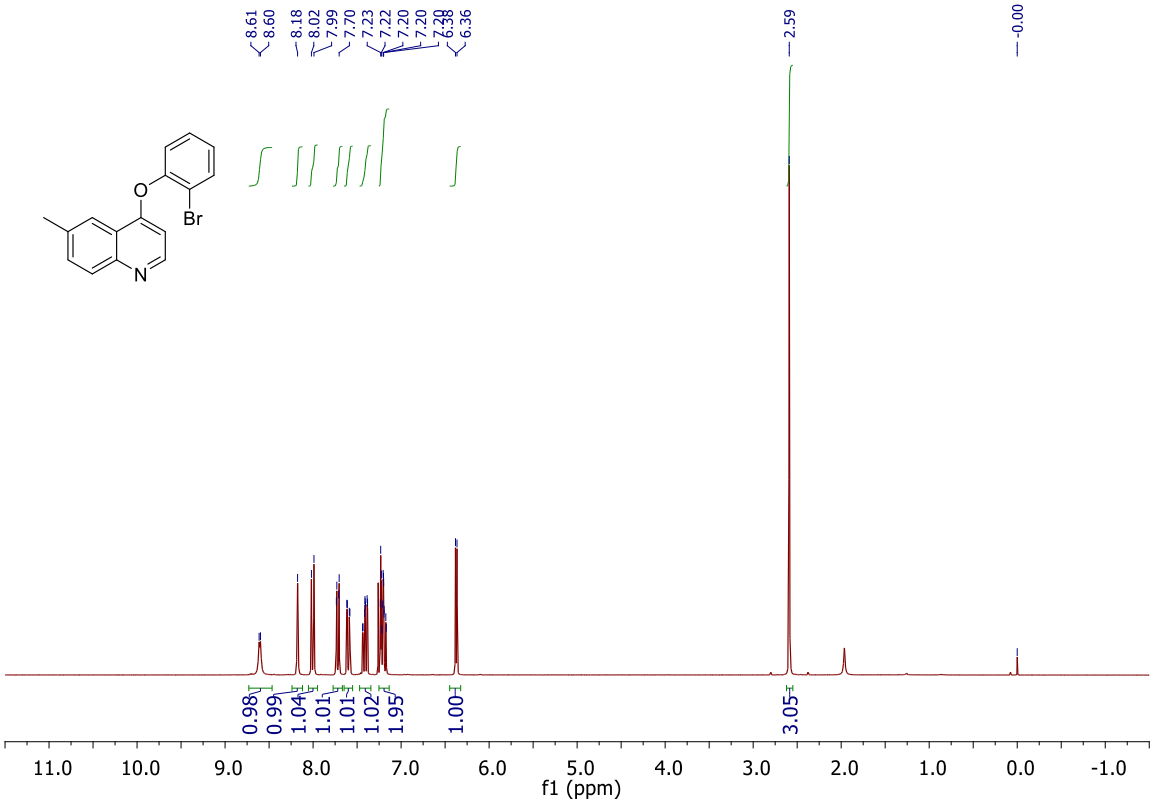
**6-Bromo-4-(2-bromophenoxy)quinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (S15)**



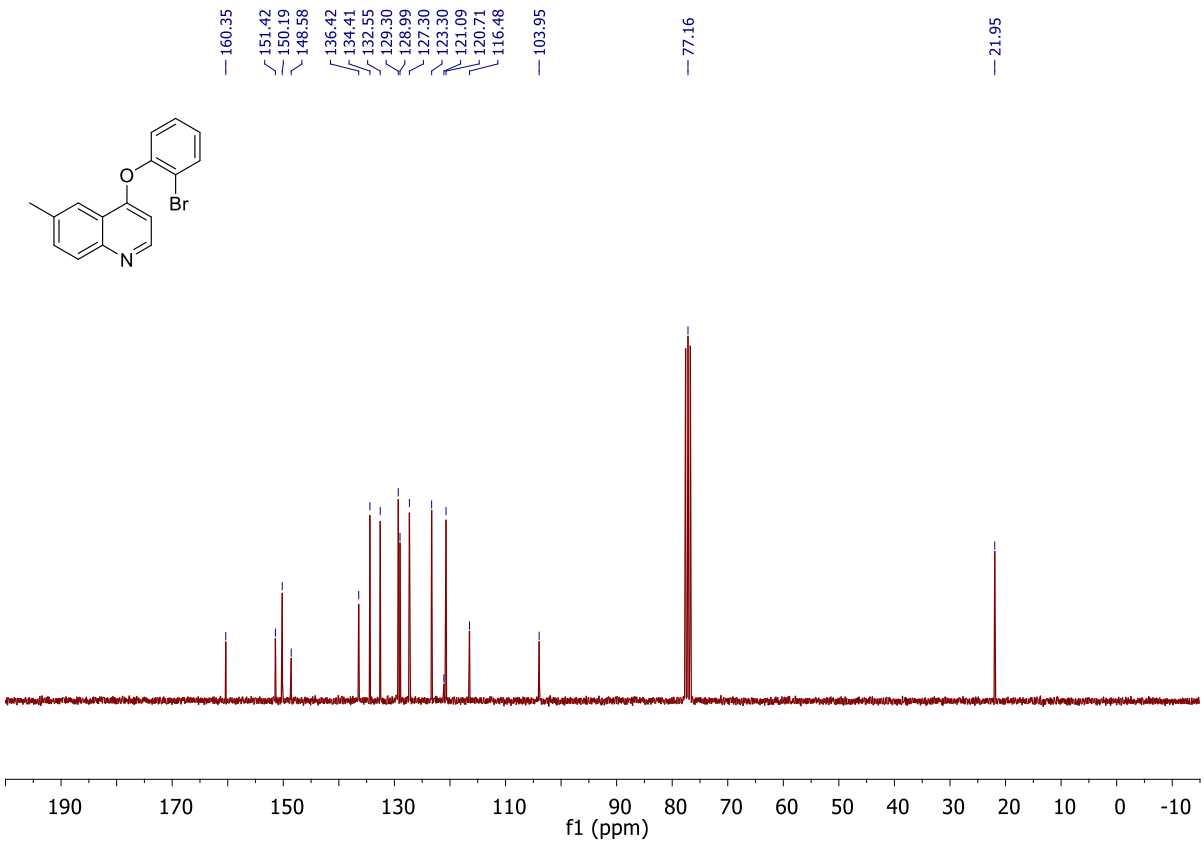

**6-Bromo-4-(2-bromophenoxy)quinoline $^{13}$C NMR, 100 MHz, $CDCl_3$ (S15)**



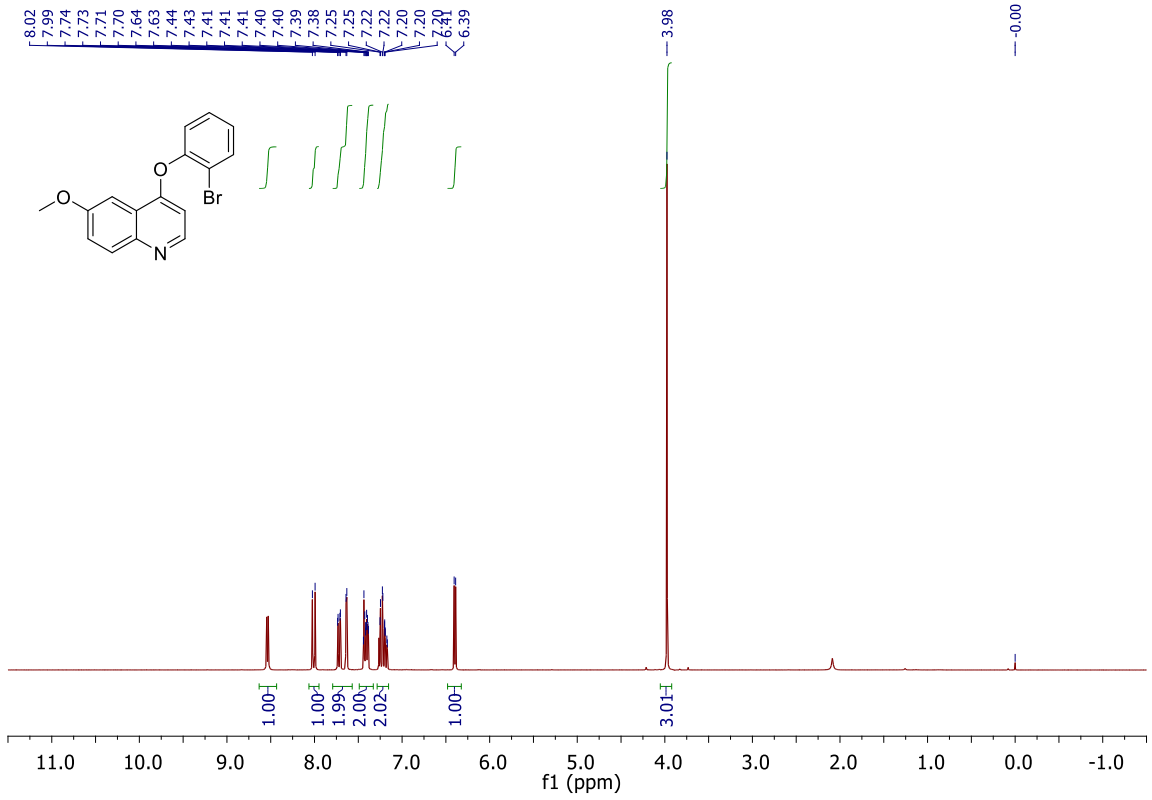
**4-(2-Bromophenoxy)-6-methylquinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (S16)**



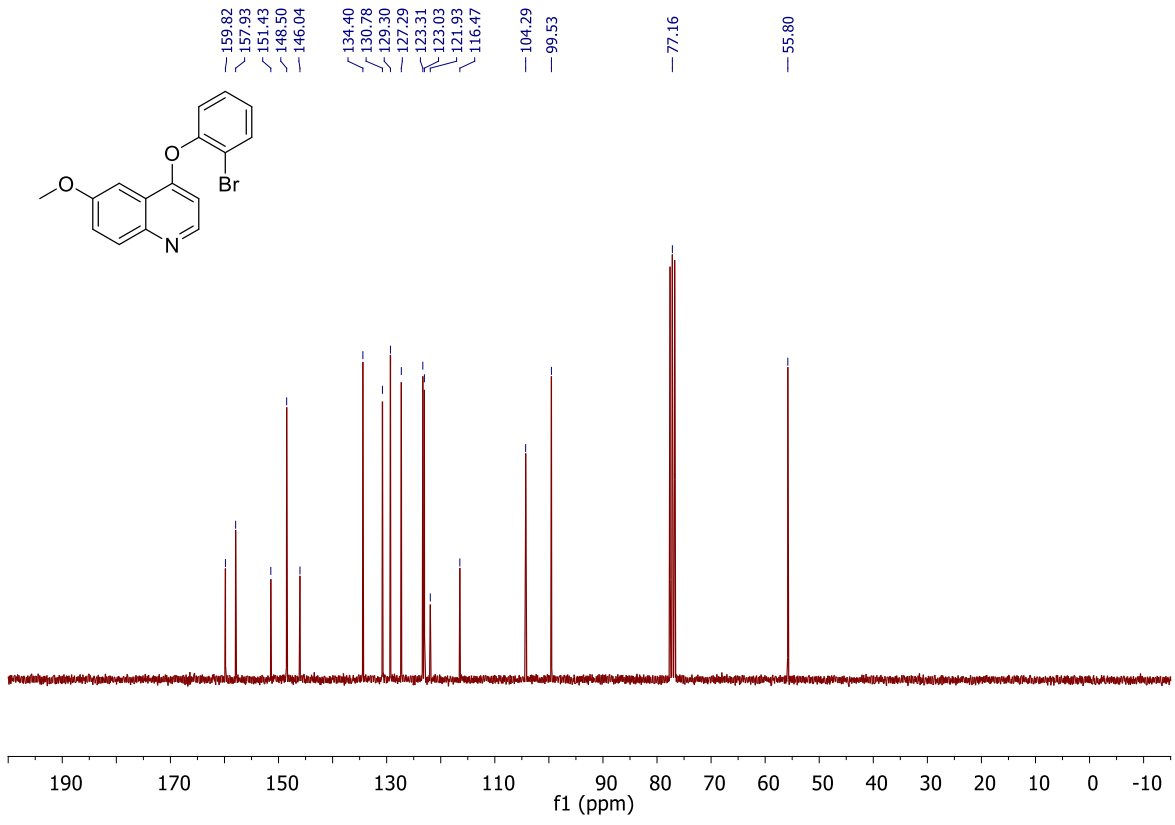

**4-(2-Bromophenoxy)-6-methylquinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (S16)**


160.35
151.42
150.19
148.58
136.42
134.41
132.55
129.30
128.99
127.30
123.30
121.09
120.71
116.48
103.95
77.16
21.95
O
Br
N
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

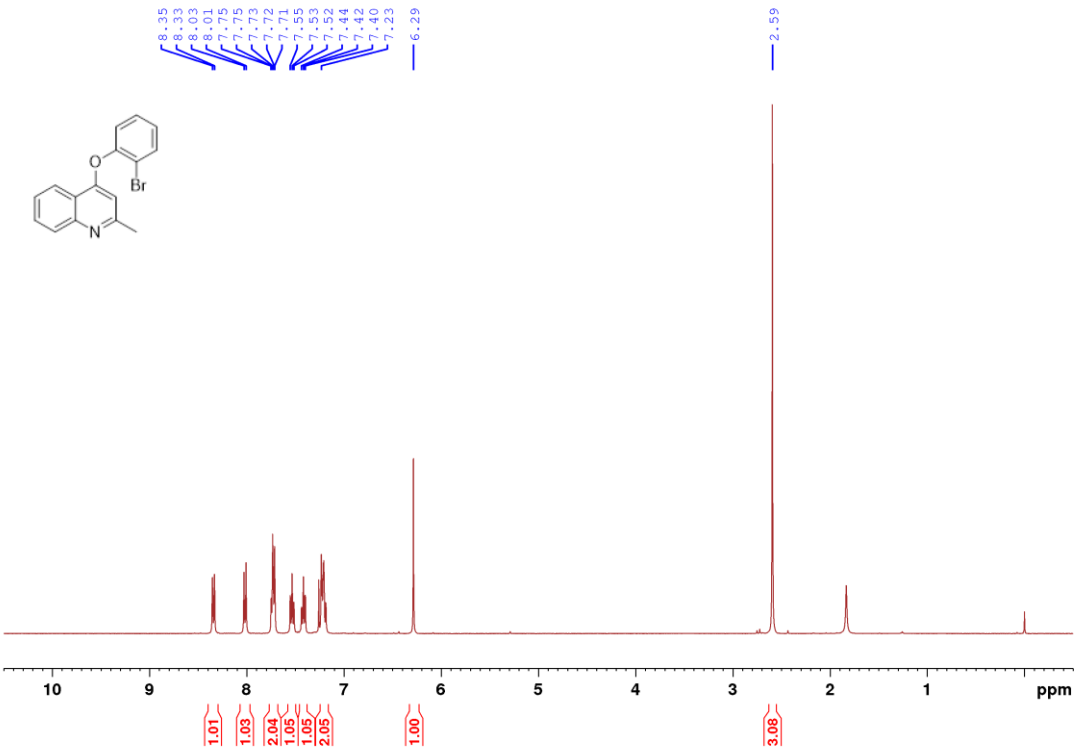
**4-(2-Bromophenoxy)-6-methoxyquinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (S17)**



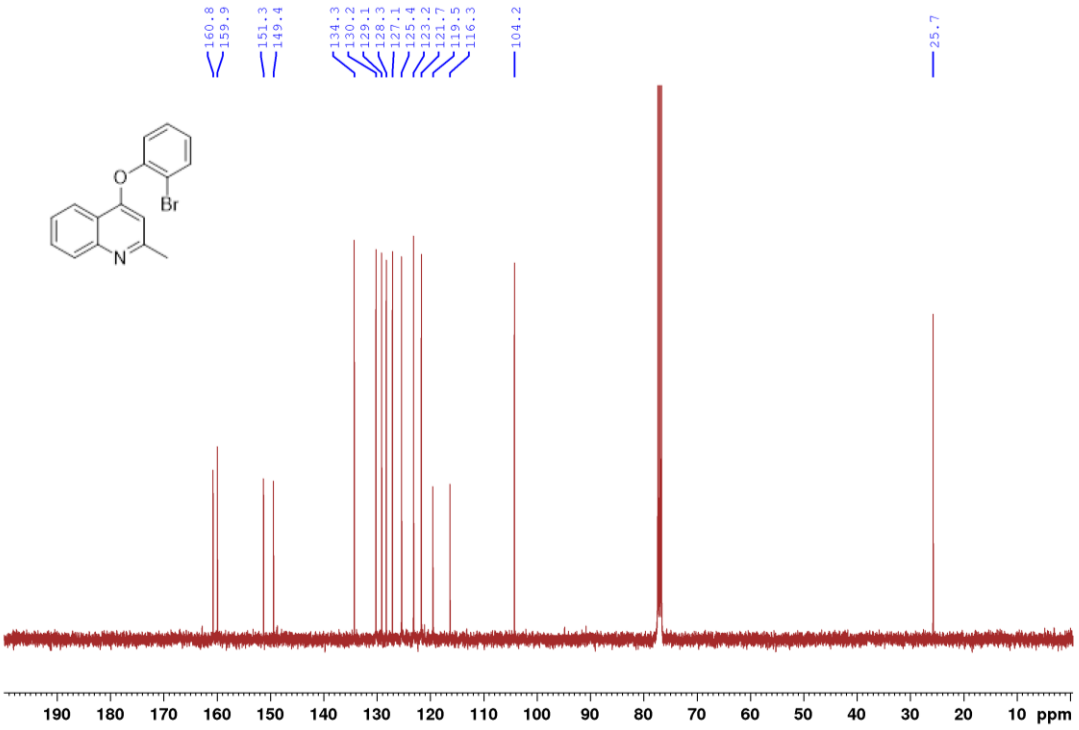

**4-(2-Bromophenoxy)-6-methoxyquinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (S17)**



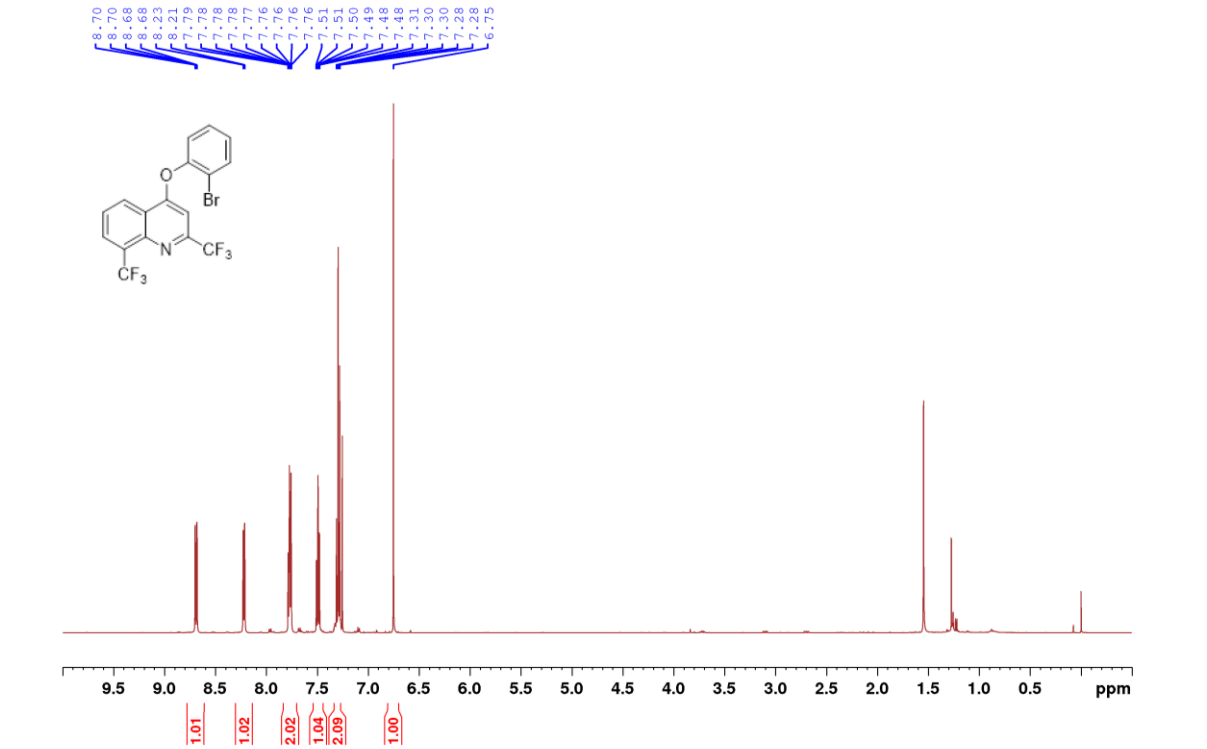
**4-(2-Bromophenoxy)-2-methylquinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (S18)**



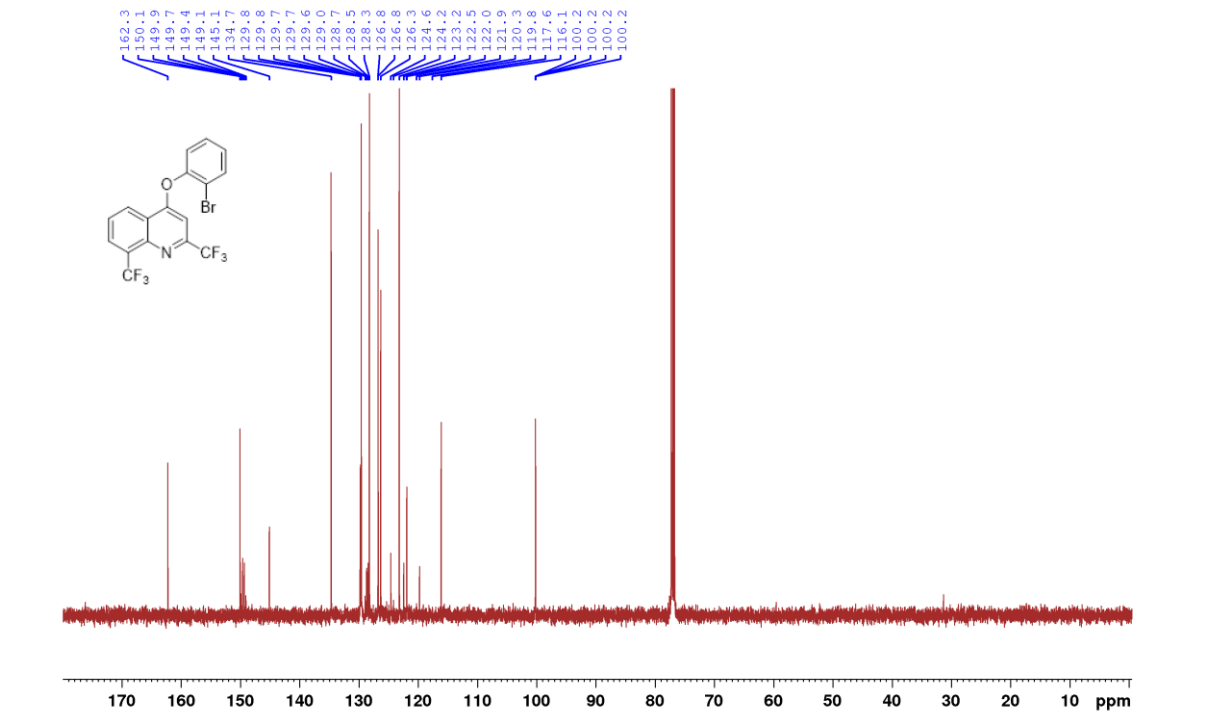

**4-(2-Bromophenoxy)-2-methylquinoline $^{13}$C NMR, 125 MHz, $CDCl_3$ (S18)**



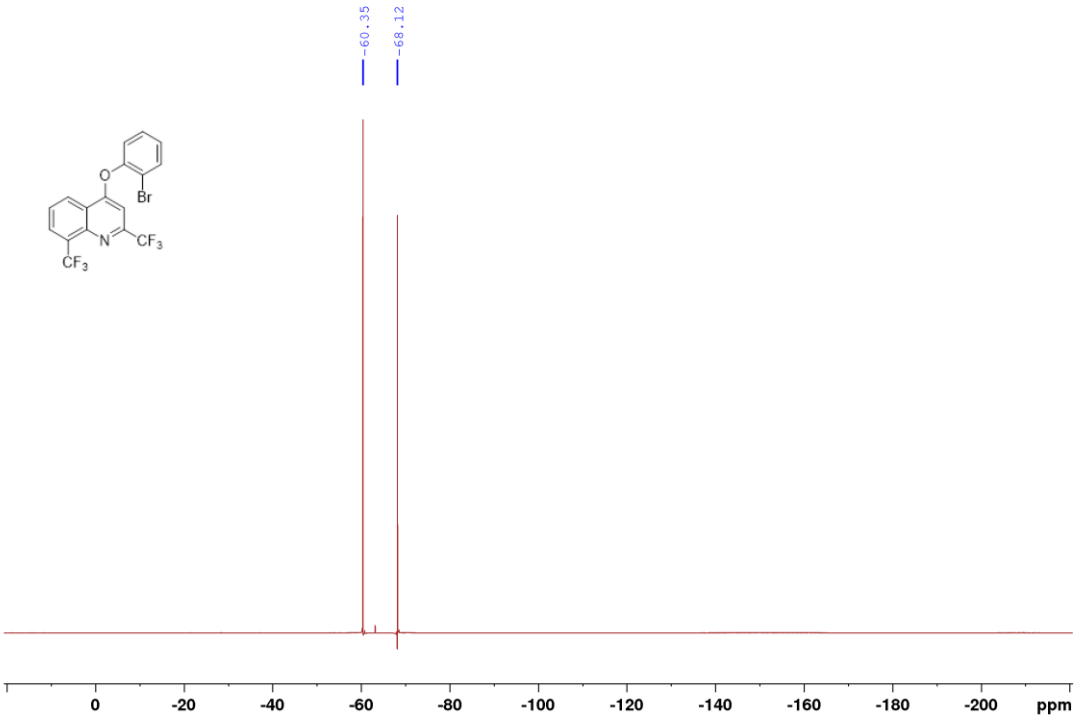
**4-(2-Bromophenoxy)-2,8-bis(trifluoromethyl)quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (S19)**



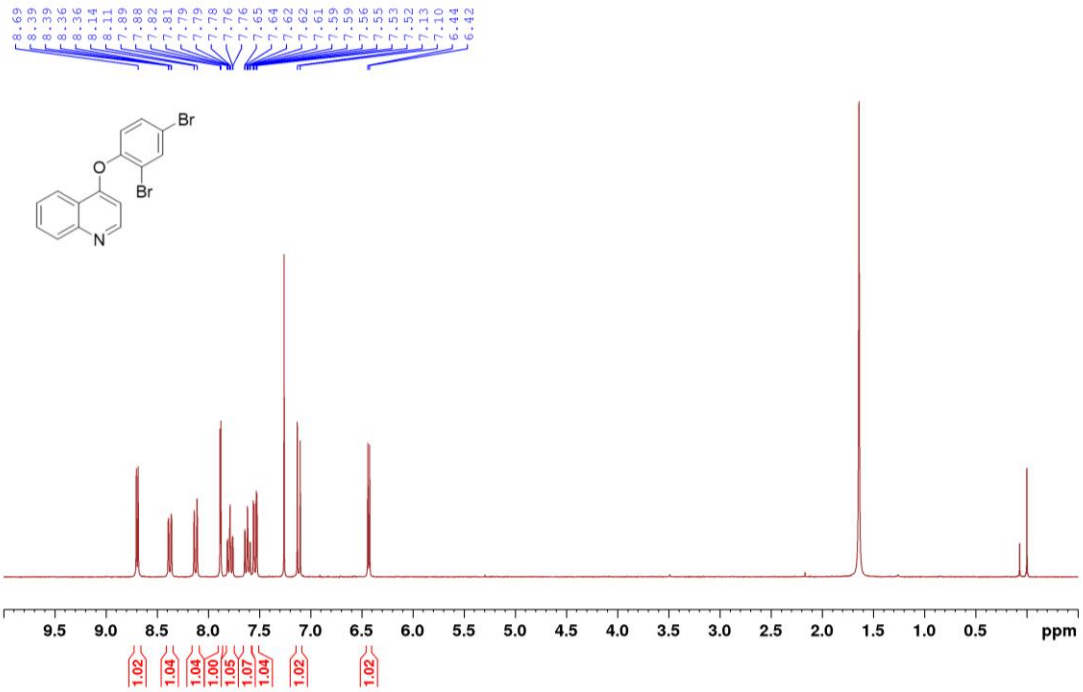

**4-(2-Bromophenoxy)-2,8-bis(trifluoromethyl)quinoline $^{13}$C NMR, 125 MHz, $CDCl_3$ (S19)**



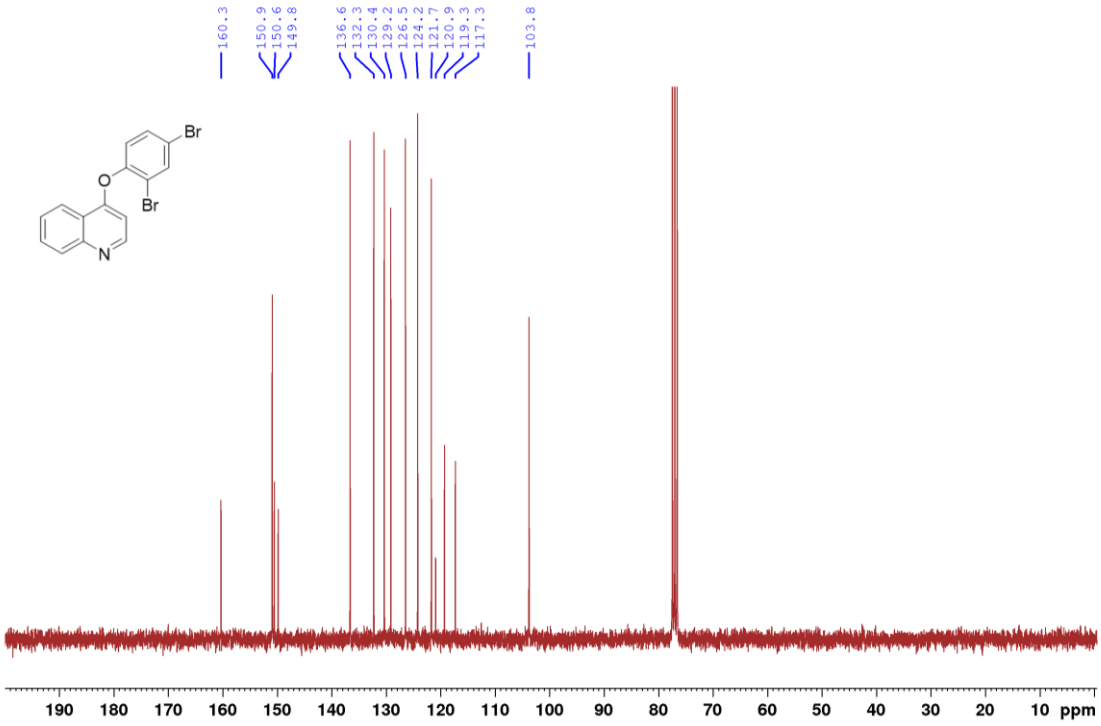
**4-(2-Bromophenoxy)-2,8-bis(trifluoromethyl)quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (S19)**



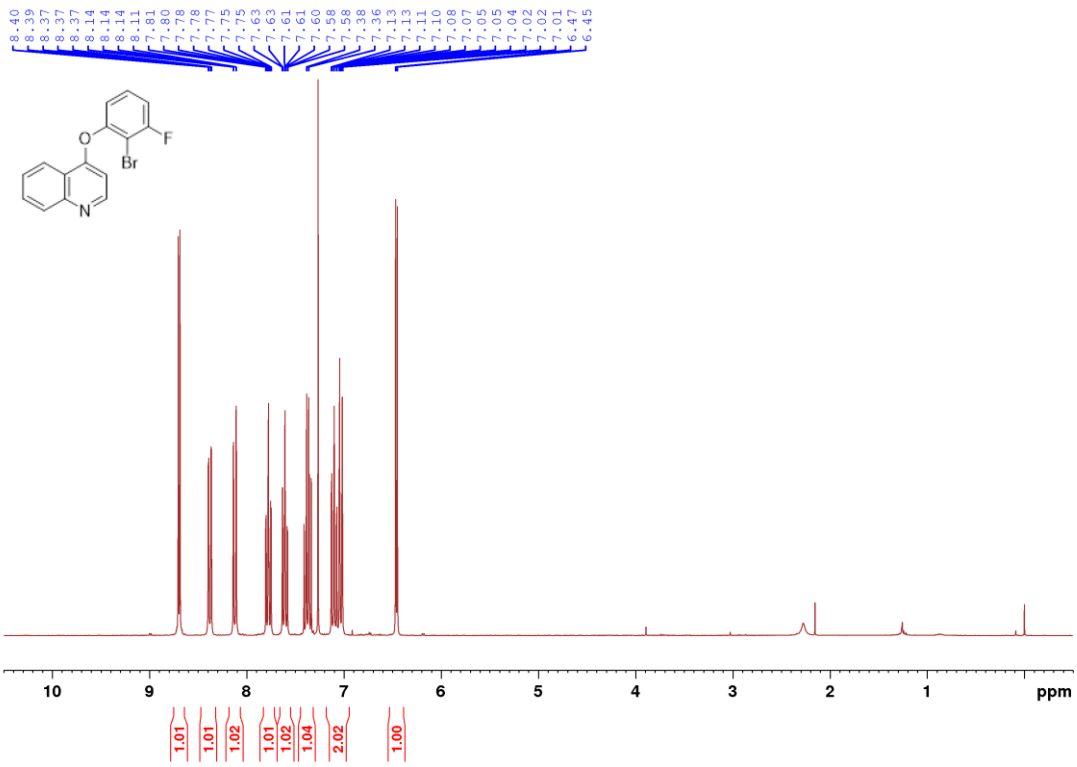

**4-(2,4-Dibromobenzyl)quinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (S20)**



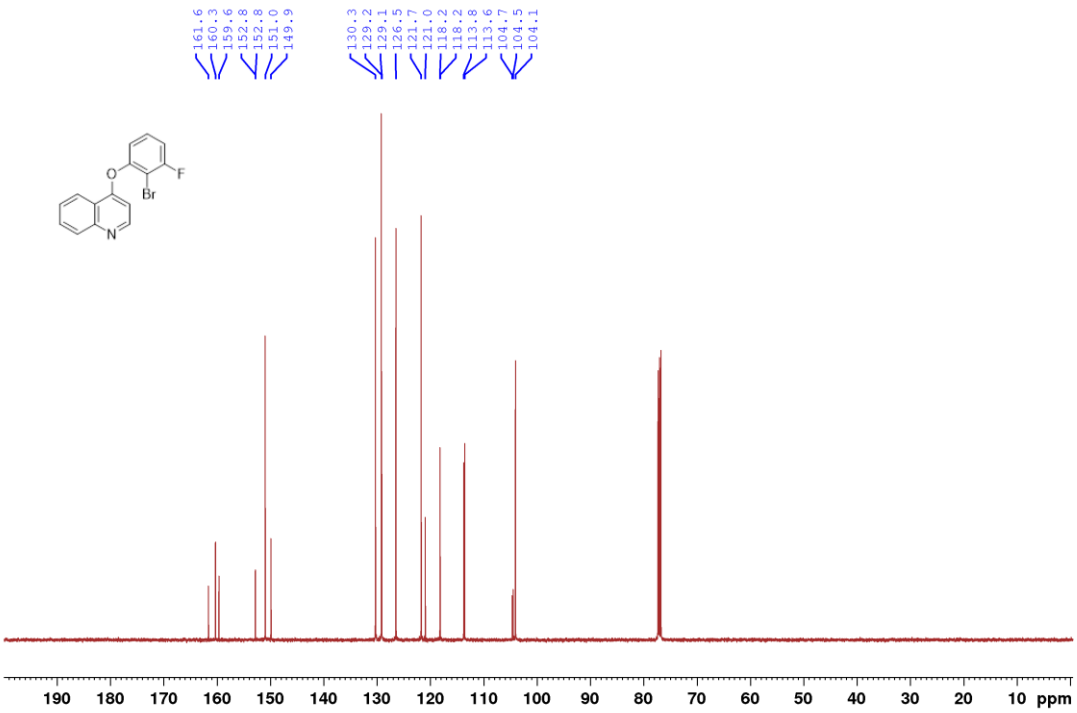
**4-(2,4-Dibromobenzyl)quinoline $^{13}C$ NMR, 75 MHz, $CDCl_3$ (S20)**



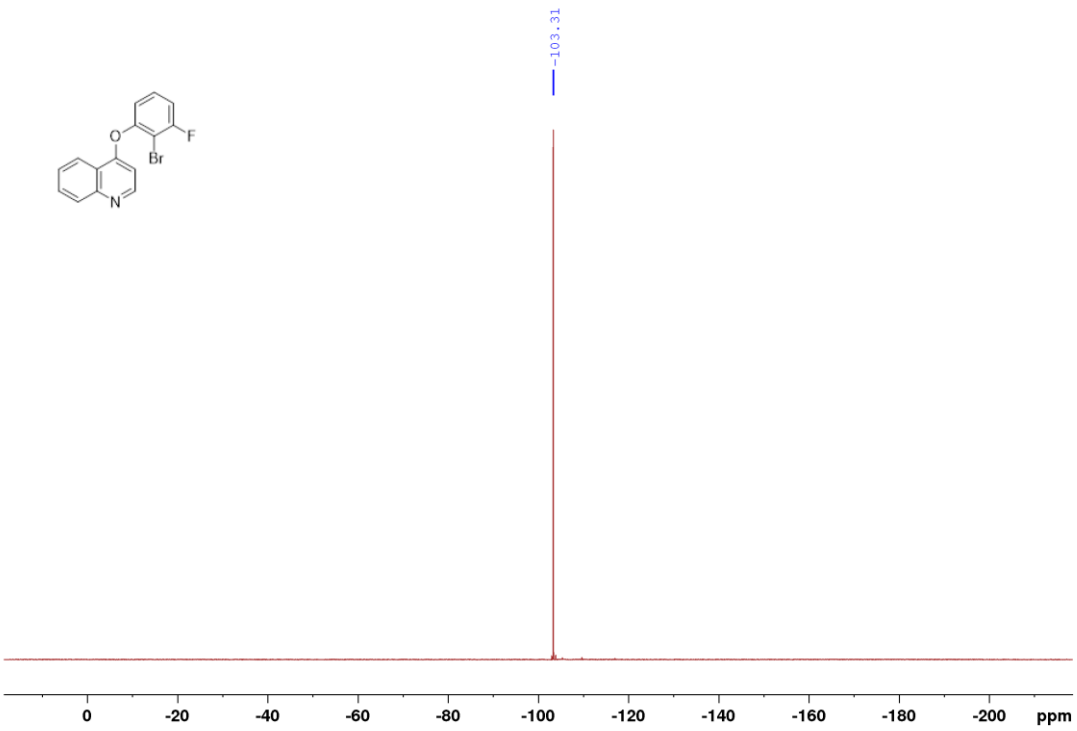

**4-(2-Bromo-3-fluorophenoxy)quinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (S21)**



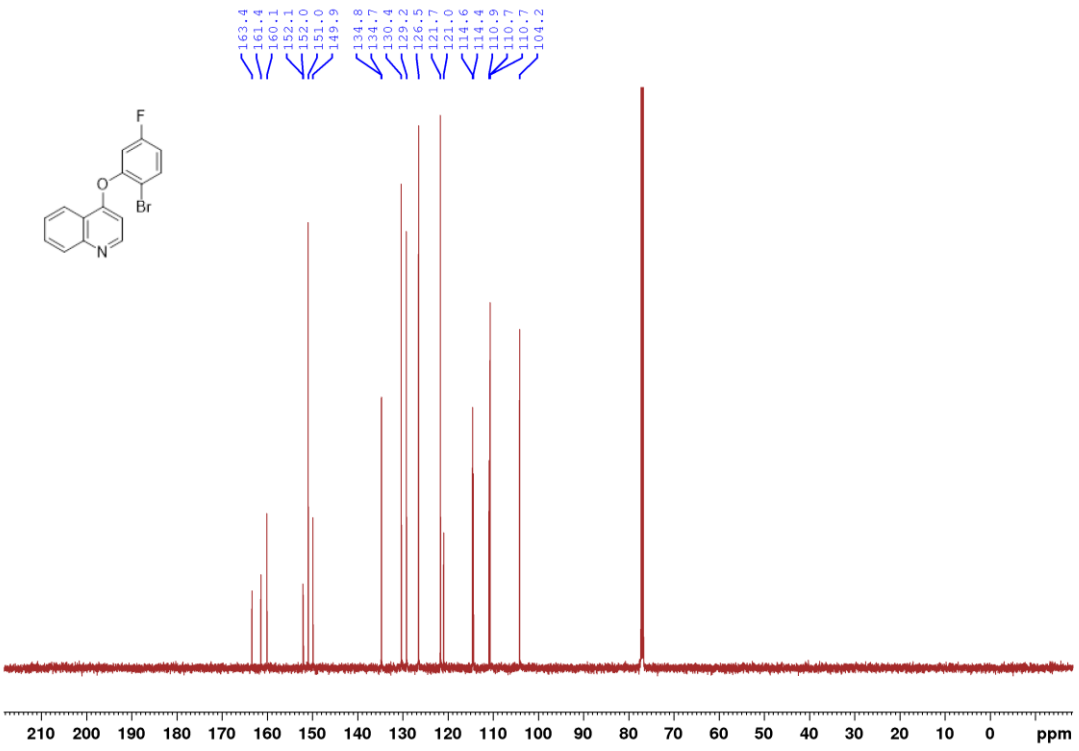
**4-(2-Bromo-3-fluorophenoxy)quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (S21)**



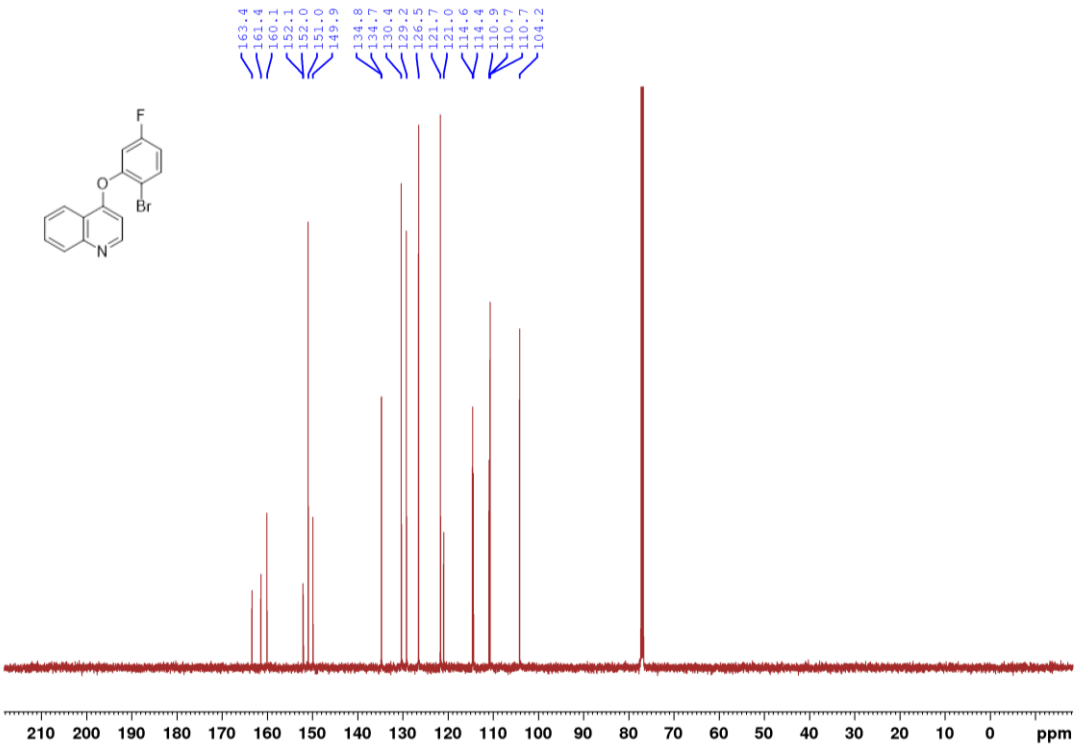

**4-(2-Bromo-3-fluorophenoxy)quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (S21)**



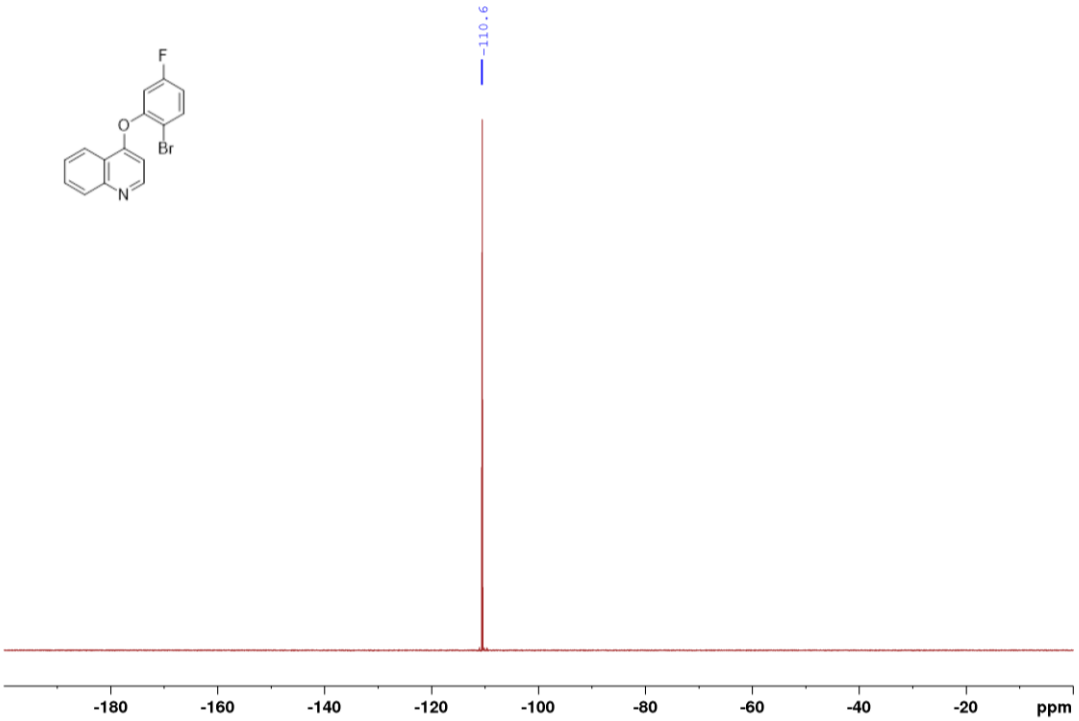
**4-(2-Bromo-5-fluorophenoxy)quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (S22)**



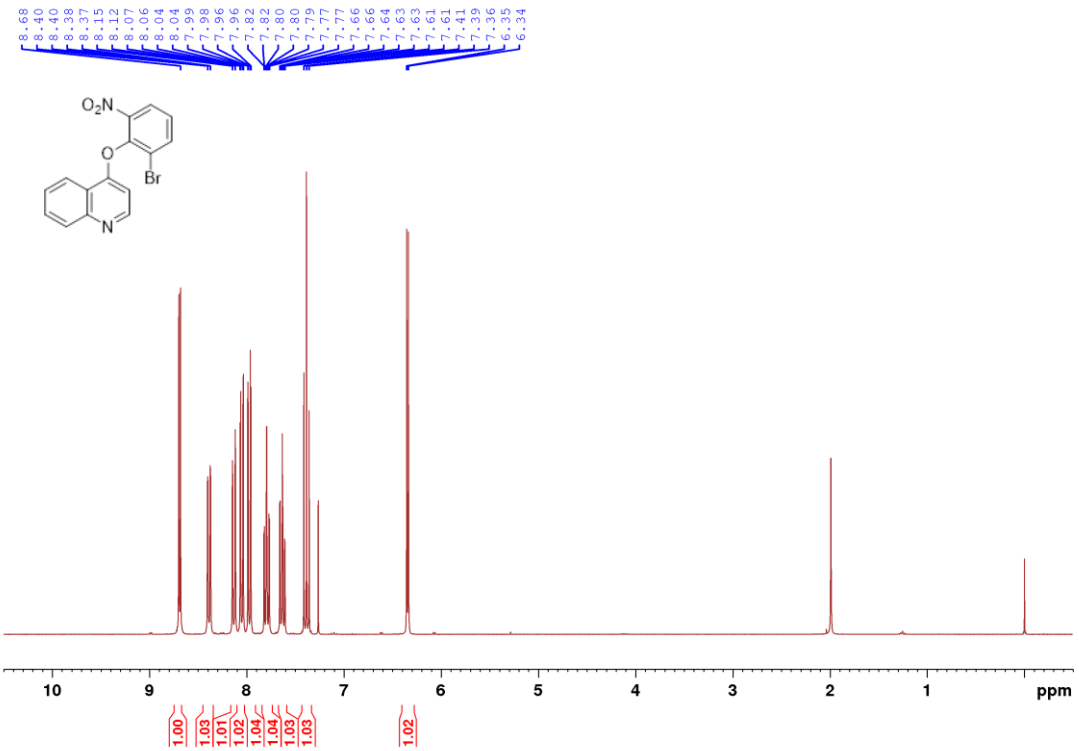

**4-(2-Bromo-5-fluorophenoxy)quinoline $^{13}$C NMR, 125 MHz, $CDCl_3$ (S22)**



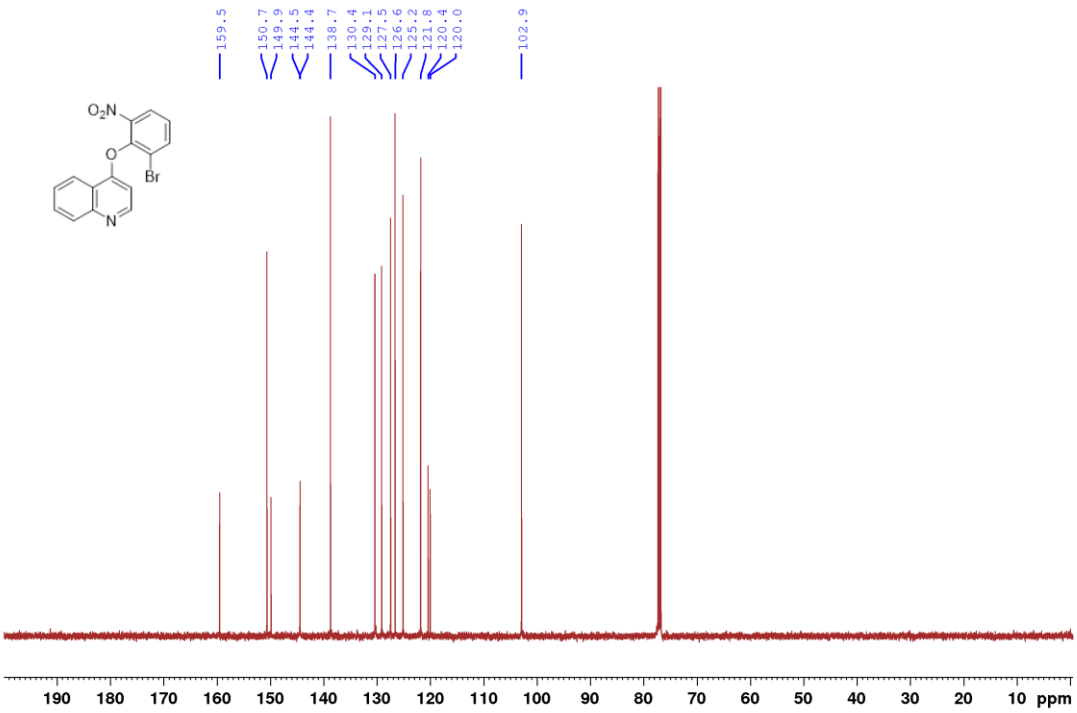
**4-(2-Bromo-5-fluorophenoxy)quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (S22)**



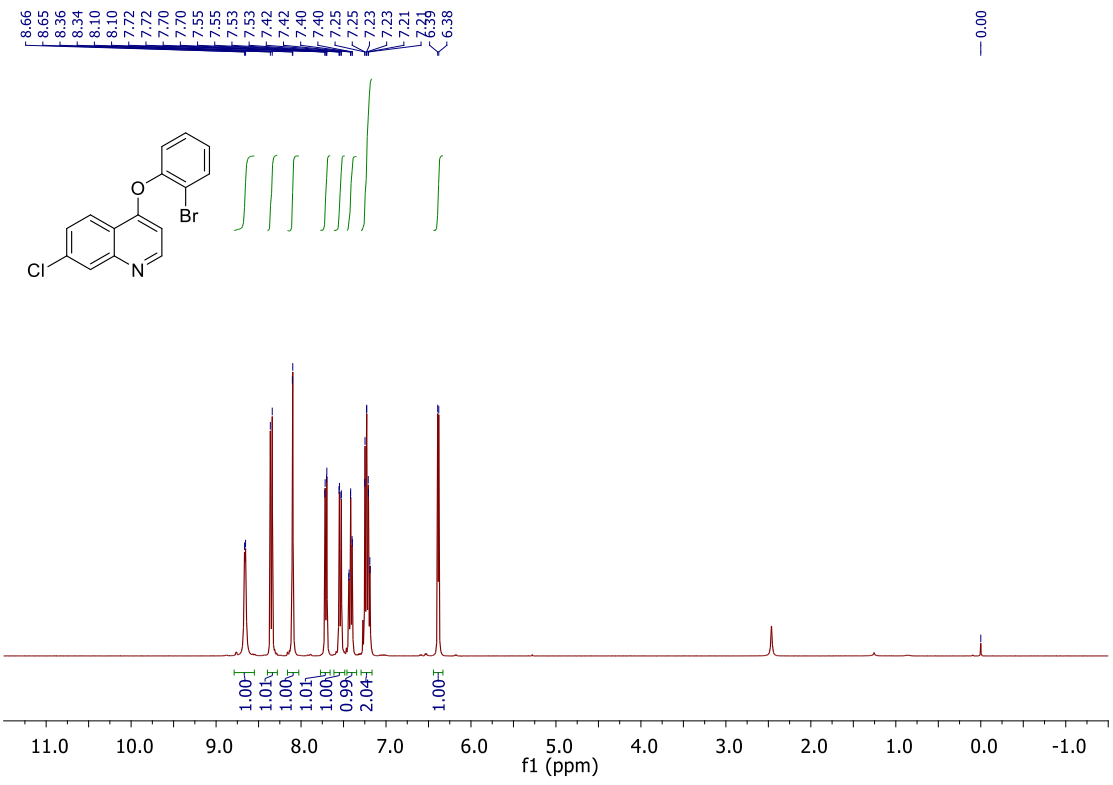

**4-(2-Bromo-6-nitrophenoxy)quinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (S23)**



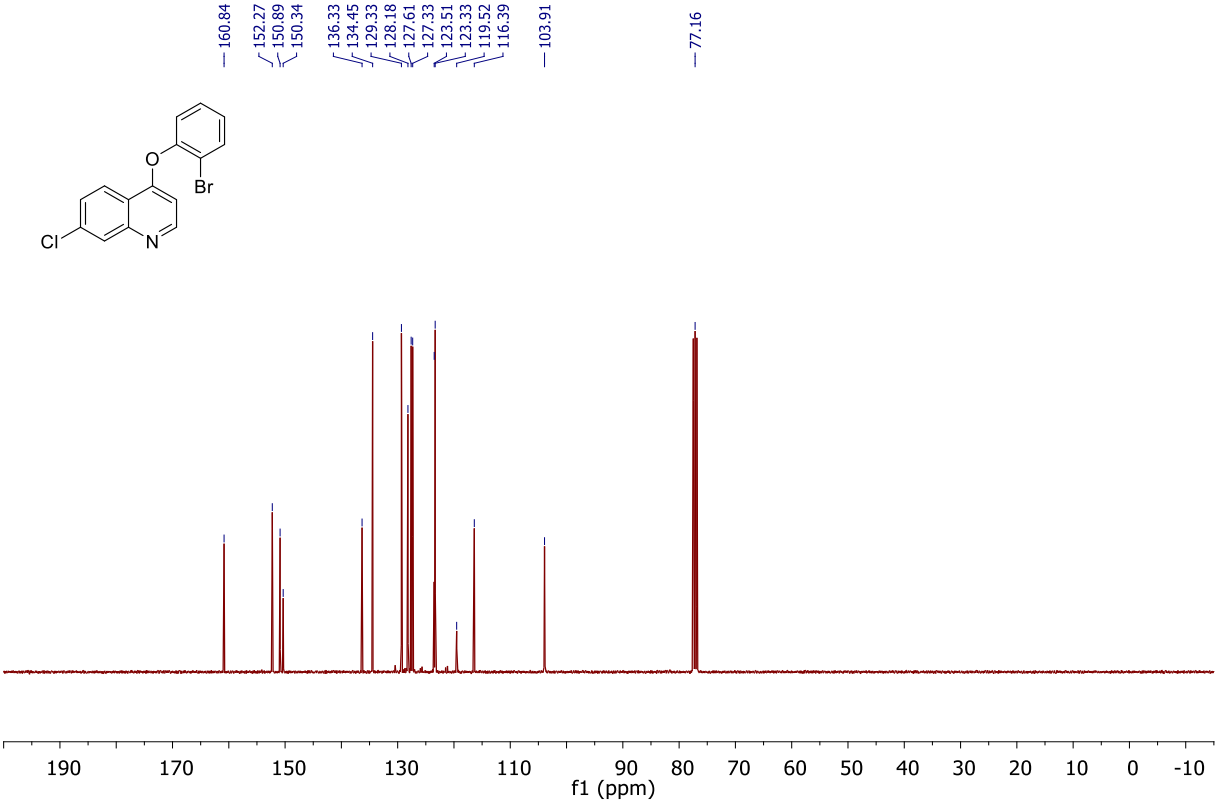
**4-(2-Bromo-6-nitrophenoxy)quinoline$^{13}$C NMR, 125 MHz, $CDCl_3$ (S23)**



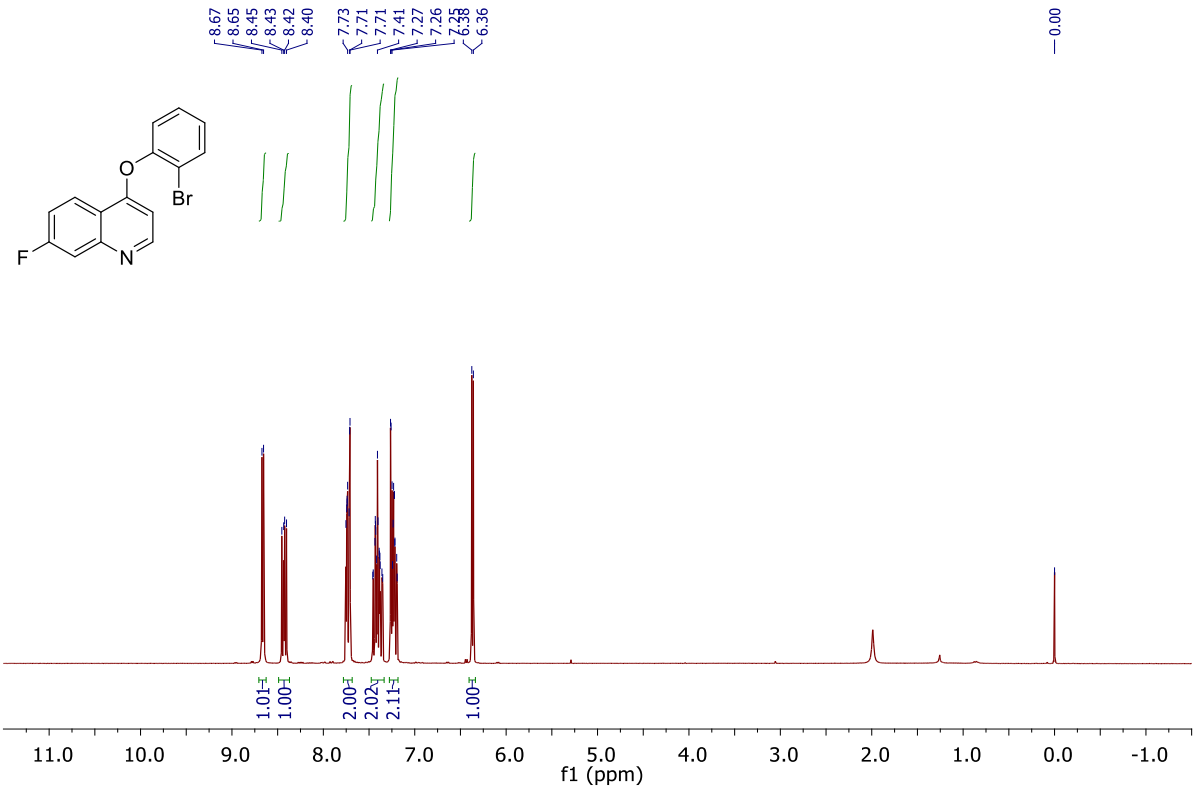

**4-(2-Bromophenoxy)-7-chloroquinoline $^1$H NMR, 400 MHz, $CDCl_3$ (S24)**



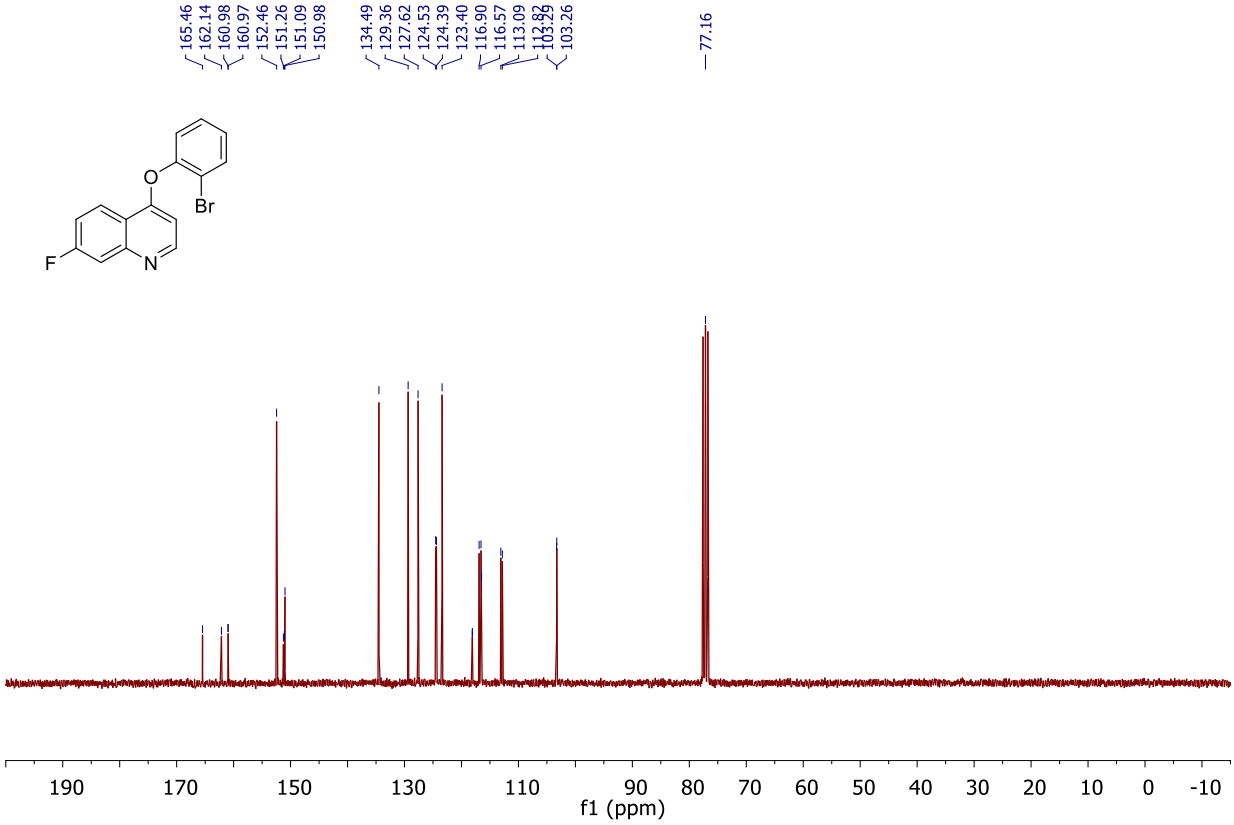
**4-(2-Bromophenoxy)-7-chloroquinoline $^{13}C$ NMR, 100 MHz, $CDCl_3$ (S24)**



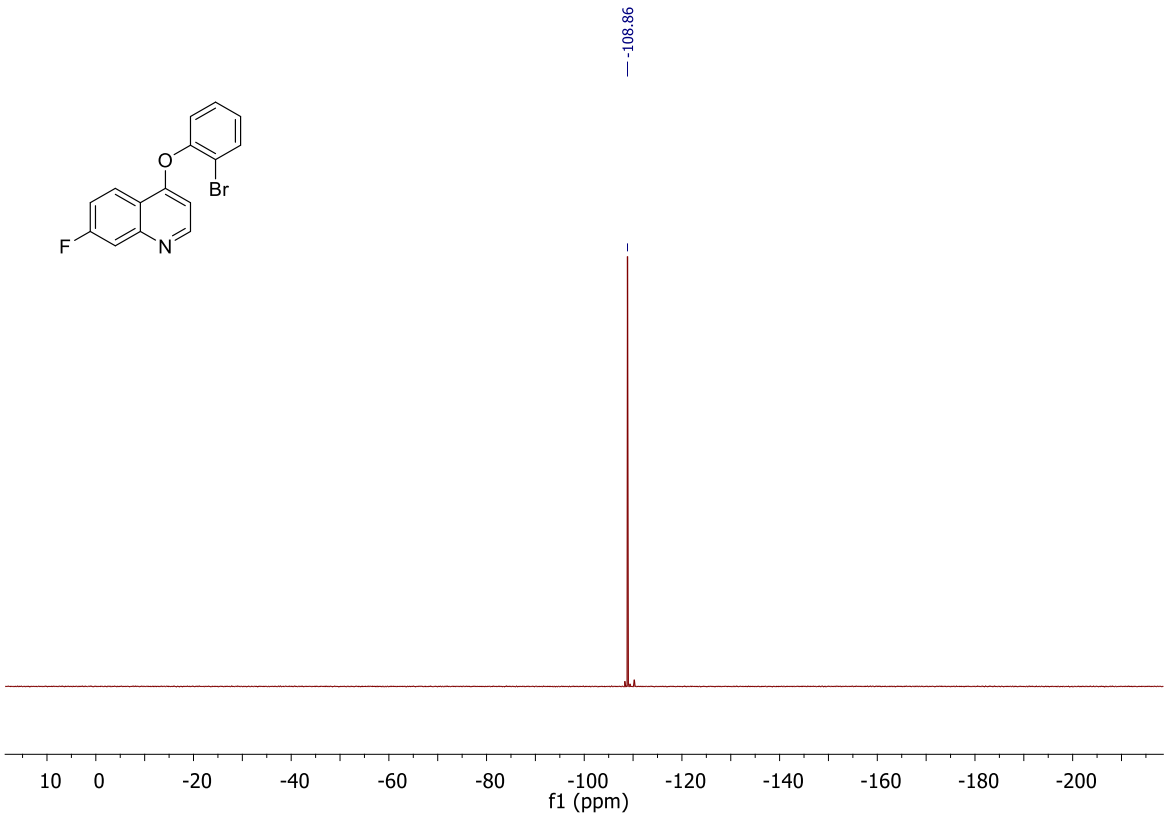

**4-(2-Bromophenoxy)-6-fluoroquinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (S25)**



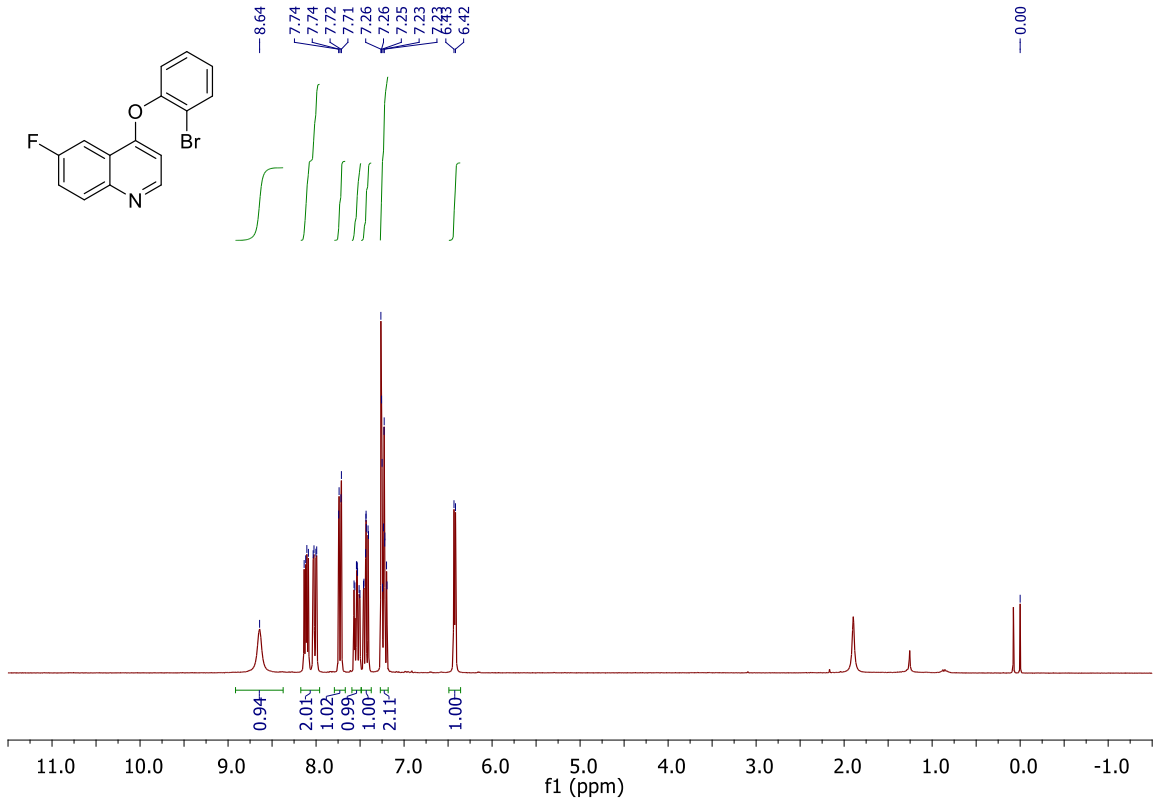
**4-(2-Bromophenoxy)-6-fluoroquinoline $^{13}C$ NMR, 75 MHz, $CDCl_3$ (S25)**



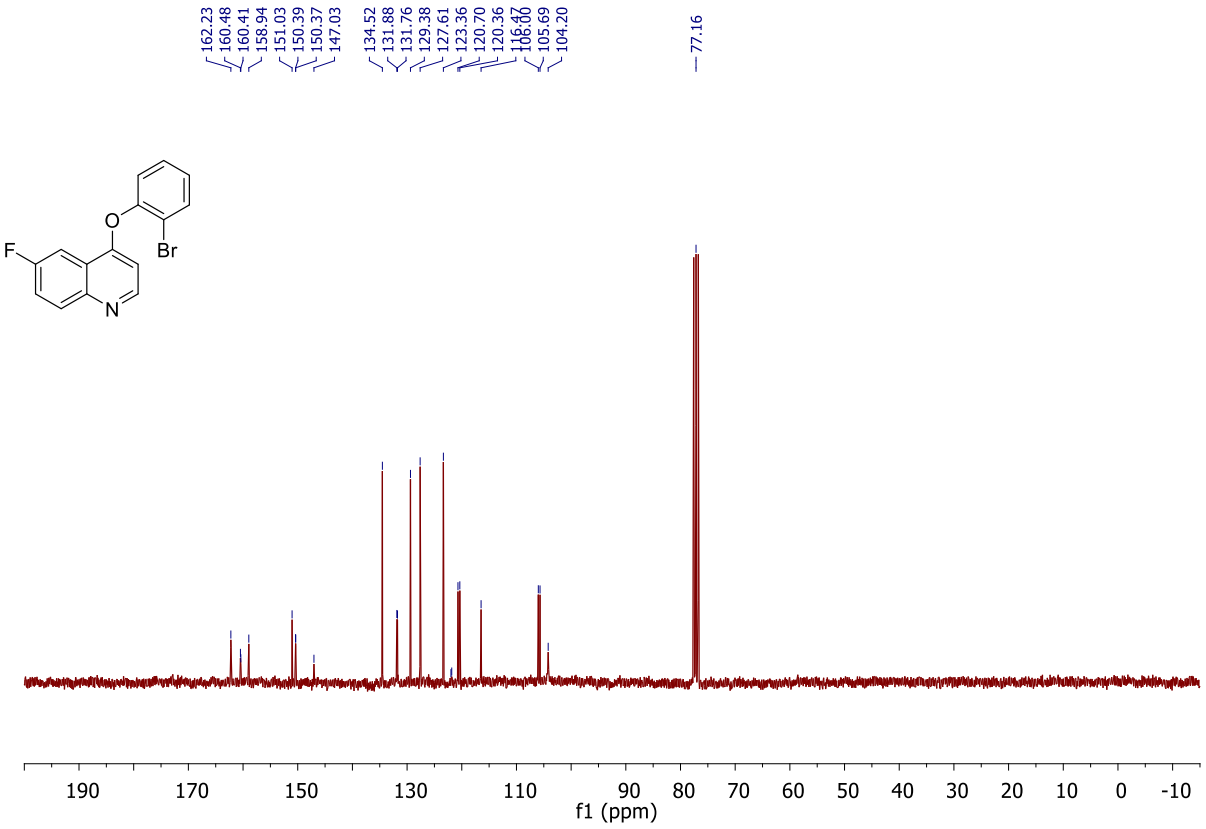

**4-(2-Bromophenoxy)-6-fluoroquinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (S25)**



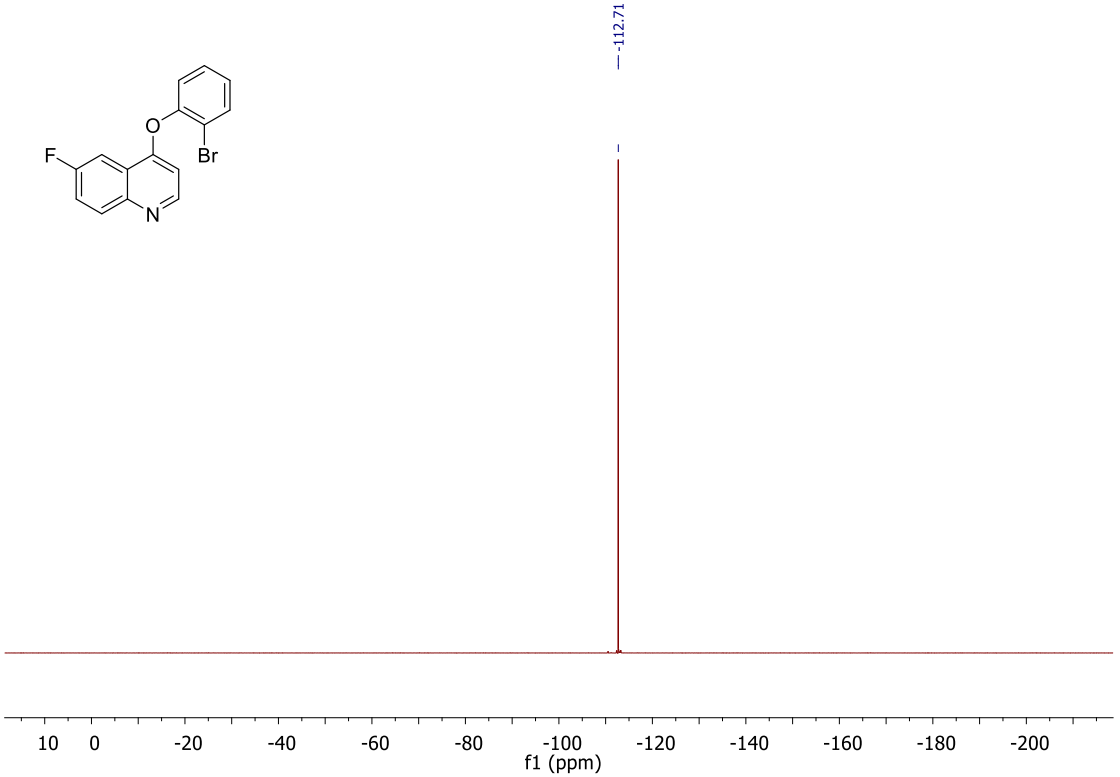
**4-(2-Bromophenoxy)-6-fluoroquinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (S26)**




**4-(2-Bromophenoxy)-6-fluoroquinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (S26)**

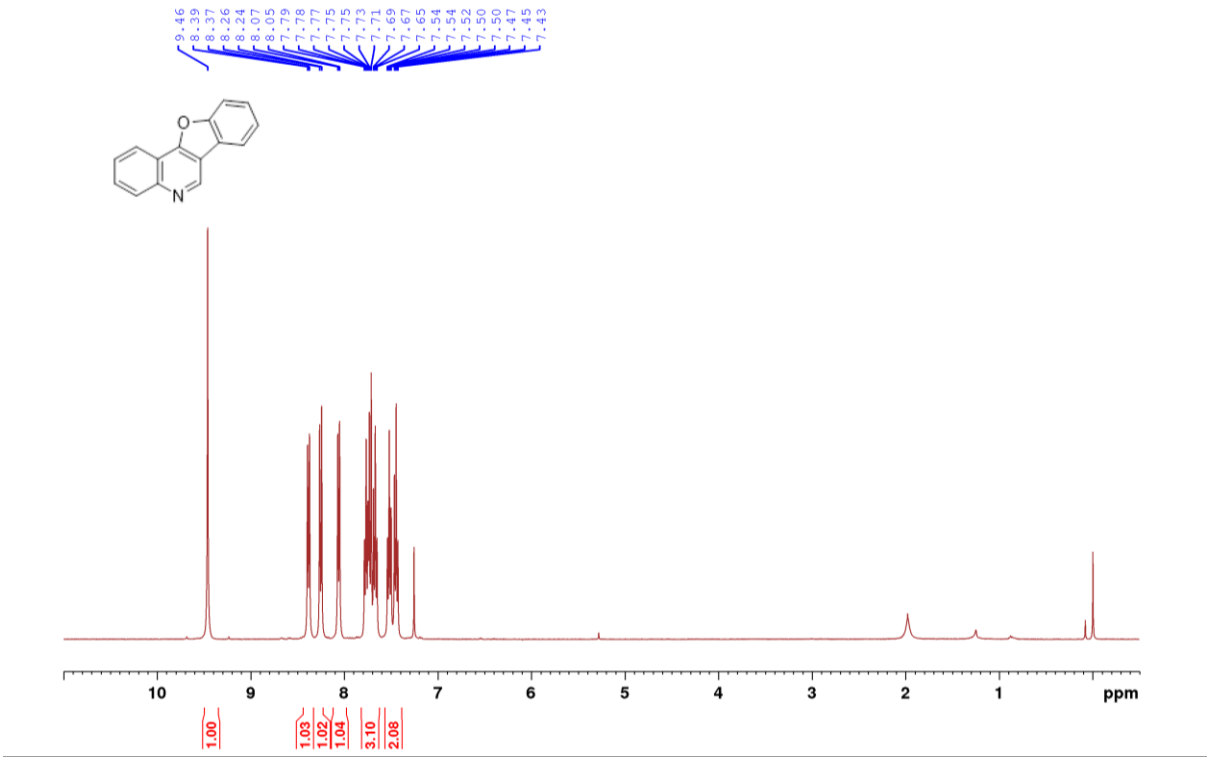


**4-(2-Bromophenoxy)-6-fluoroquinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (S26)**

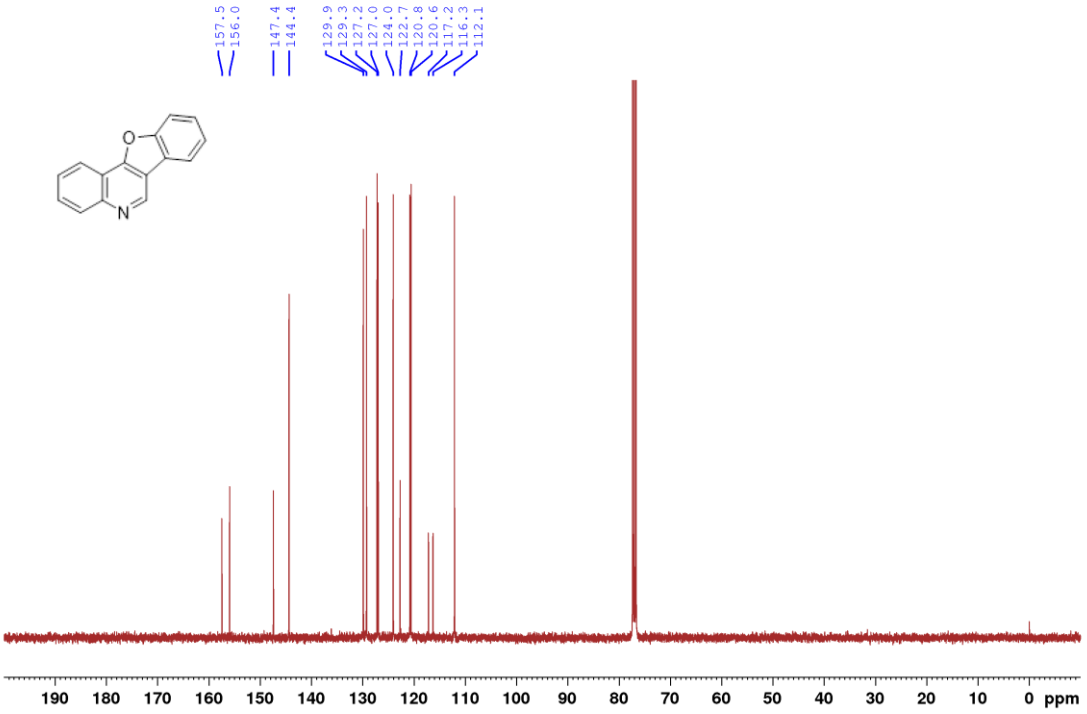



## NMR Spectra of Benzofuroquinolines

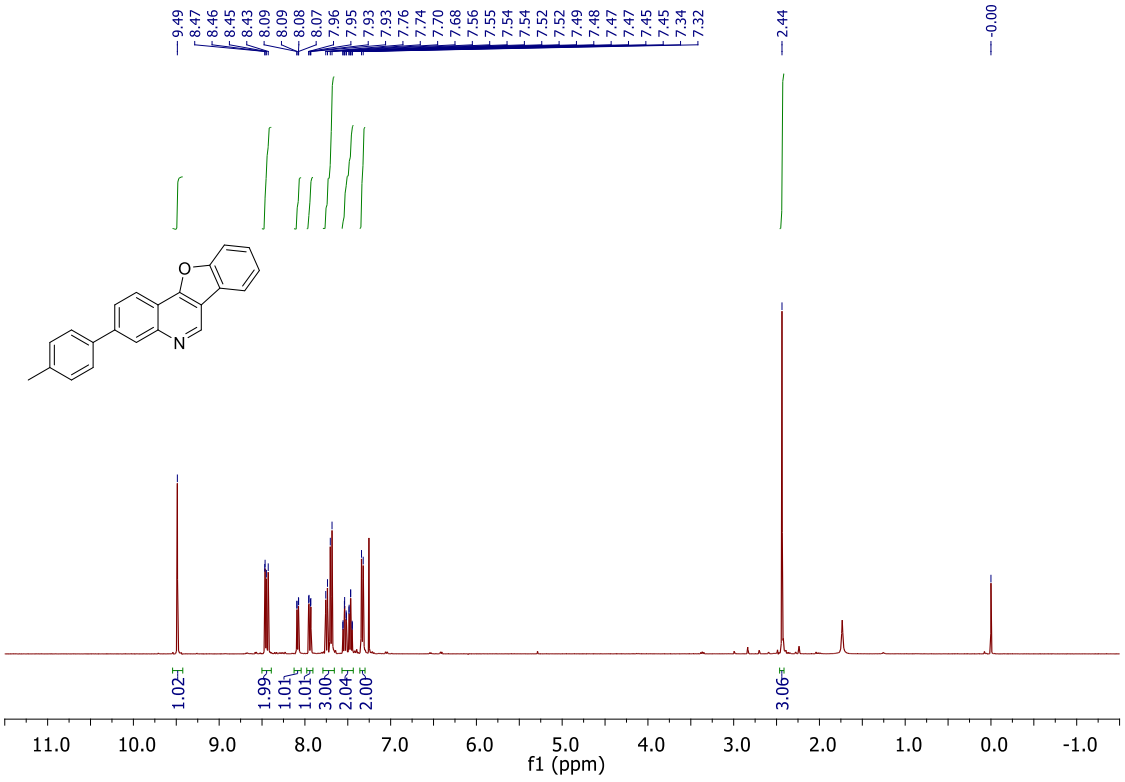
**Benzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (1a)**



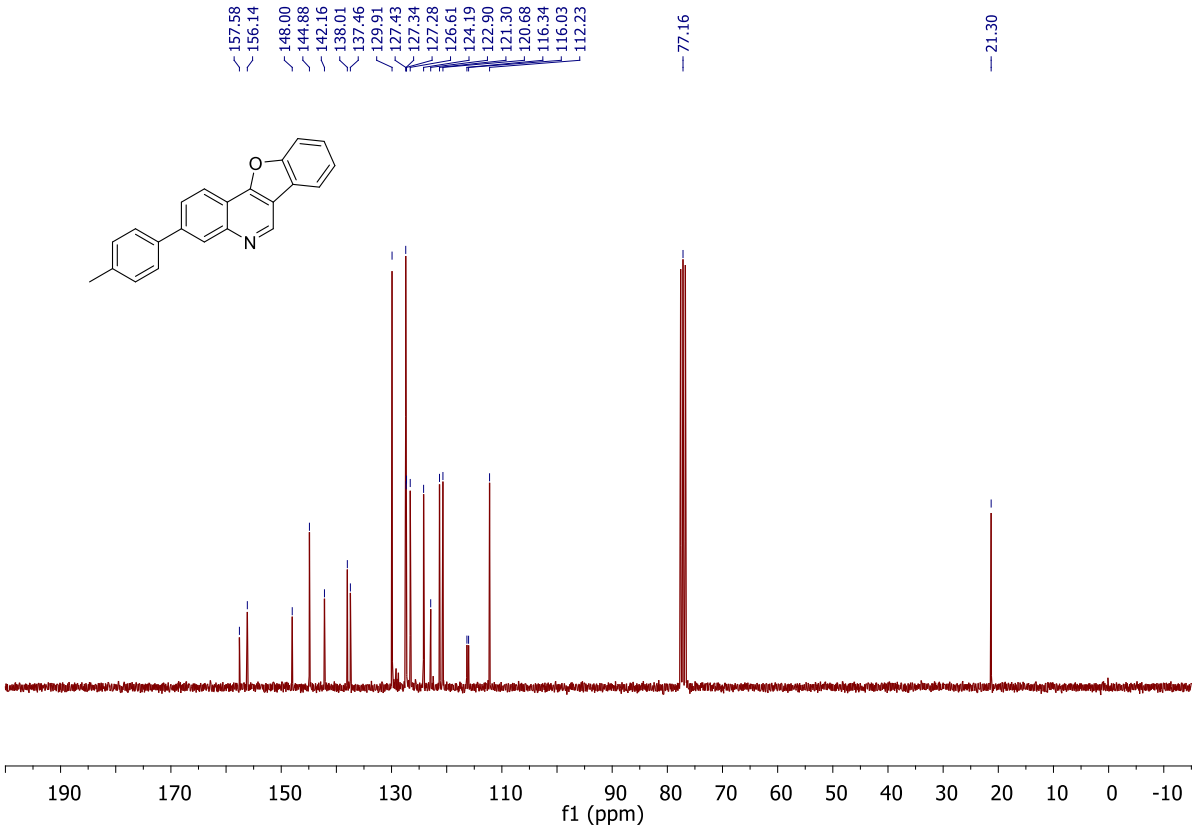
**Benzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 150 MHz, $CDCl_3$ (1a)**



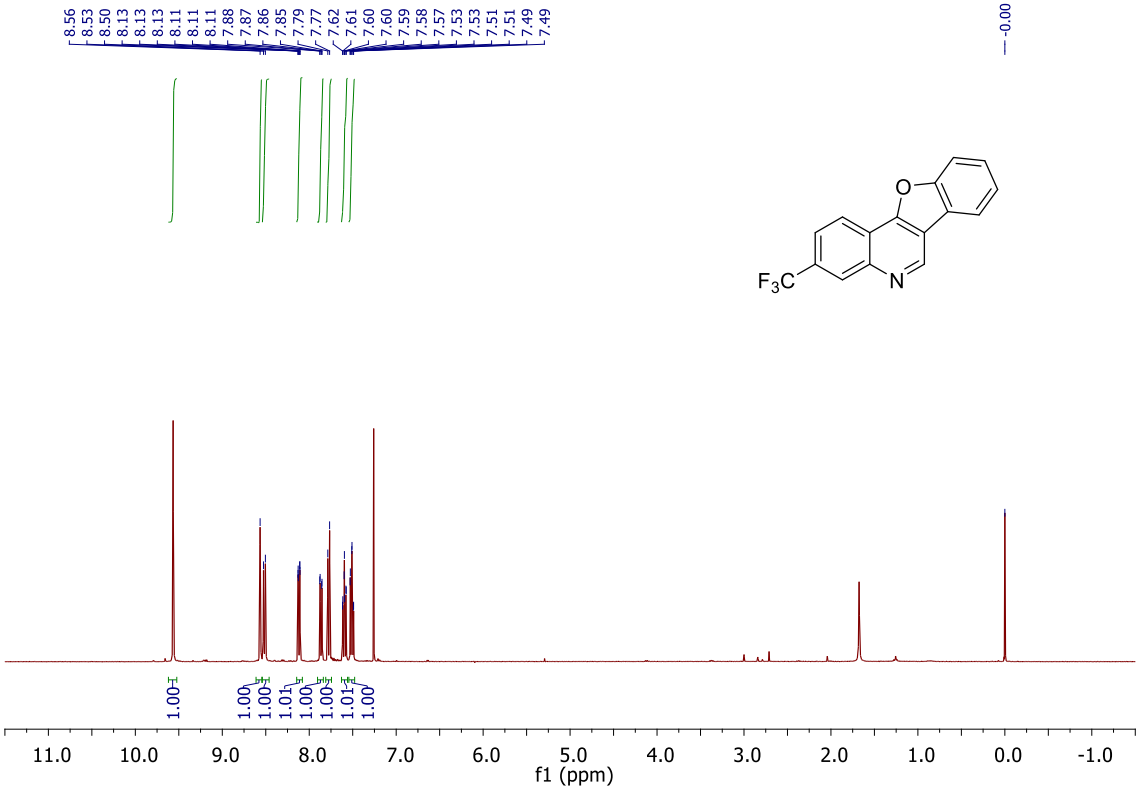

**3-(*p*-Tolyl)benzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 400 MHz, $CDCl_3$ (1b)**



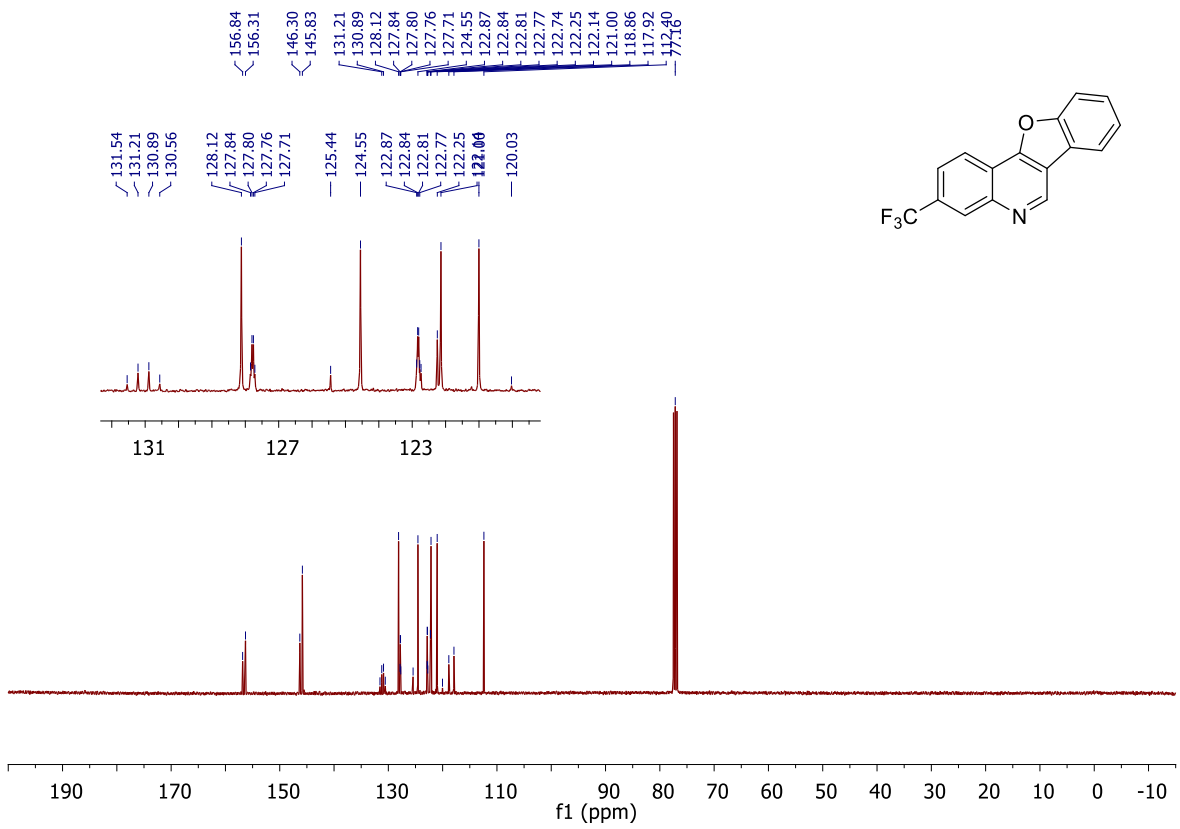
**3-(*p*-Tolyl)benzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 376 MHz, $CDCl_3$ (1b)**



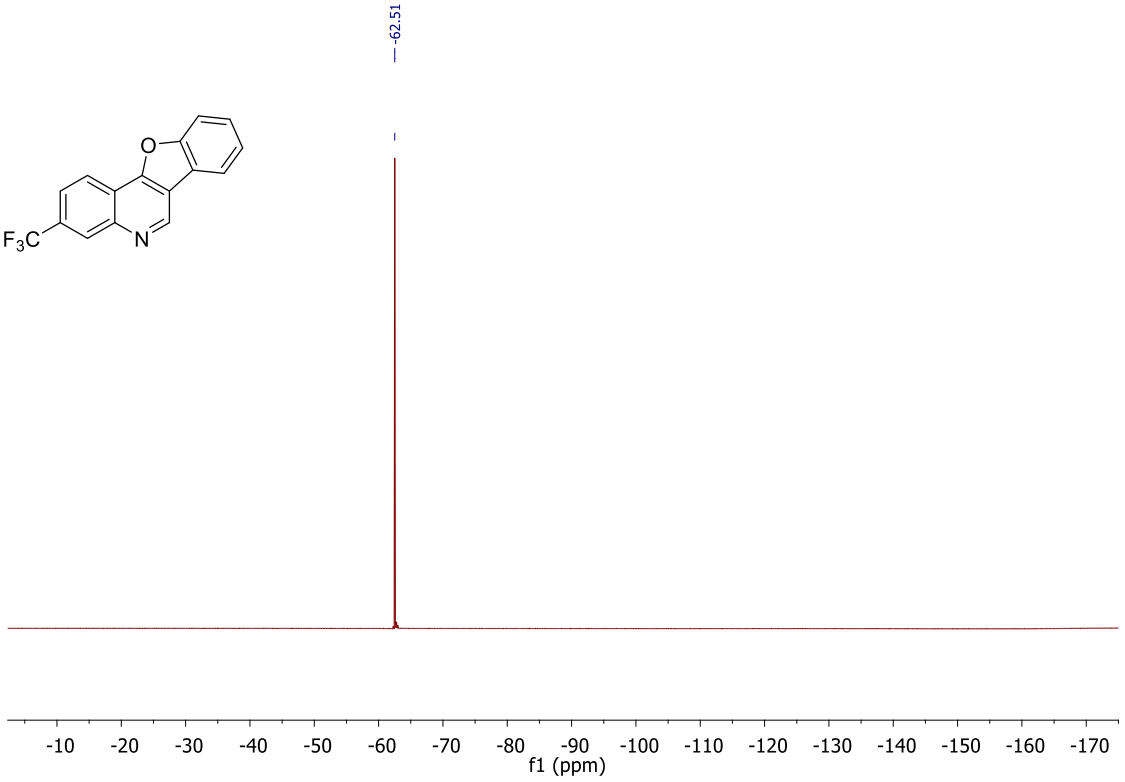

**3-(Trifluoromethyl)benzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 400 MHz, $CDCl_3$ (1c)**



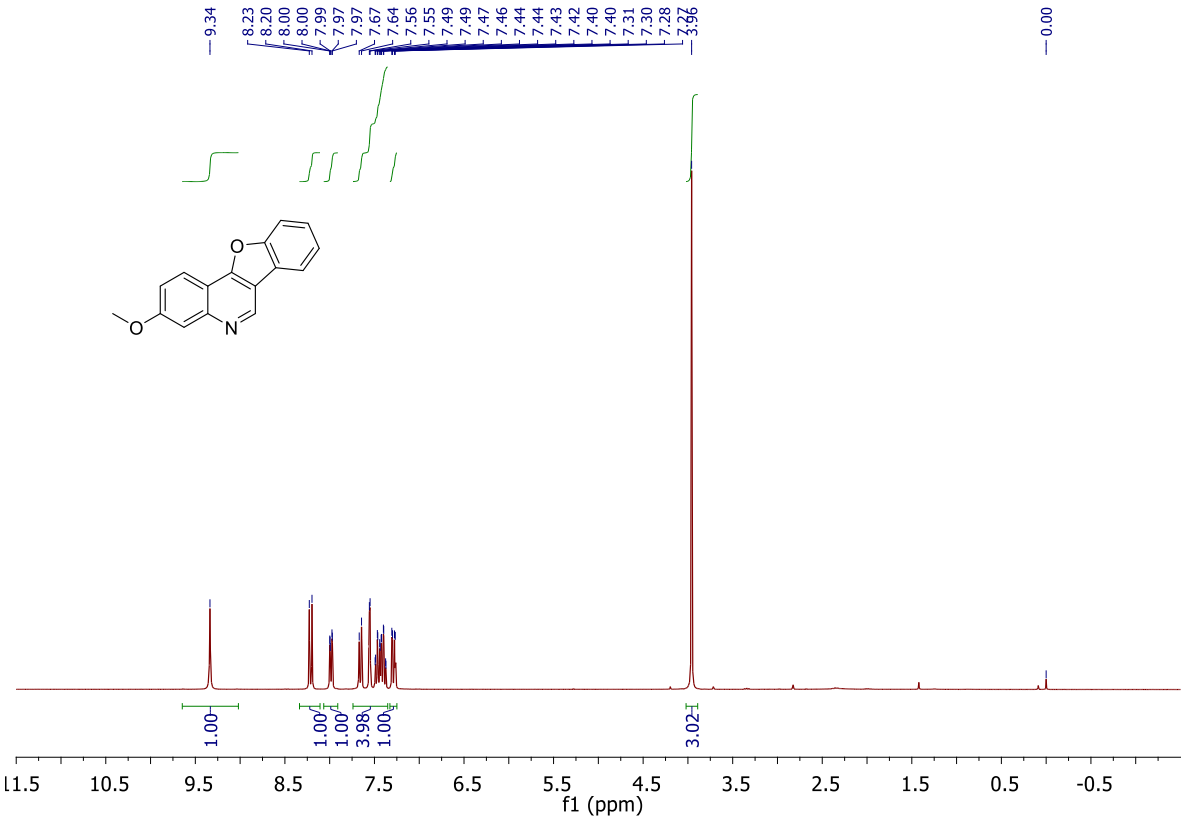
**3-(Trifluoromethyl)benzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 100 MHz, $CDCl_3$ (1c)**



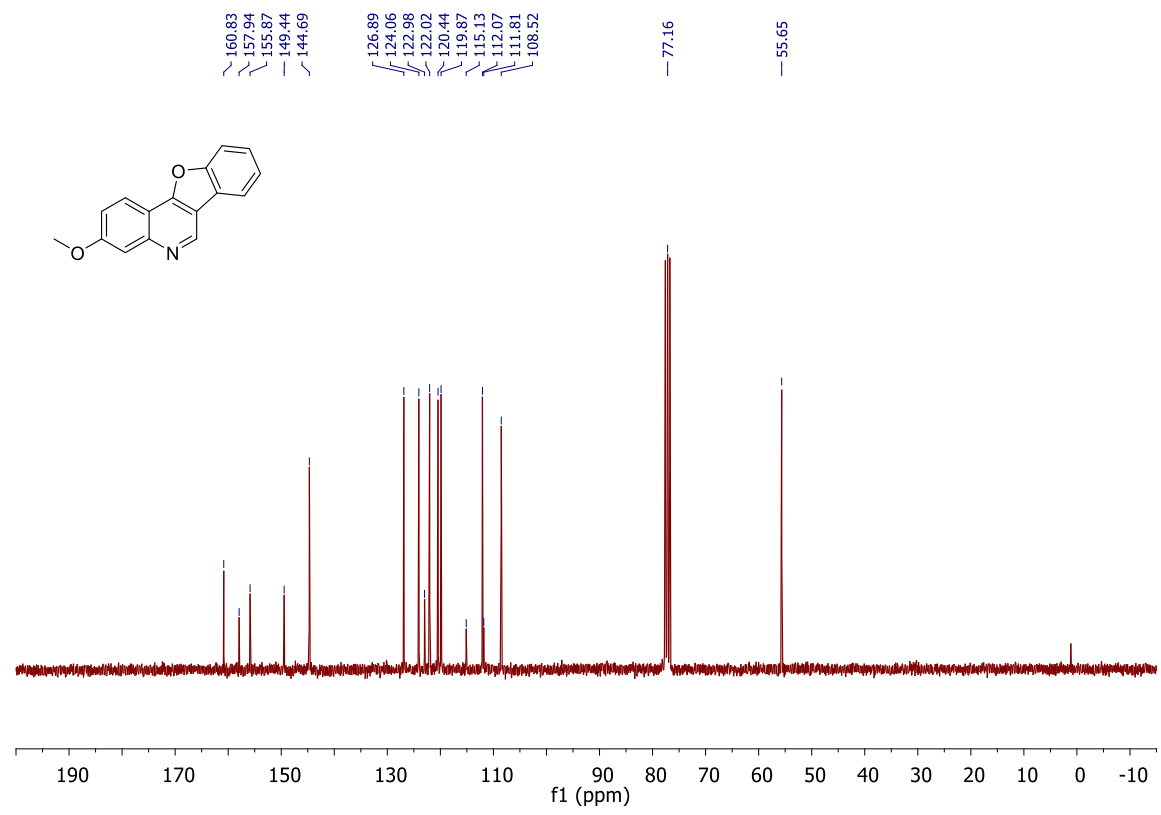

**3-(Trifluoromethyl)benzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 376 MHz, $CDCl_3$ (1c)**



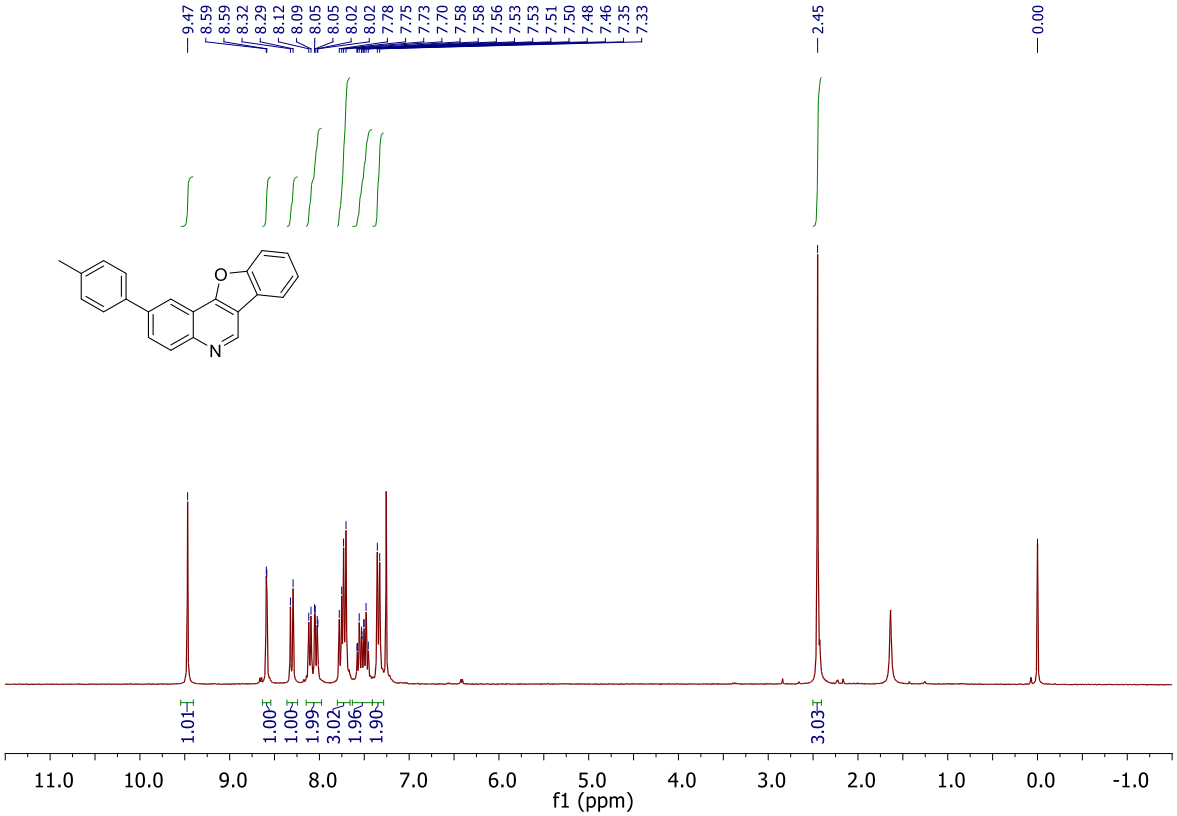
**3-Methoxybenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (1d)**



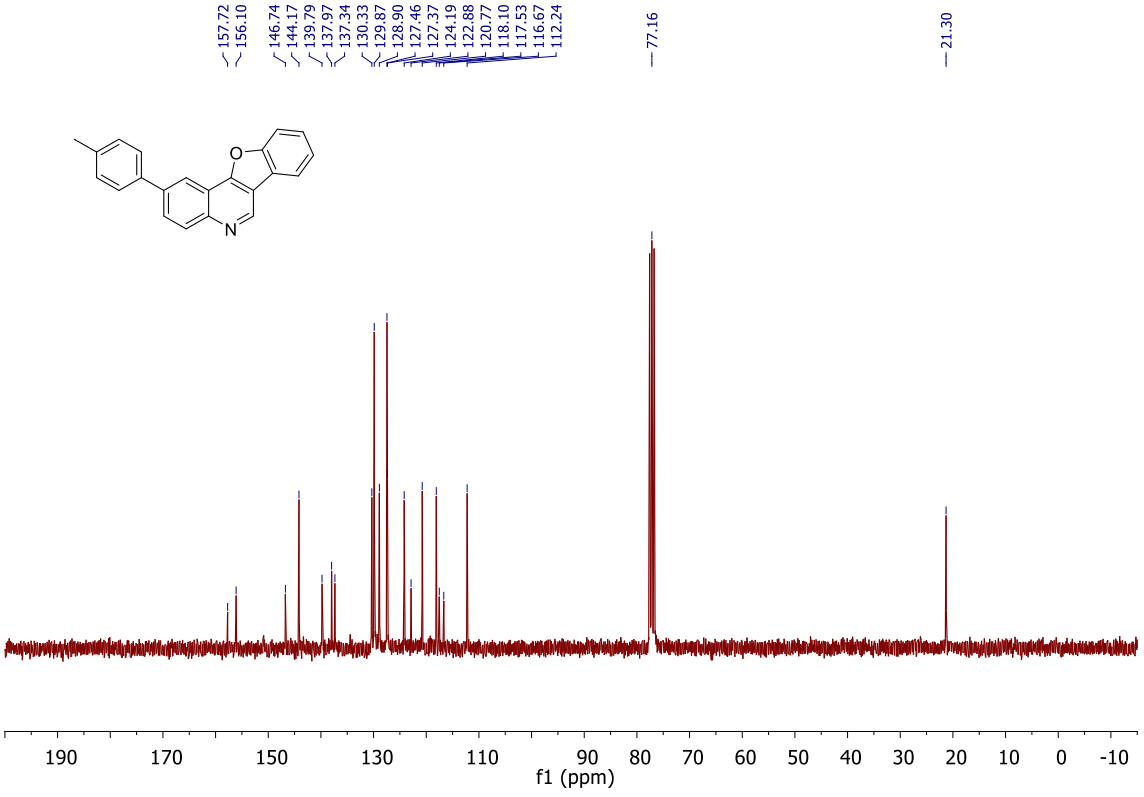

**3-Methoxybenzofuro[3,2-*c*]quinoline$^{13}$C NMR, 75 MHz, $CDCl_3$ (1d)**



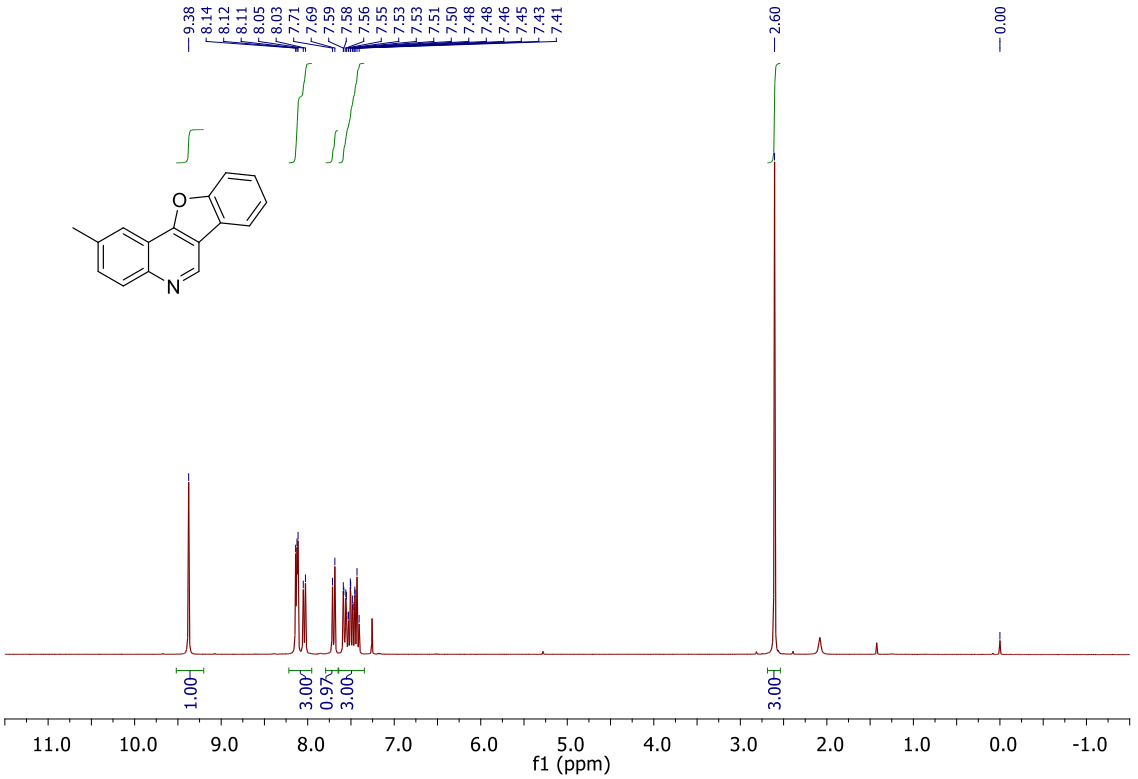
**2-(*p*-Tolyl)benzofuro[3,2-*c*]quinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (1f)**



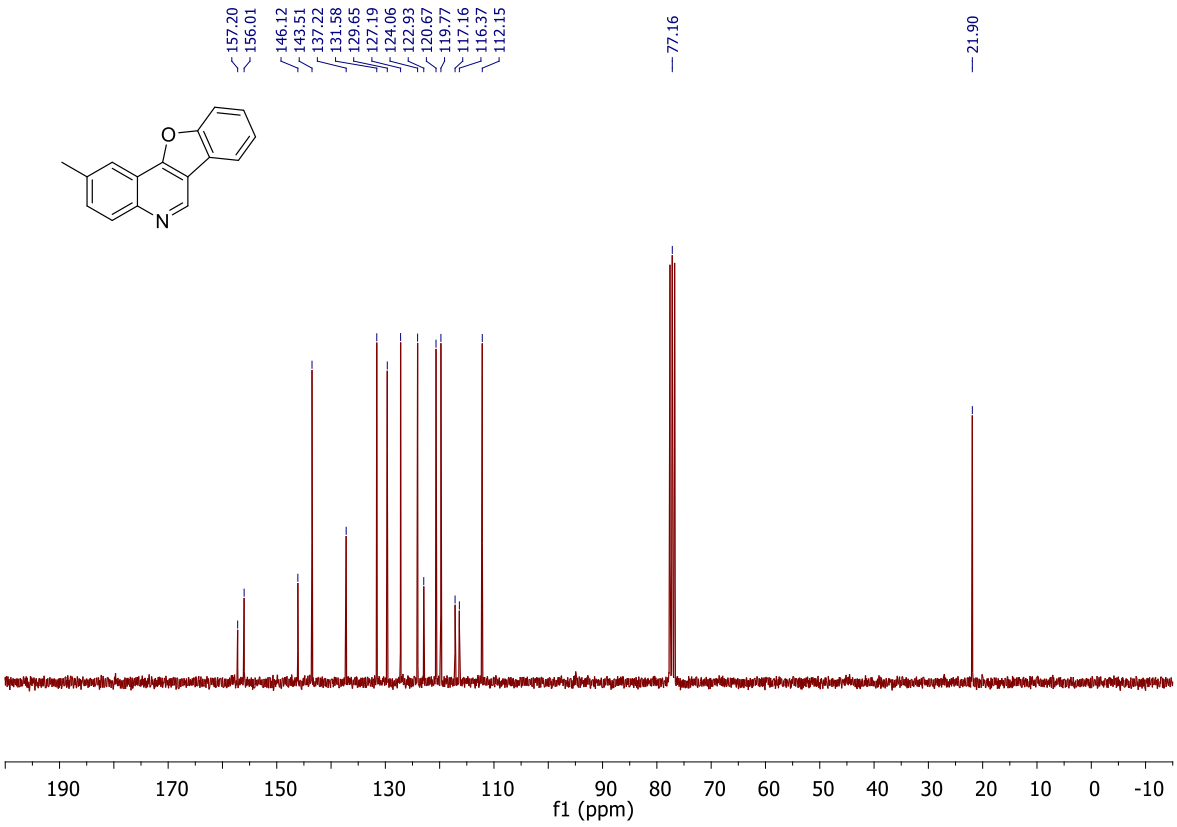

**2-(*p*-Tolyl)benzofuro[3,2-*c*]quinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (1f)**



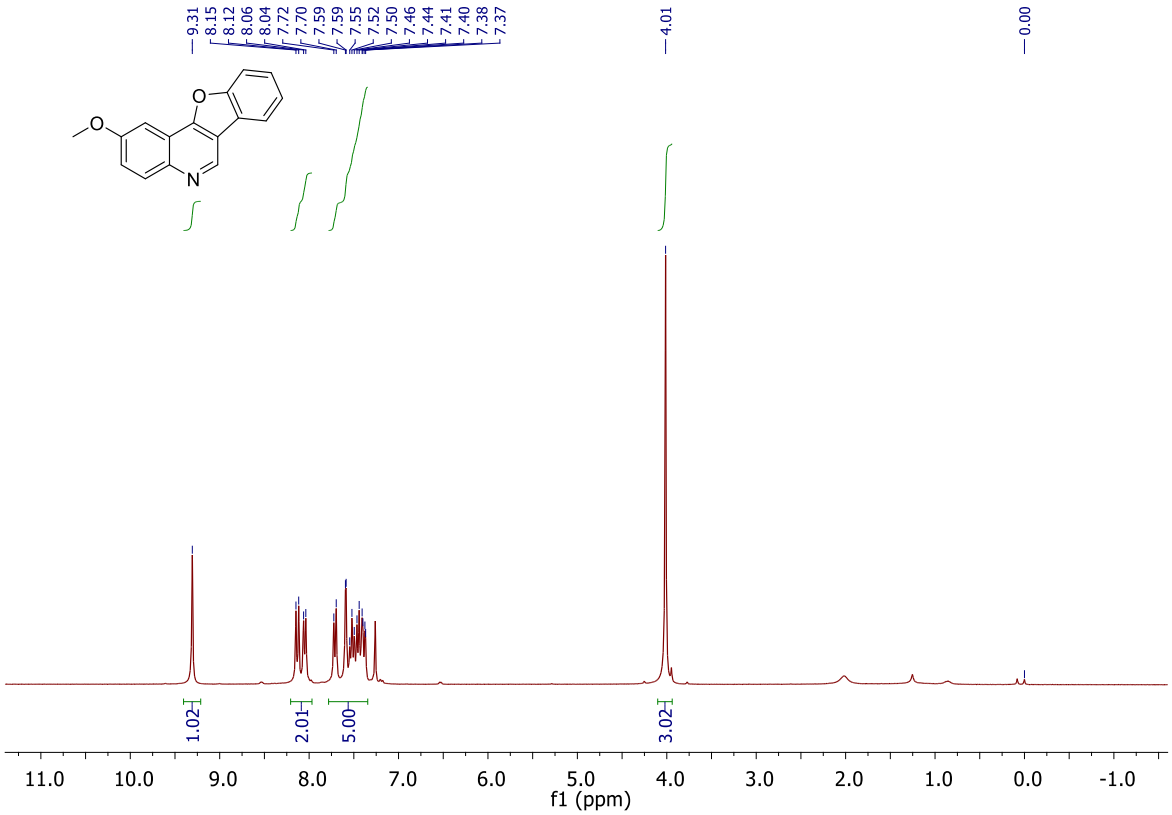
**2-Methylbenzofuro[3,2-*c*]quinoline$^{1}$H NMR, 300 MHz, $CDCl_3$ (1g)**



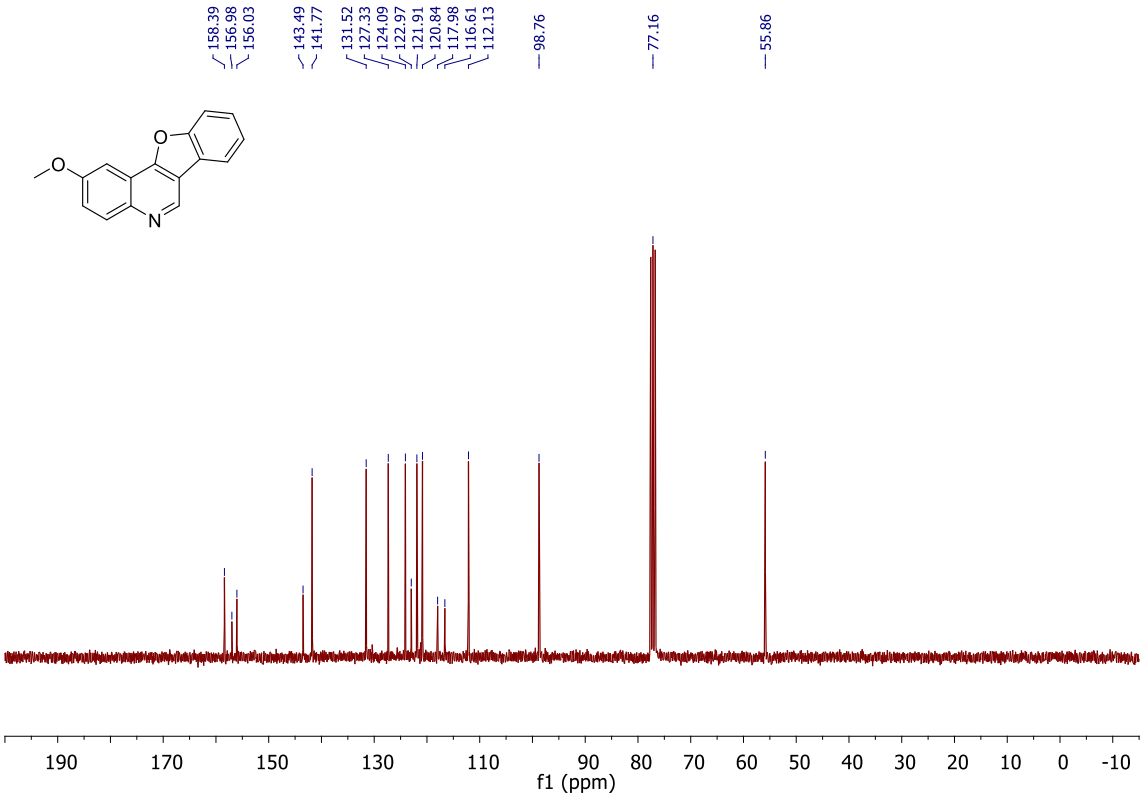

**2-Methylbenzofuro[3,2-*c*]quinoline$^{13}$C NMR, 75 MHz, $CDCl_3$ (1g)**



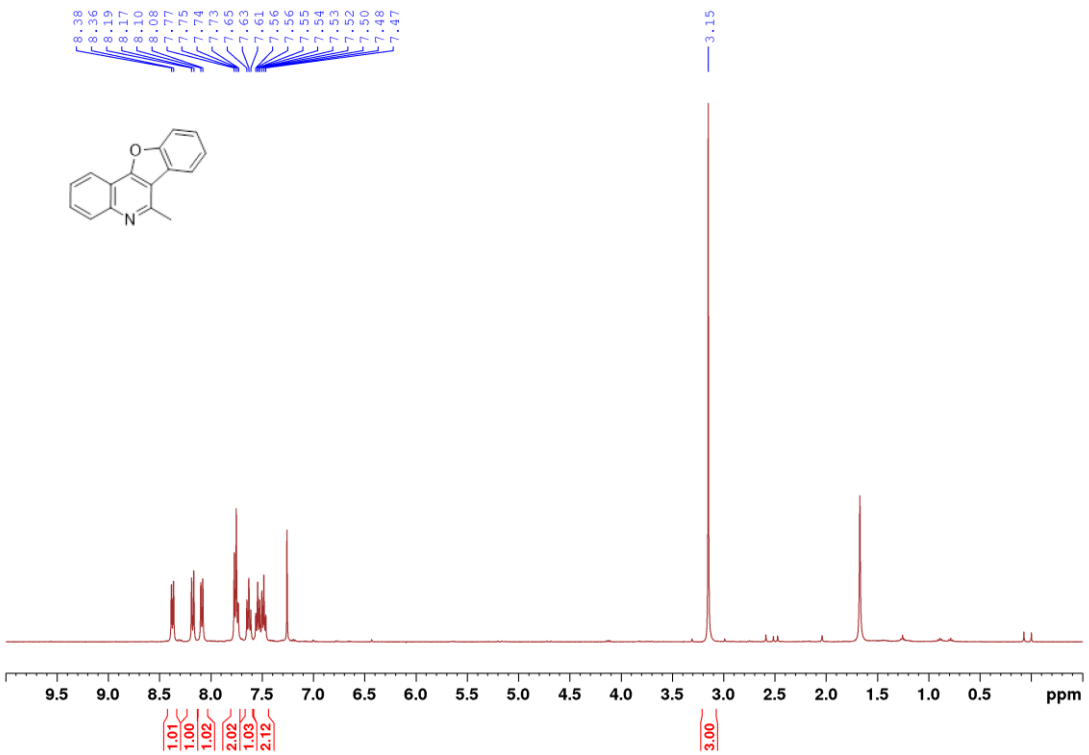
**2-Methoxybenzofuro[3,2-*c*]quinoline$^{1}$H NMR, 300 MHz, $CDCl_3$ (1h)**



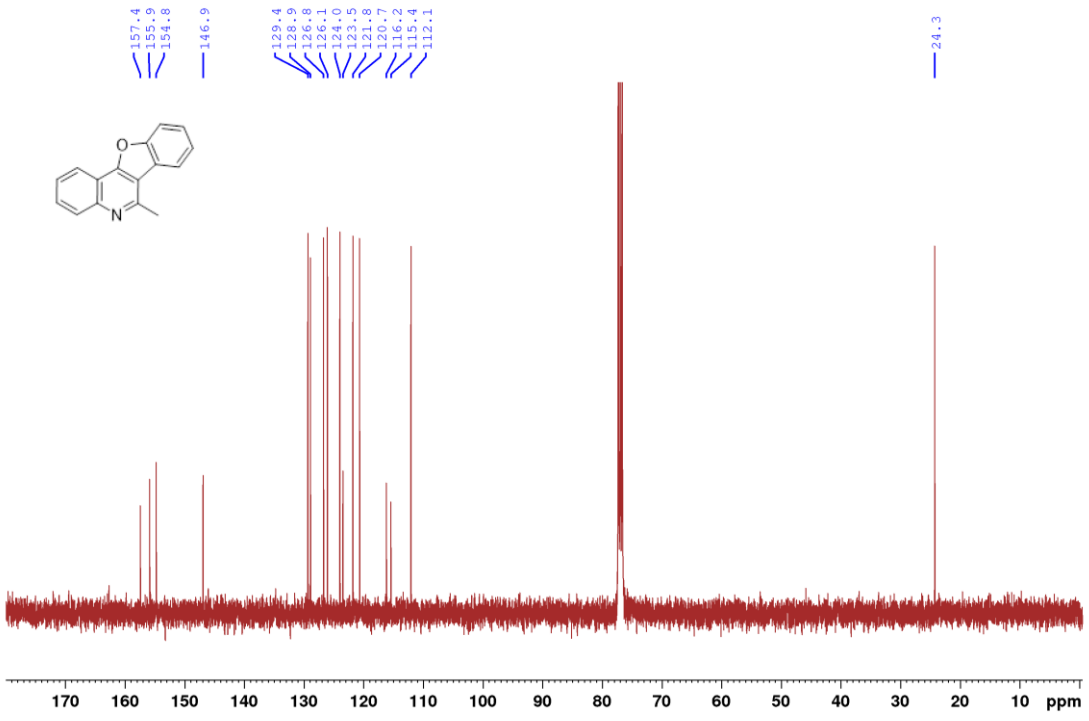

**2-Methoxybenzofuro[3,2-*c*]quinoline$^{13}$C NMR, 75 MHz, $CDCl_3$ (1h)**



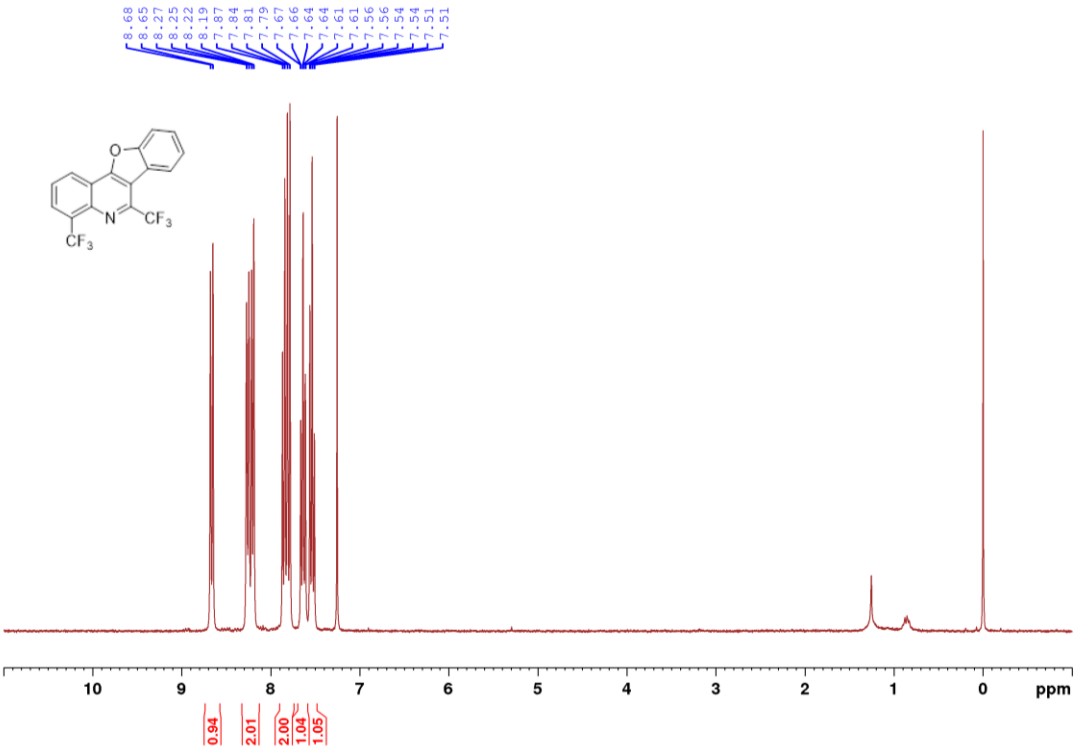
**6-Methylbenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (1i)**



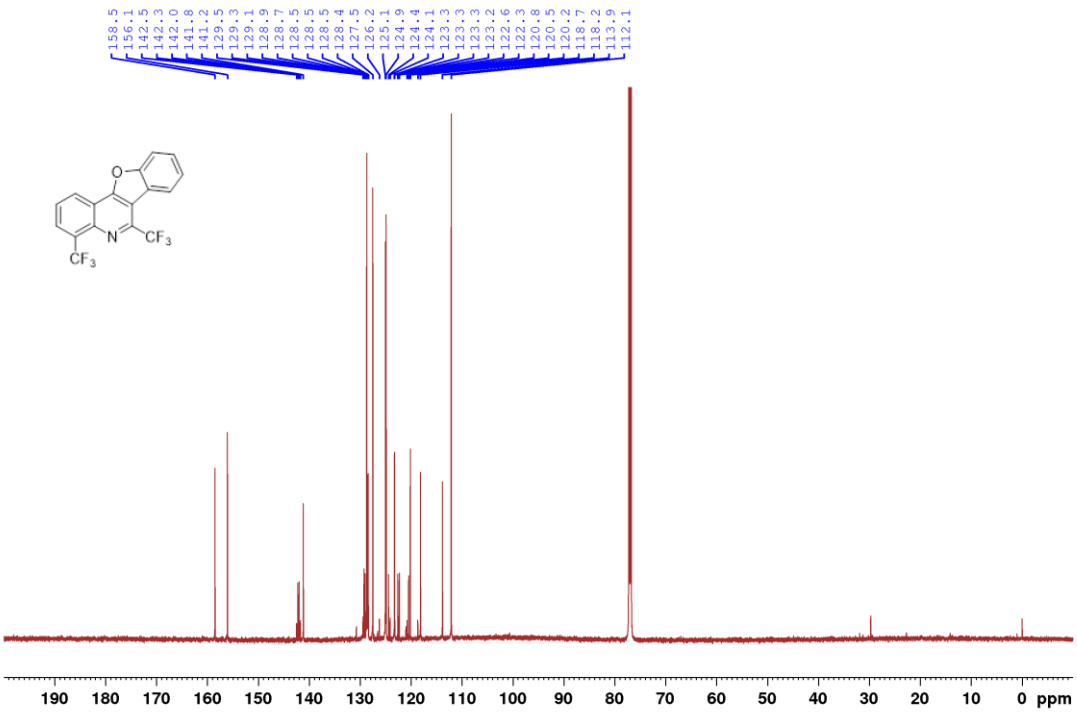

**6-Methylbenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 150 MHz, $CDCl_3$ (1i)**



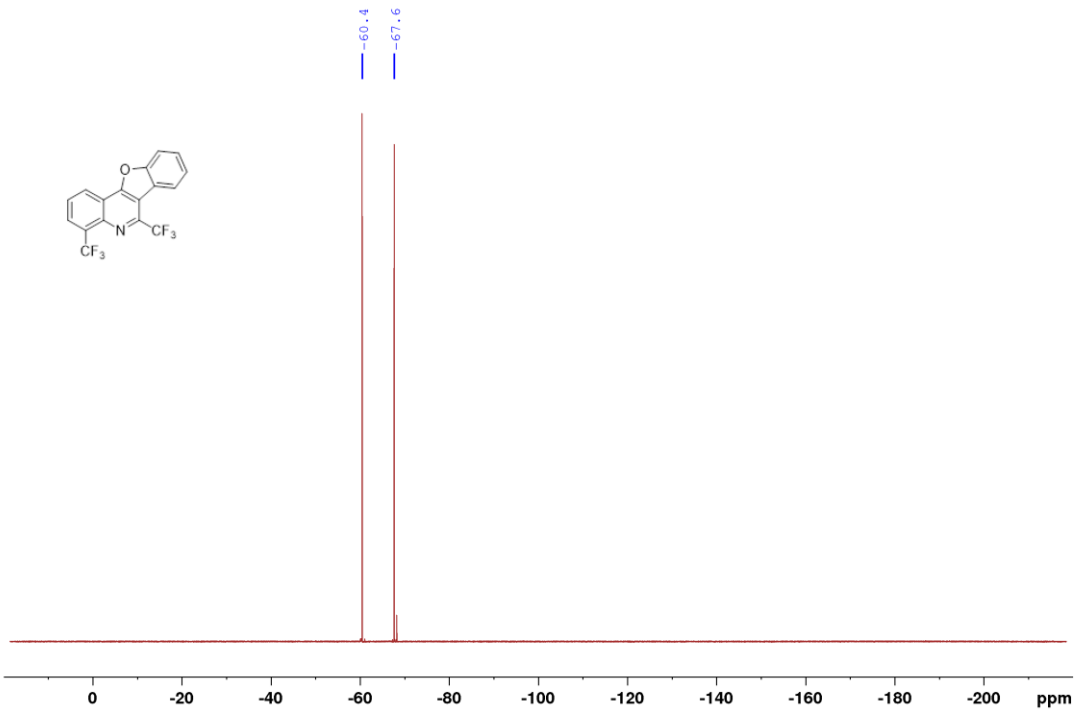
**4,6-Bis(Trifluoromethyl)benzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (1j)**



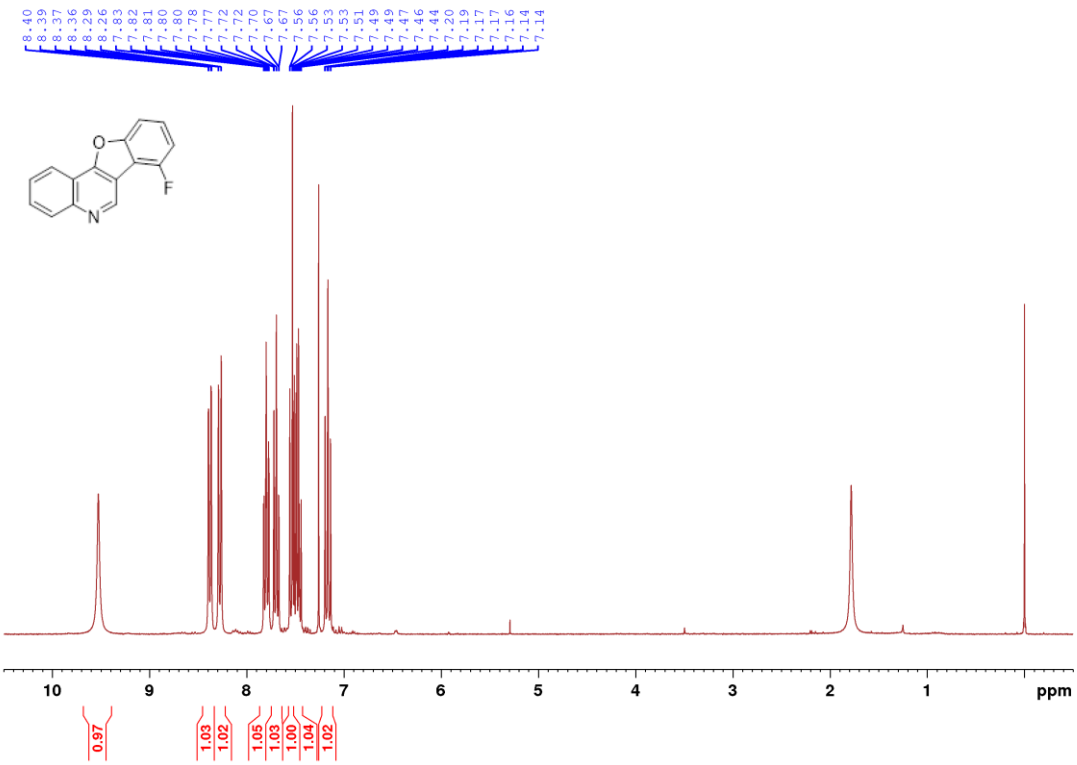

**4,6-Bis(trifluoromethyl)benzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (1j)**



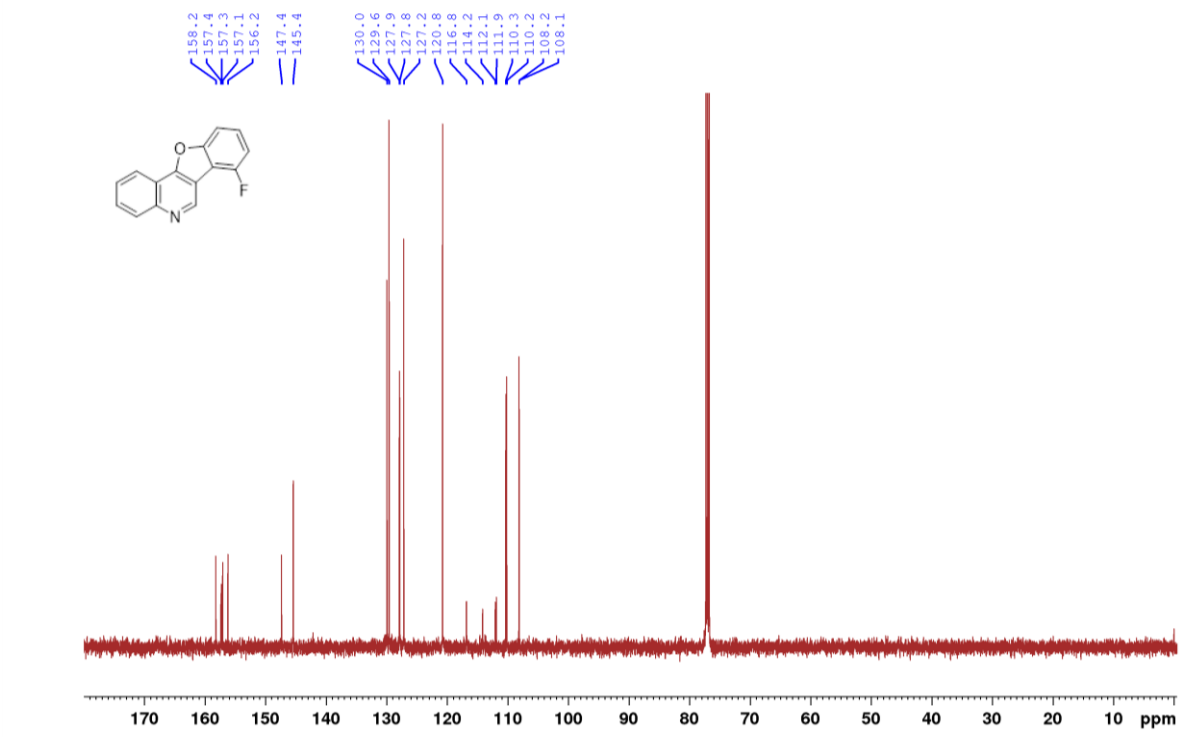
**4,6-Bis(Trifluoromethyl)benzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (1j)**



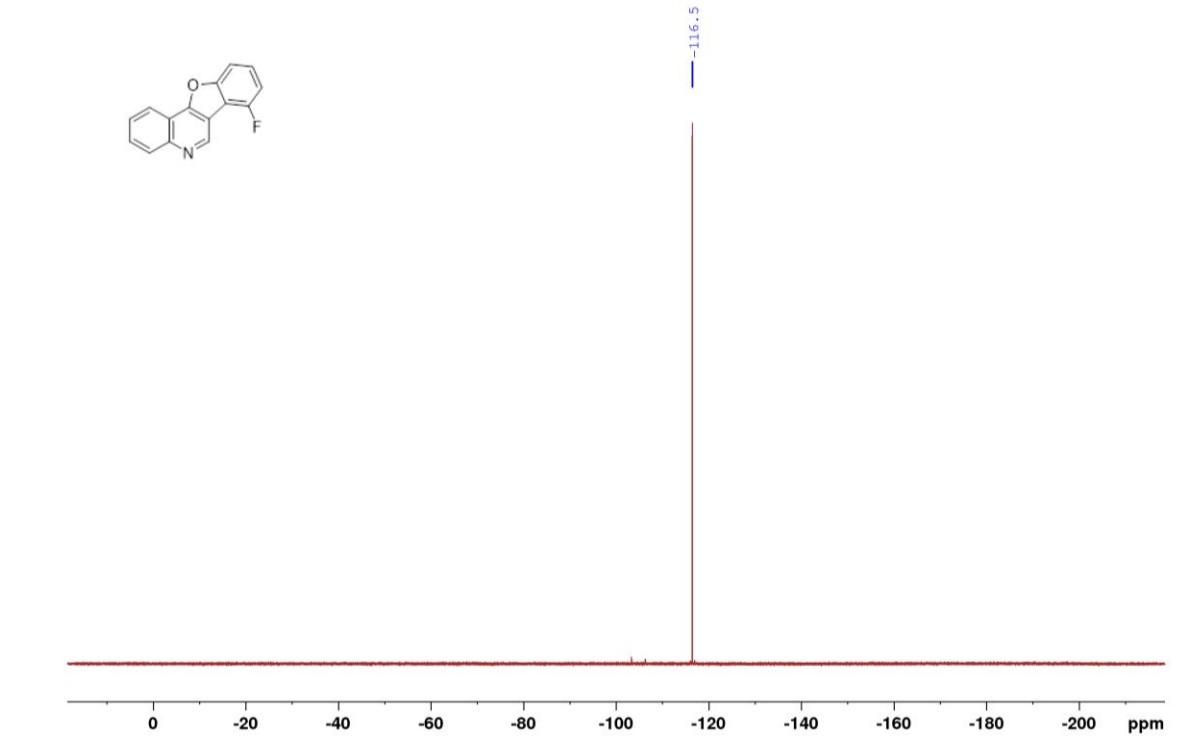

**7-Fluorobenzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (1m)**



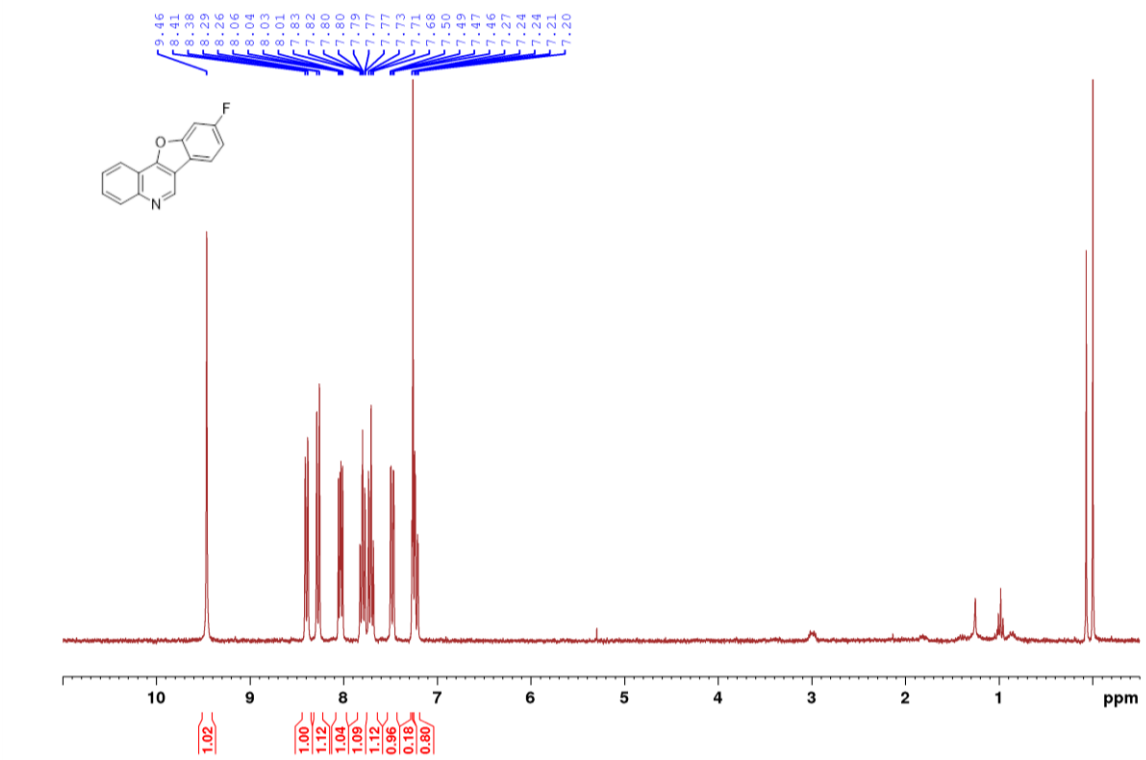
**7-Fluorobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (1m)**



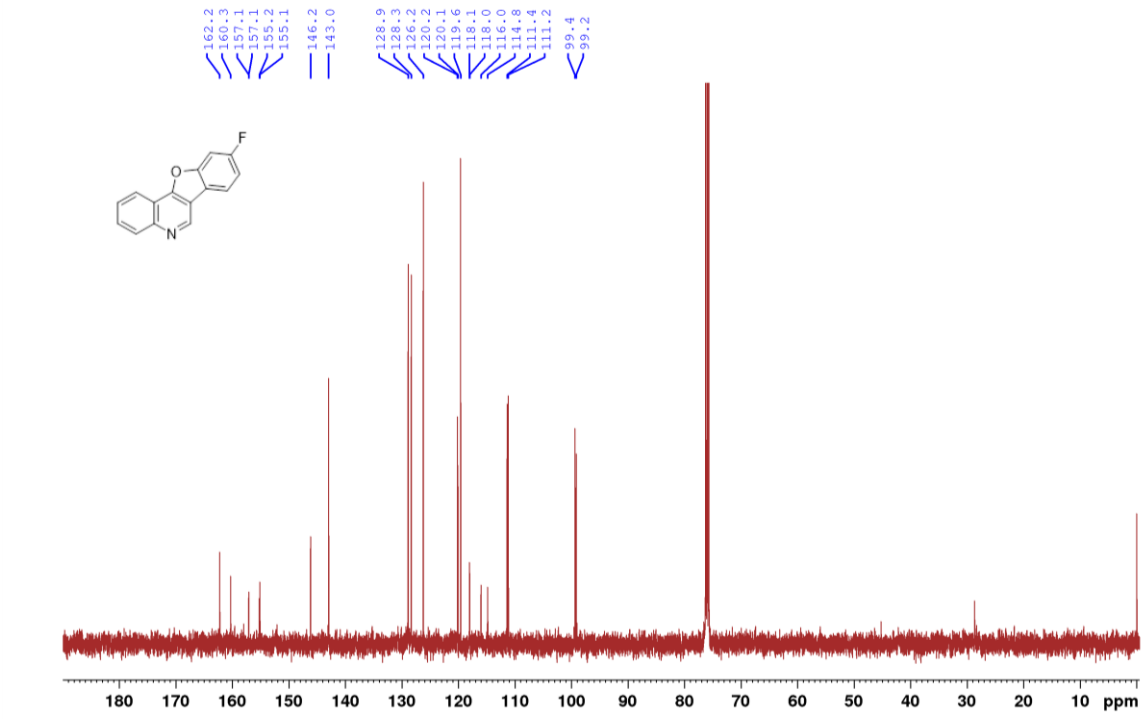

**7-Fluorobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (1m)**



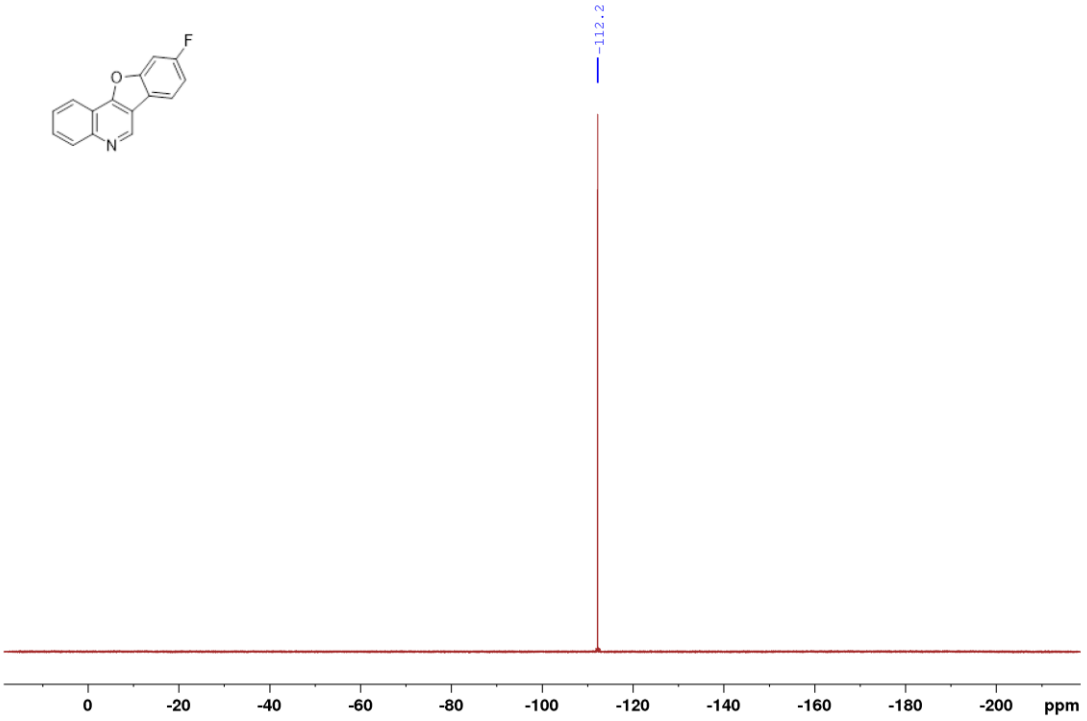
**9-Fluorobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (1n)**



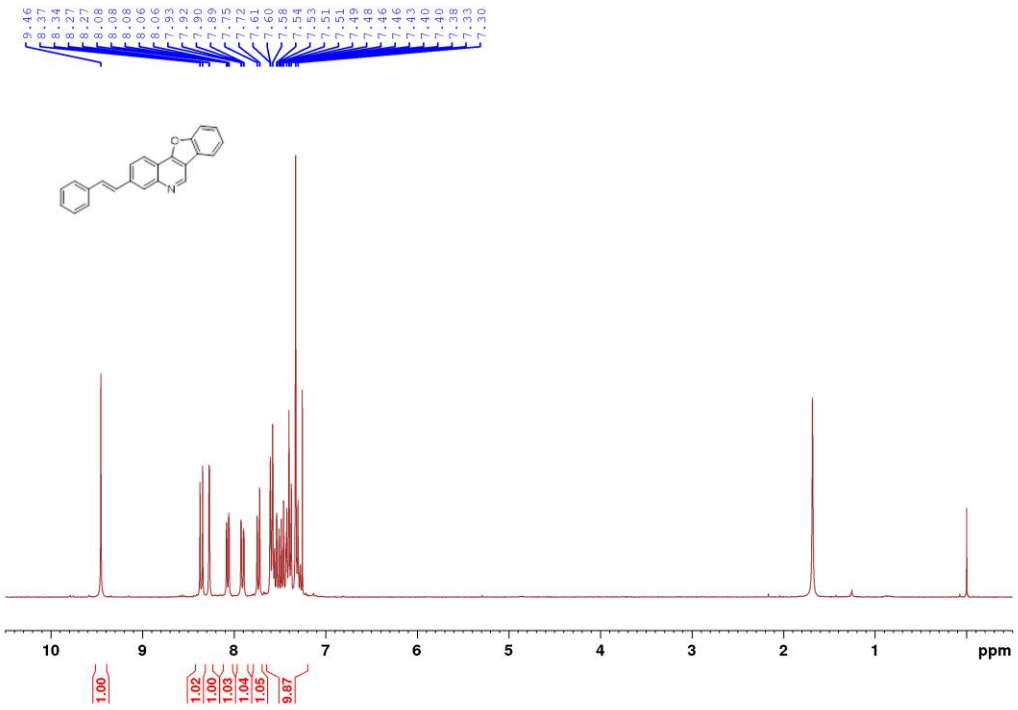

**9-Fluorobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 150 MHz, $CDCl_3$ (1n)**



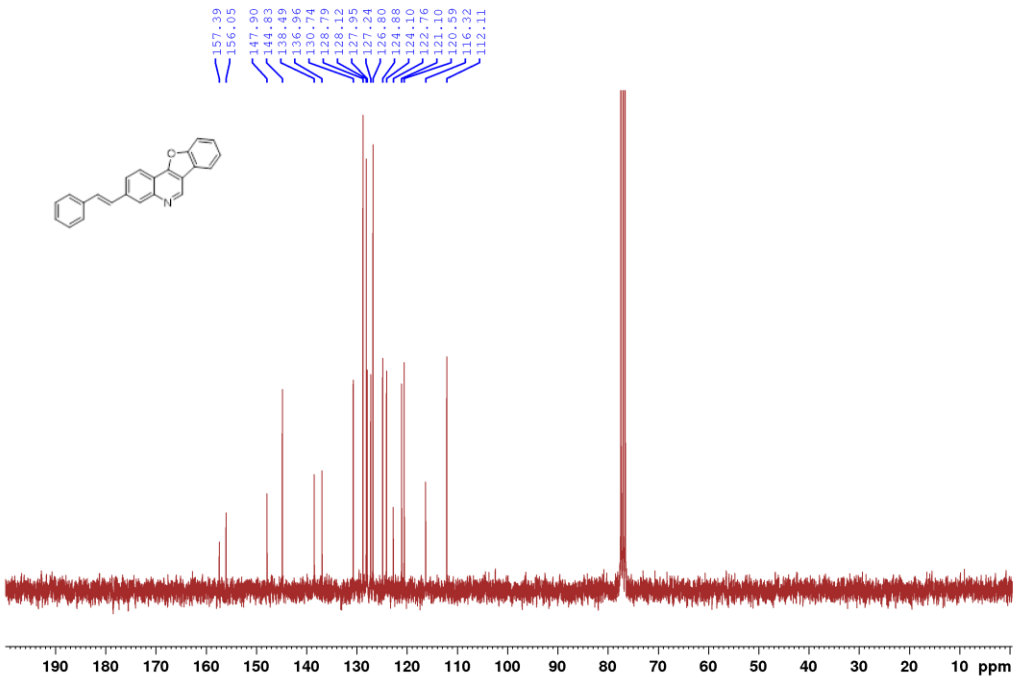
**9-Fluorobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (1n)**



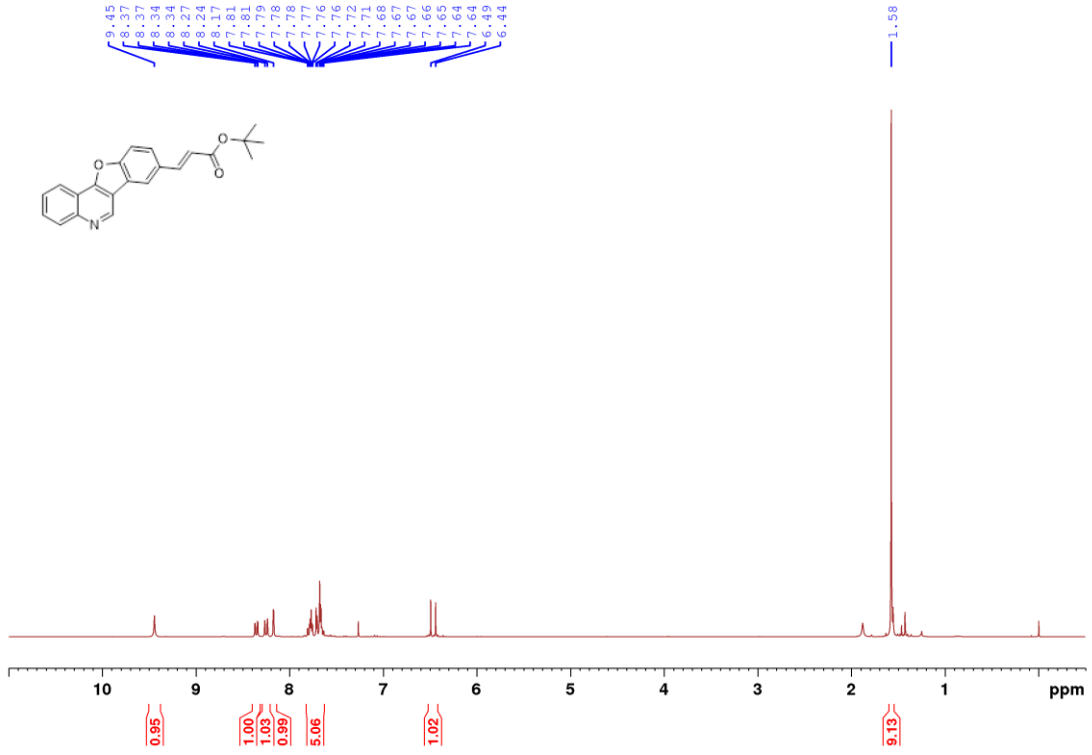

**(*E*)-3-Styrylbenzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (3b)**



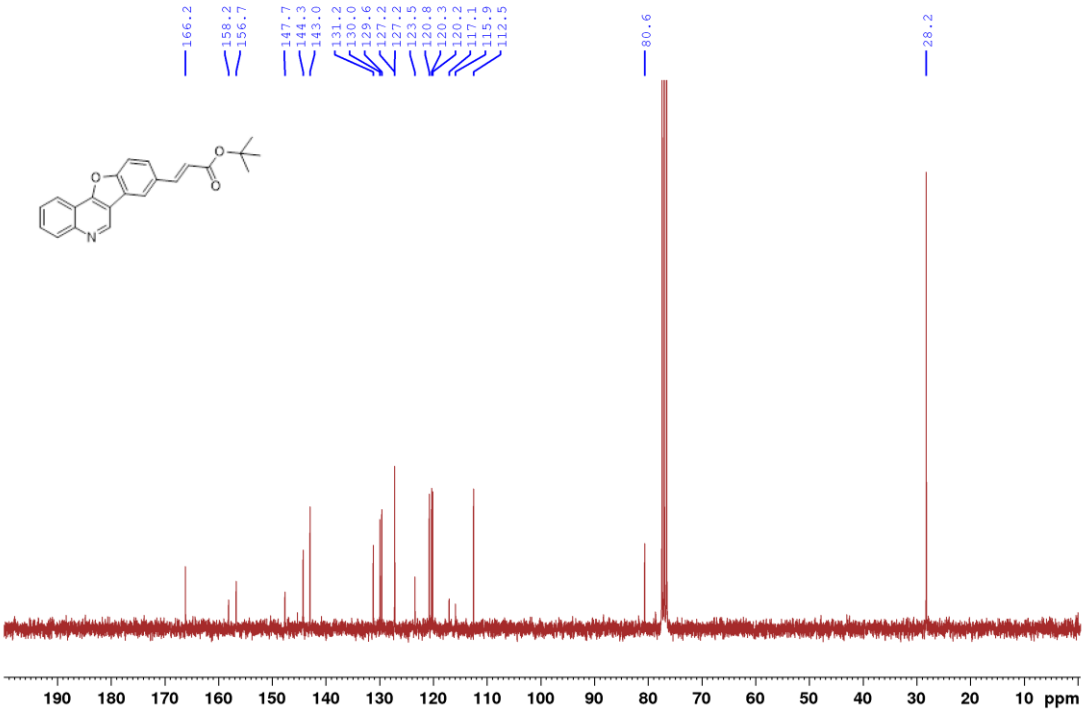
**(*E*)-3-Styrylbenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 75 MHz, $CDCl_3$ (3b)**



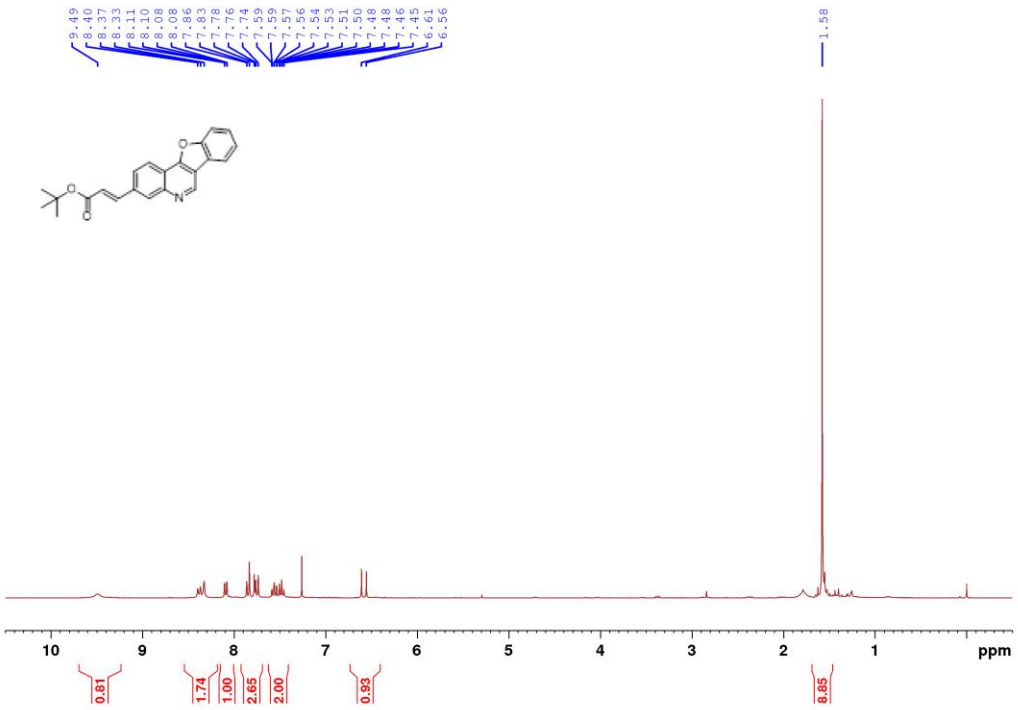

***tert*-Butyl (*E*)-3-(benzofuro[3,2-*c*]quinolin-8-yl)acrylate $^{1}H$ NMR, 300 MHz, $CDCl_3$ (3c)**



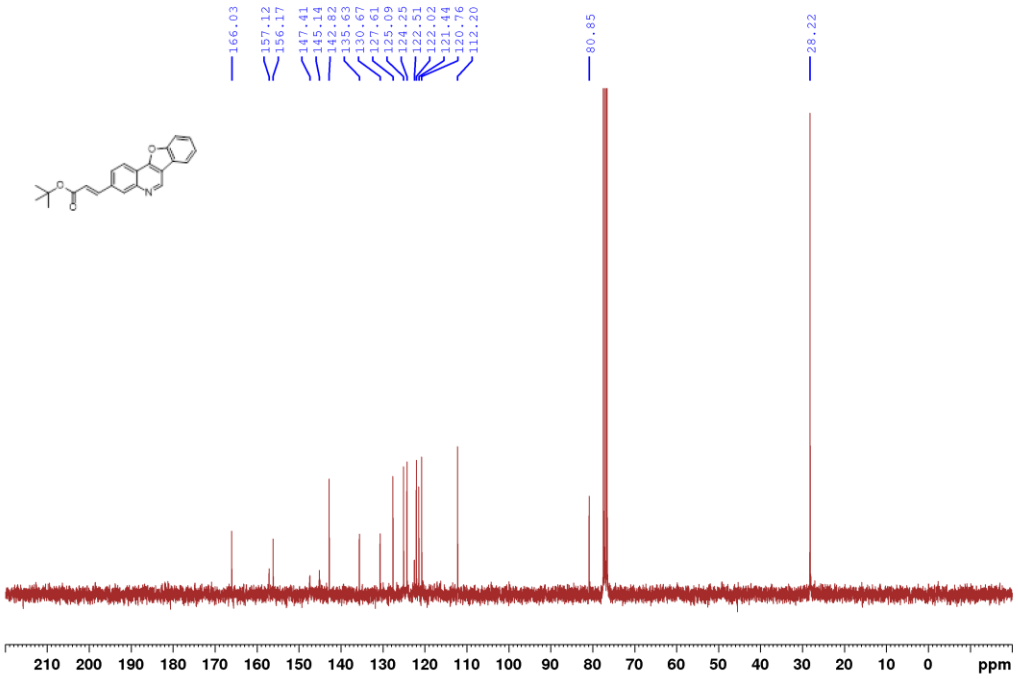
***tert*-Butyl (*E*)-3-(benzofuro[3,2-*c*]quinolin-8-yl)acrylate $^{13}$C NMR, 75 MHz, $CDCl_3$ (3c)**



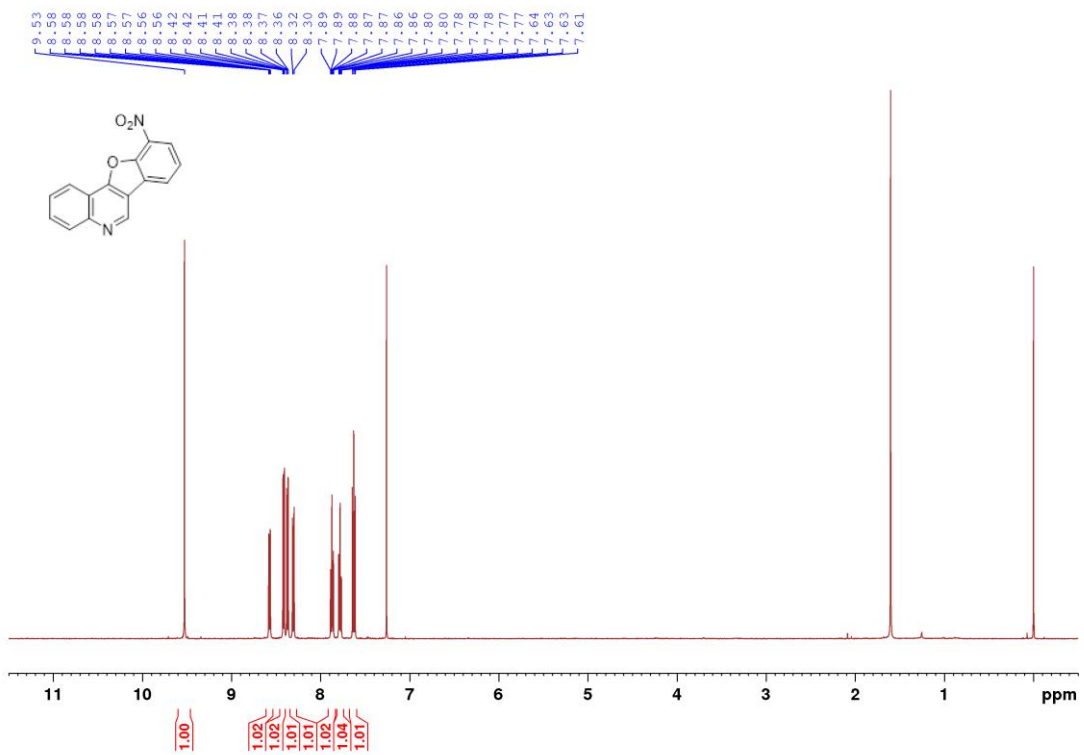

***tert*-Butyl (*E*)-3-(benzofuro[3,2-*c*]quinolin-3-yl)acrylate $^{1}$H NMR, 300 MHz, $CDCl_3$ (3d)**



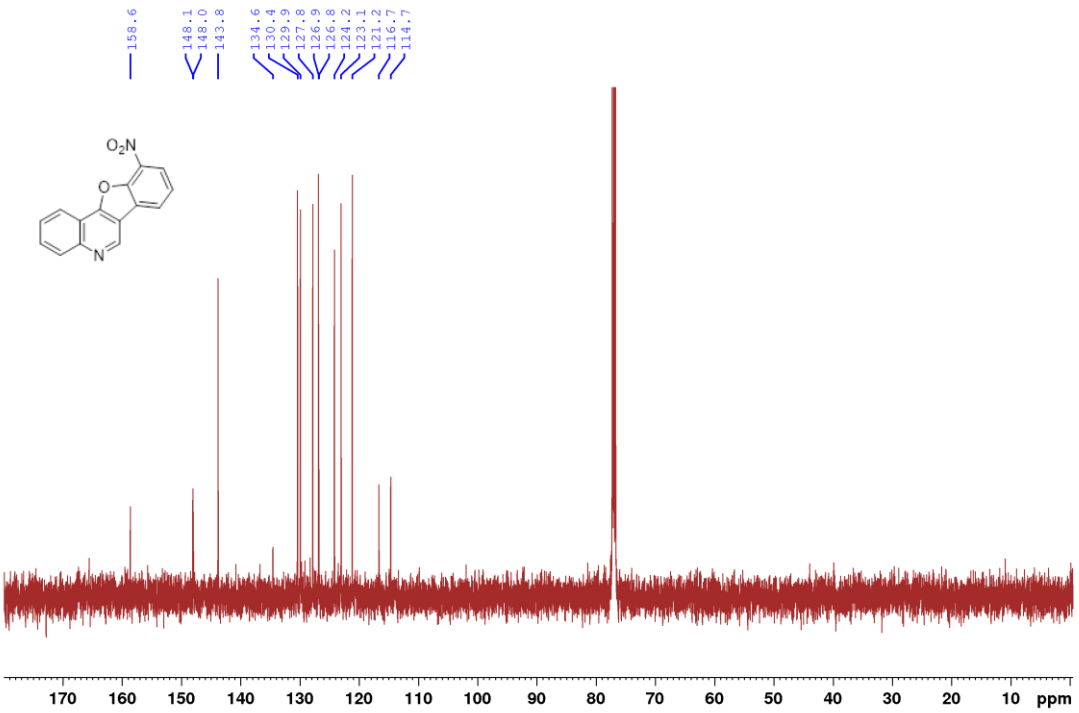
**_tert_-Butyl (_E_)-3-(benzofuro[3,2-_c_]quinolin-3-yl)acrylate $^{13}$C NMR, 75 MHz, $CDCl_3$ (3d)**



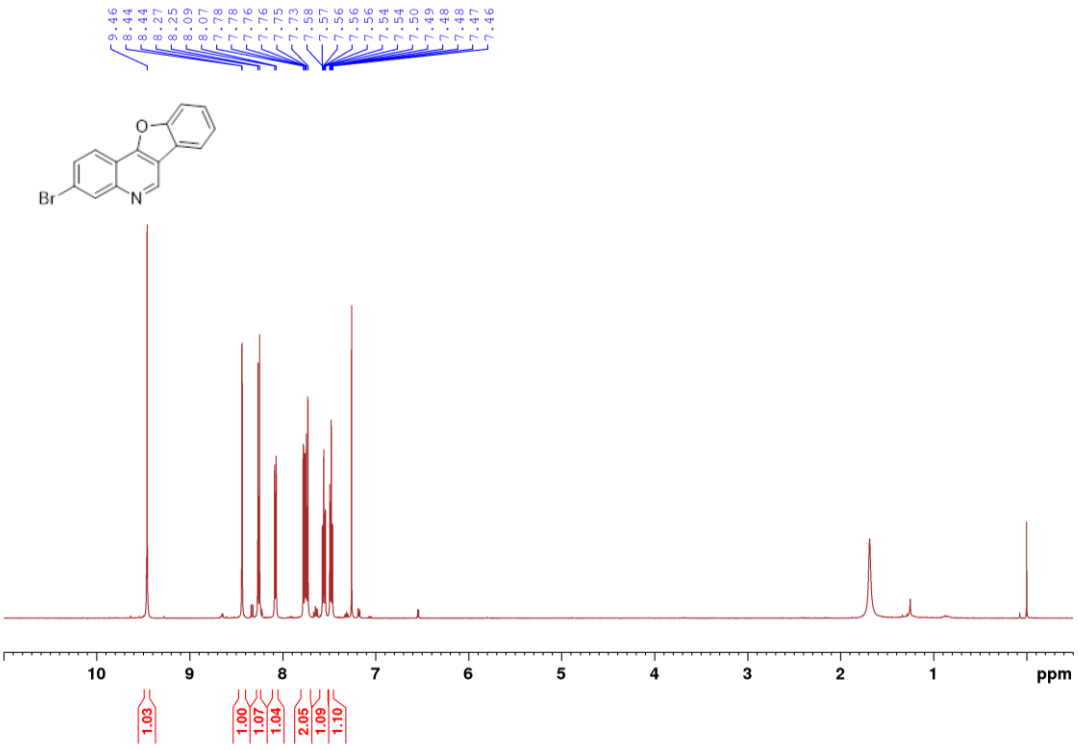

**10-Nitrobenzofuro[3,2-_c_]quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (5)**



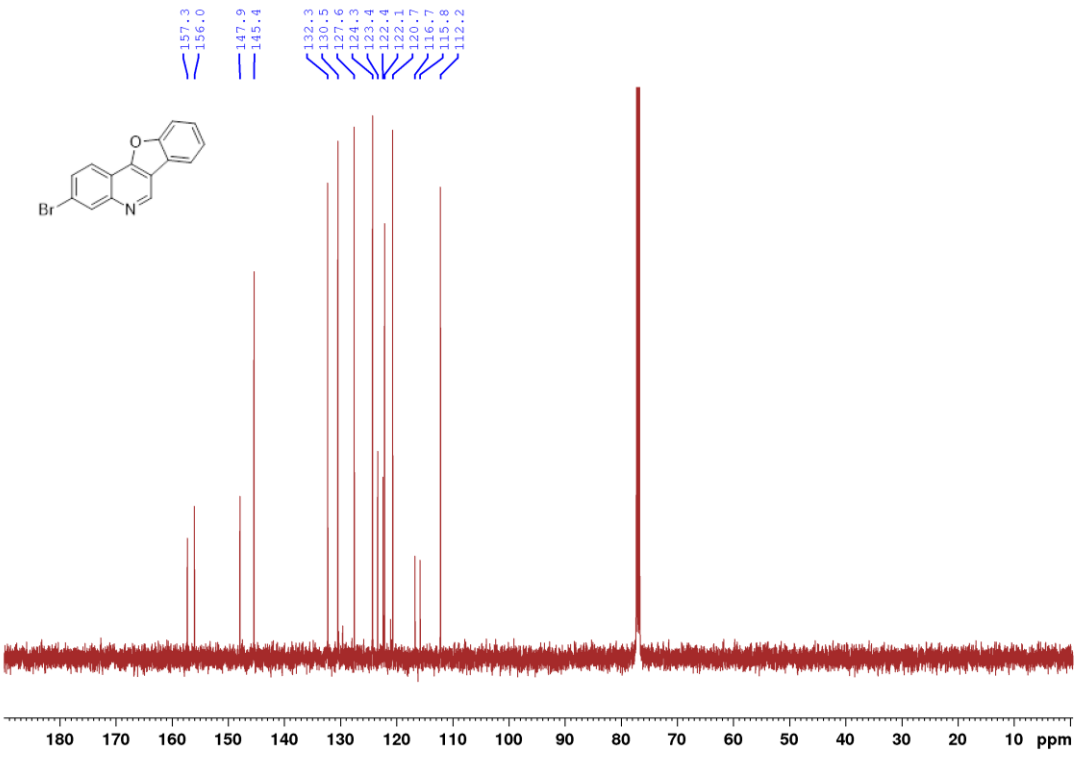
**10-Nitrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (5)**



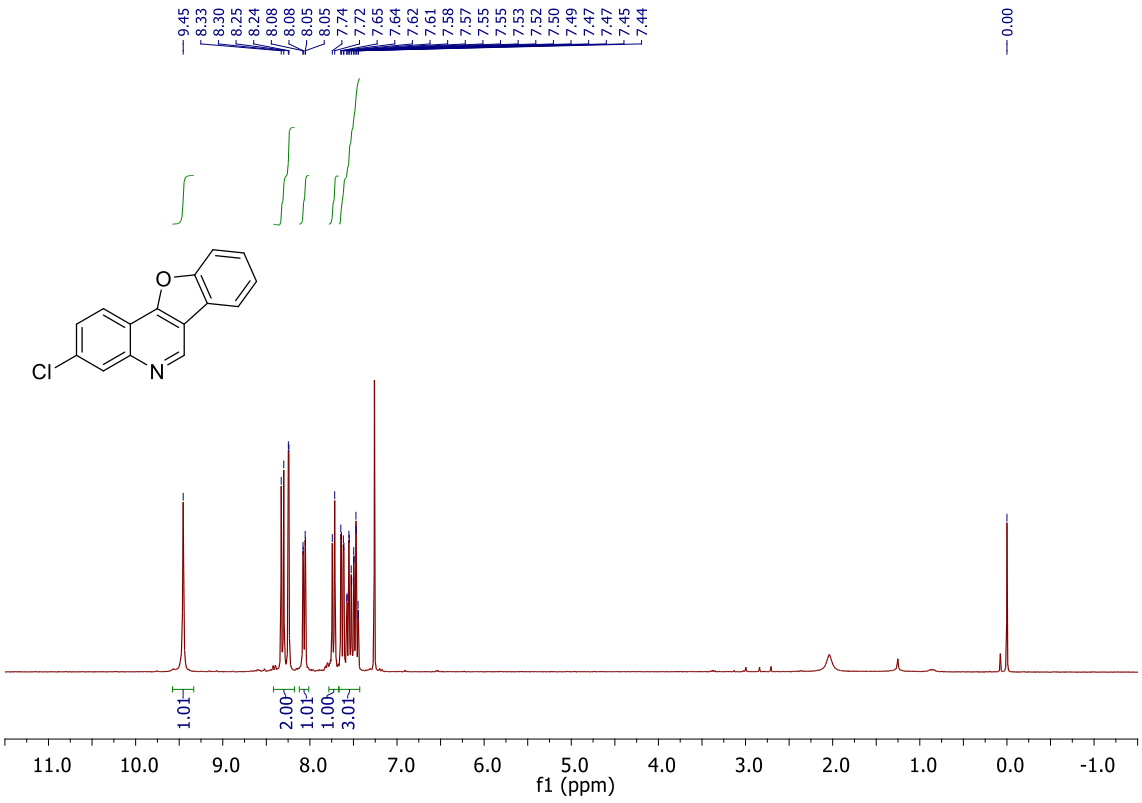

**3-Bromobenzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (S2)**



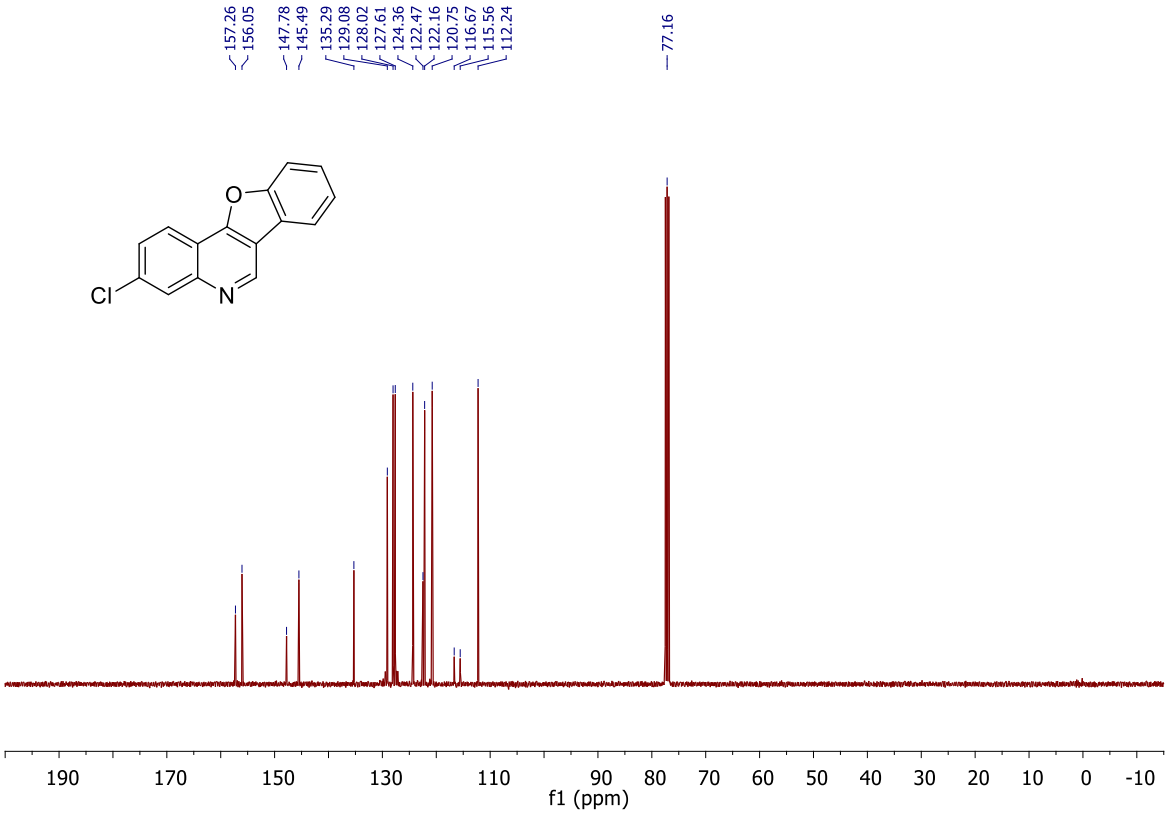
**3-Bromobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (S2)**



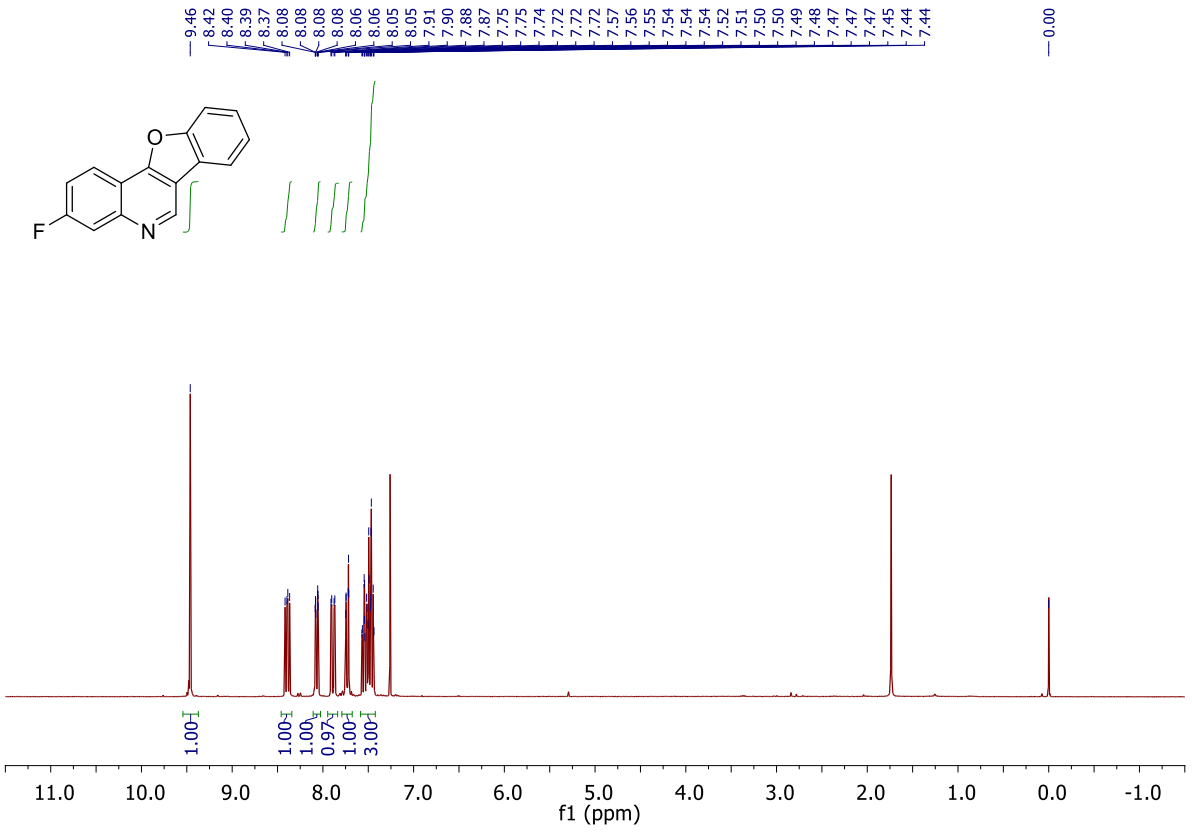

**3-Chlorobenzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (S3)**



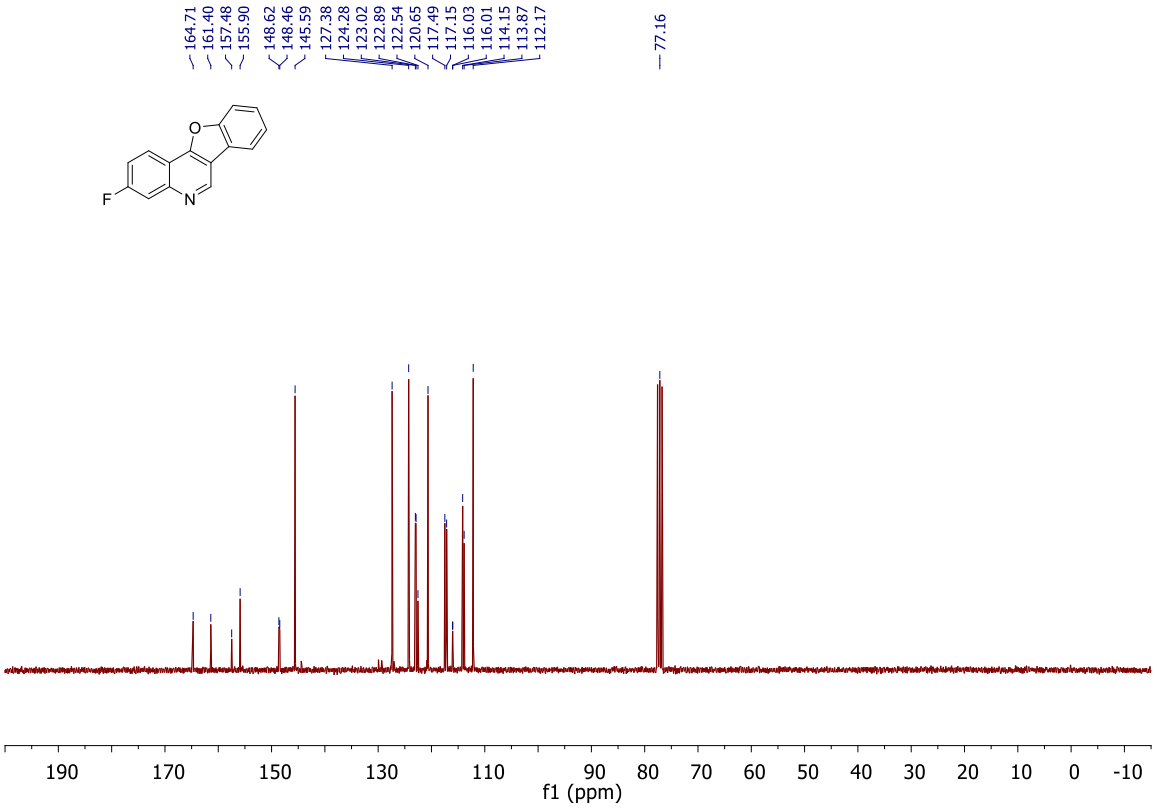
**3-Chlorobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 100 MHz, $CDCl_3$ (S3)**



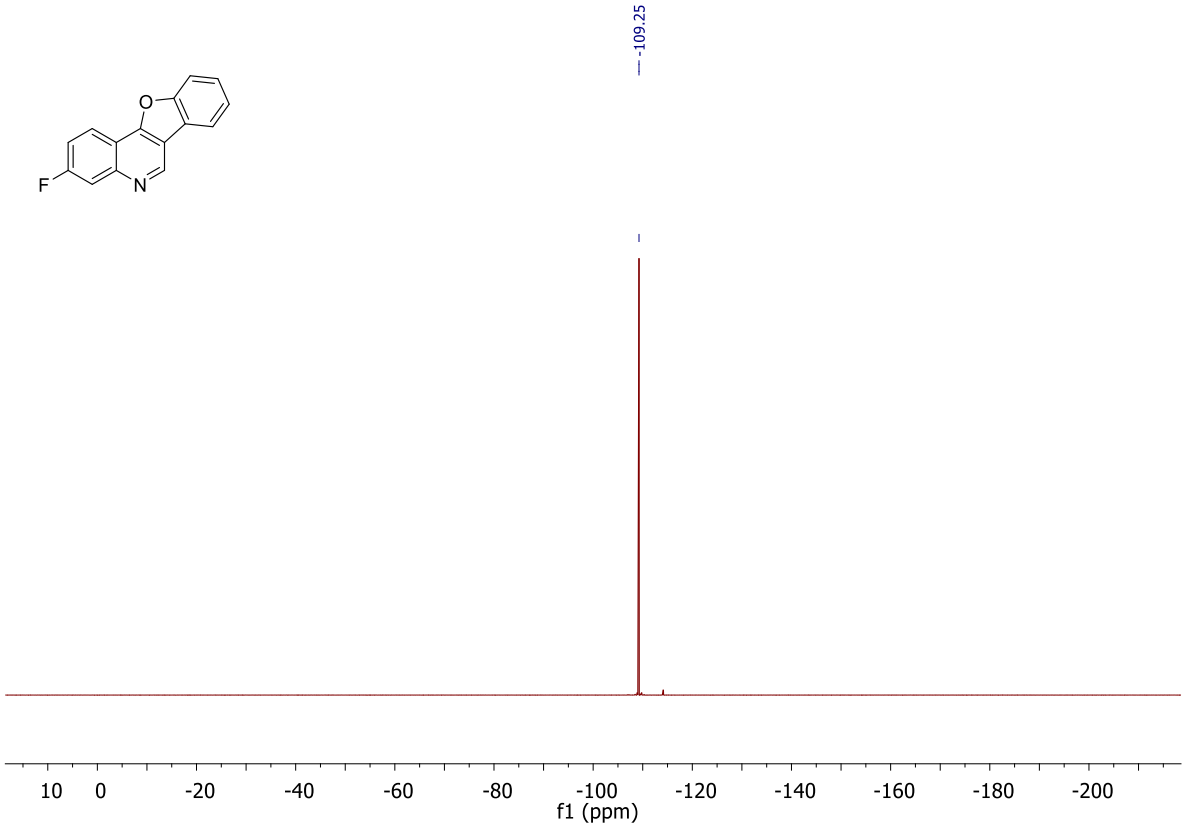

**3-Fluorobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (S4)**



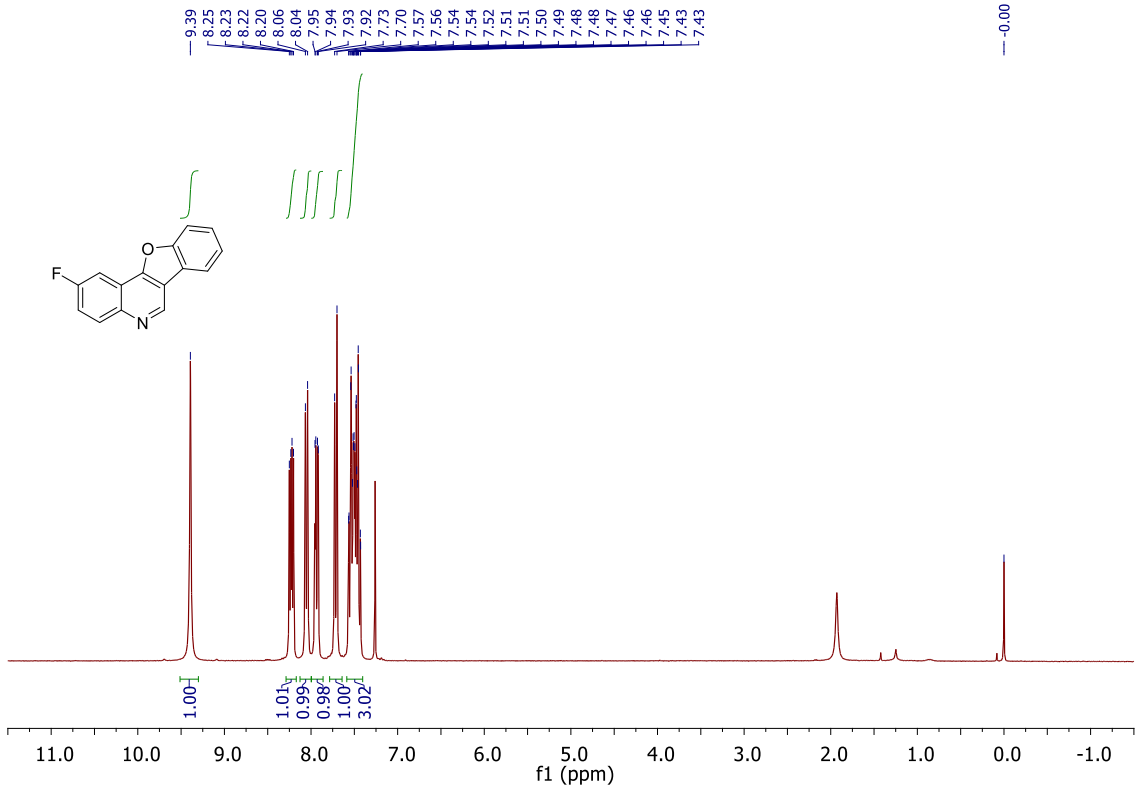
**3-Fluorobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 75 MHz, $CDCl_3$ (S4)**



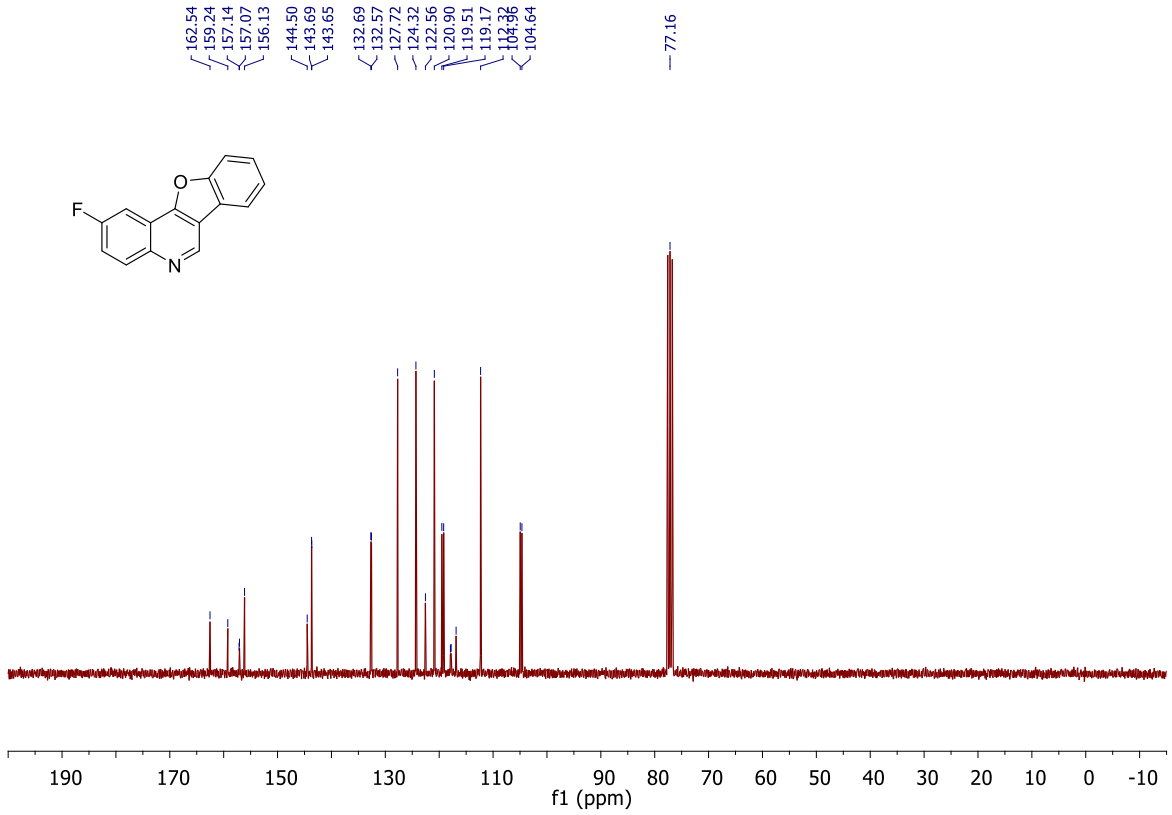

**3-Fluorobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (S4)**



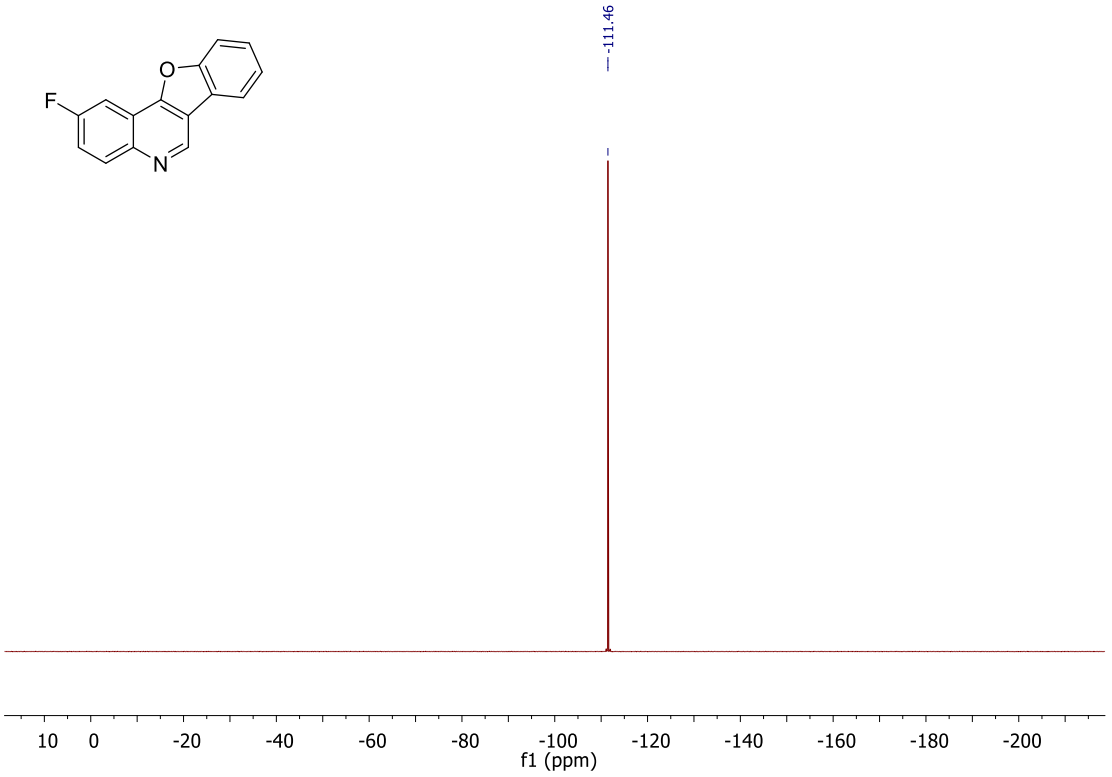
**2-Fluorobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (S5)**




**2-Fluorobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (S5)**

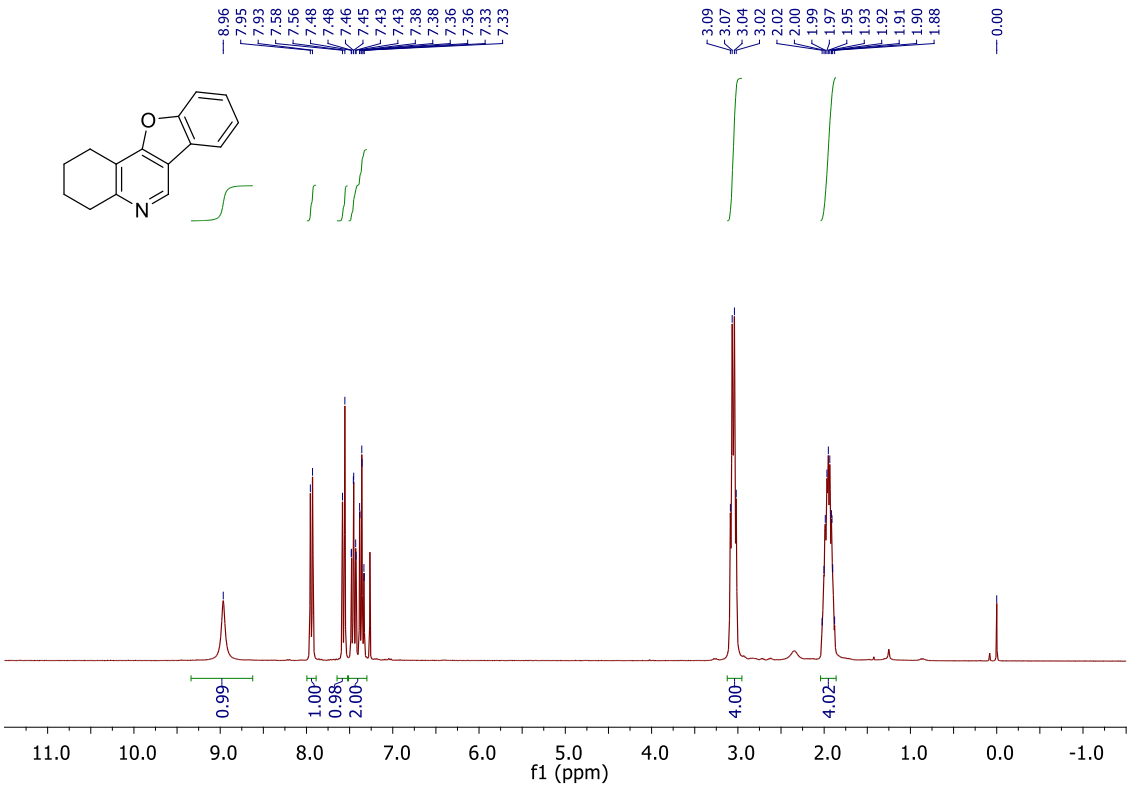


**2-Fluorobenzofuro[3,2-*c*]quinoline $^{19}$F NMR, 282 MHz, $CDCl_3$ (S5)**

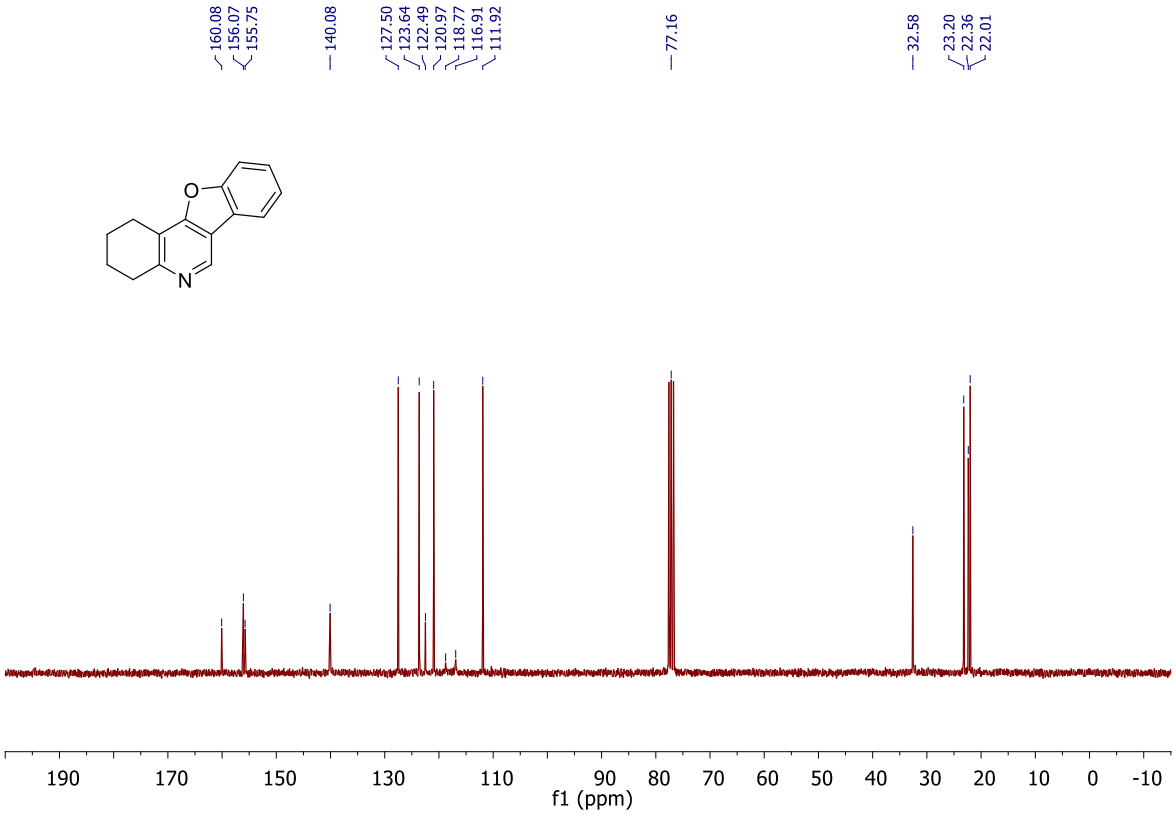



NMR Spectra of Reduced Products

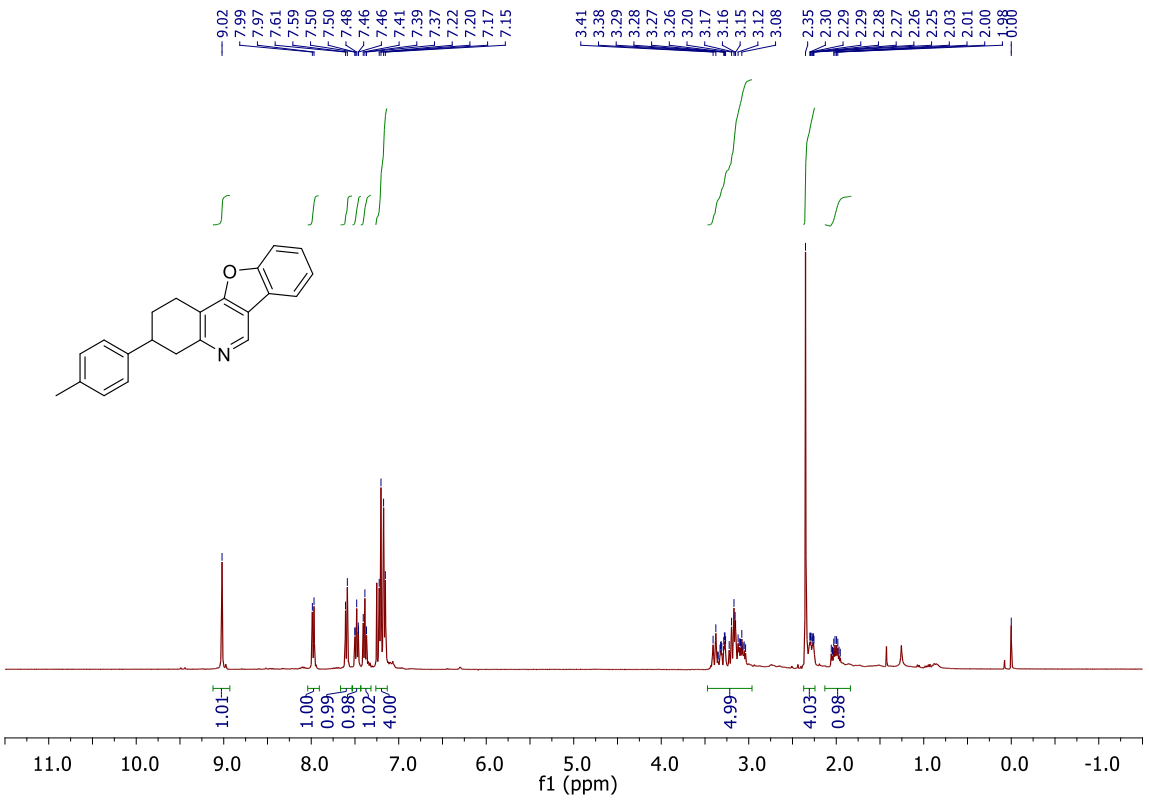
**1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 300 MHz, $CDCl_3$ (2a)**



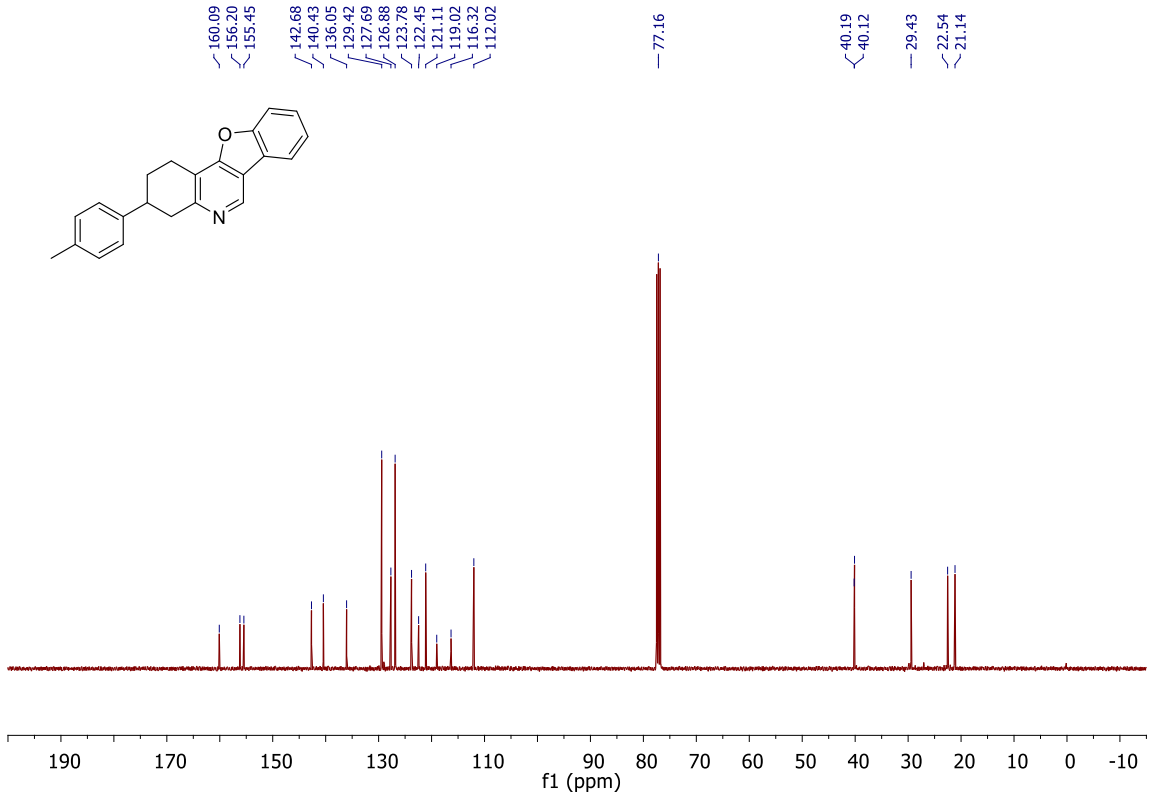
**1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 75 MHz, $CDCl_3$ (2a)**



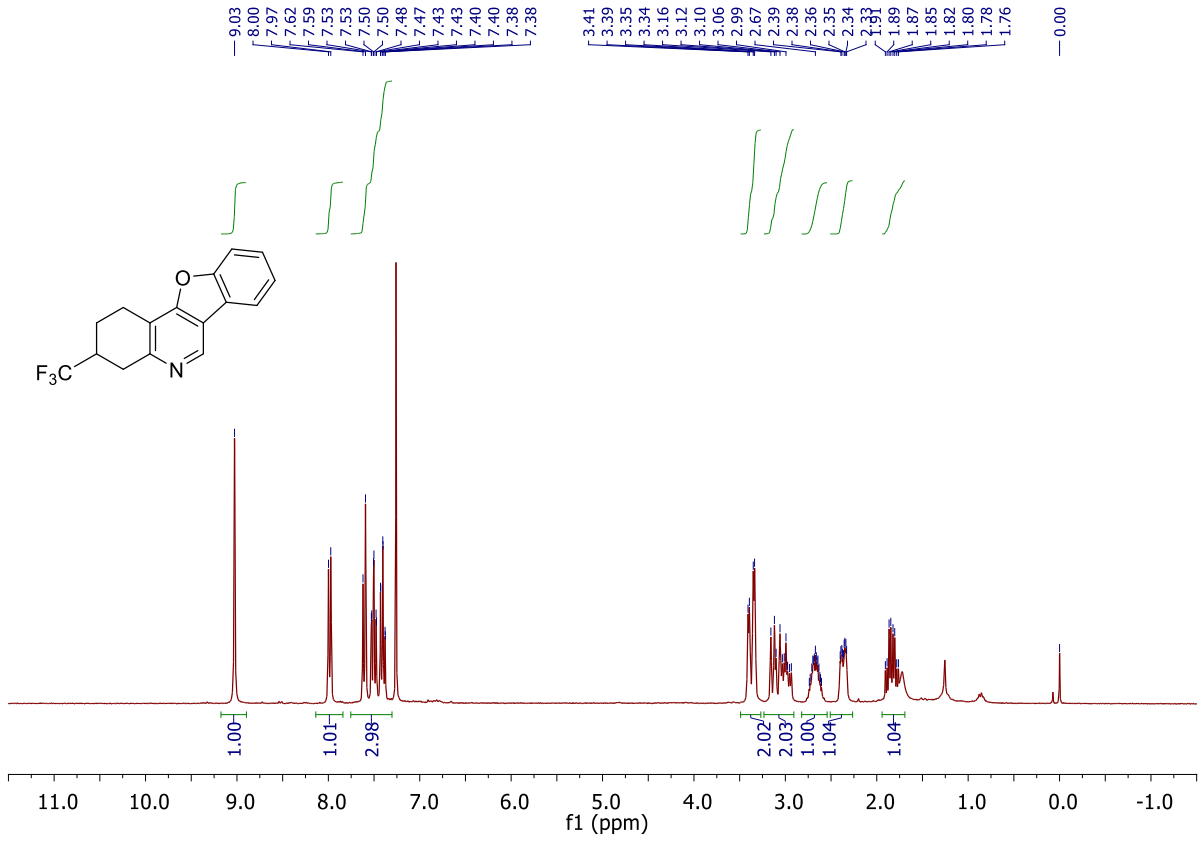

**3-(*p*-Tolyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (2b)**



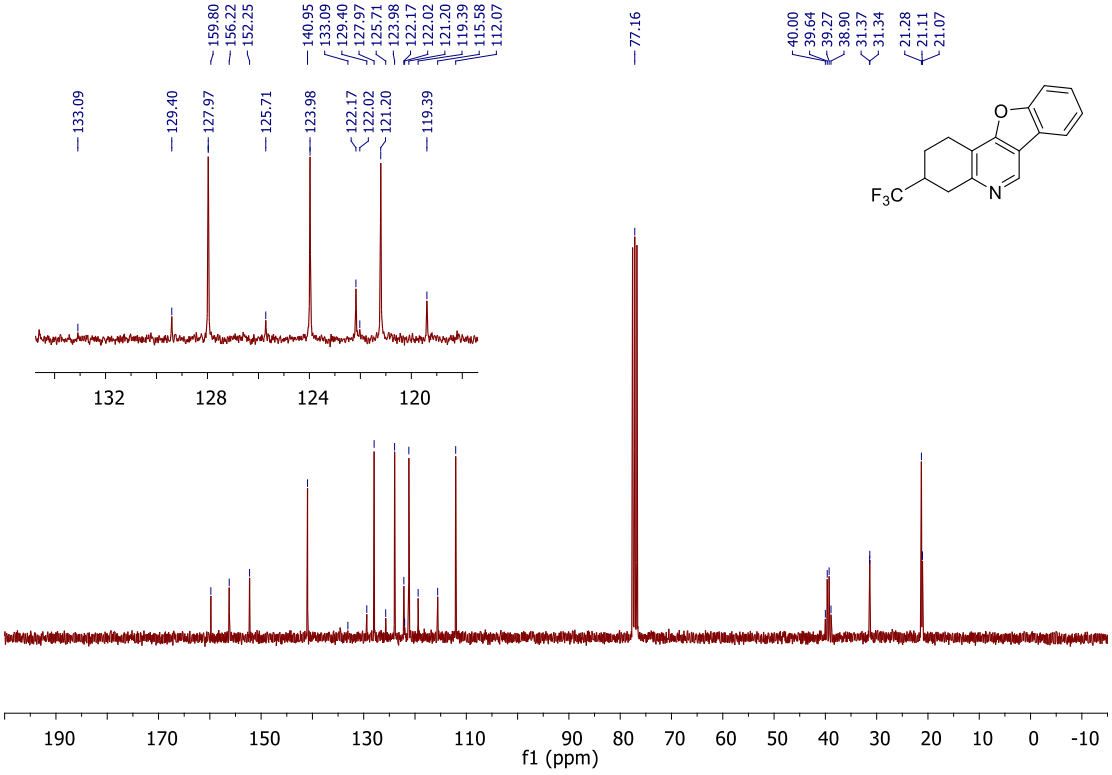
**3-(*p*-Tolyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 100 MHz, $CDCl_3$ (2b)**



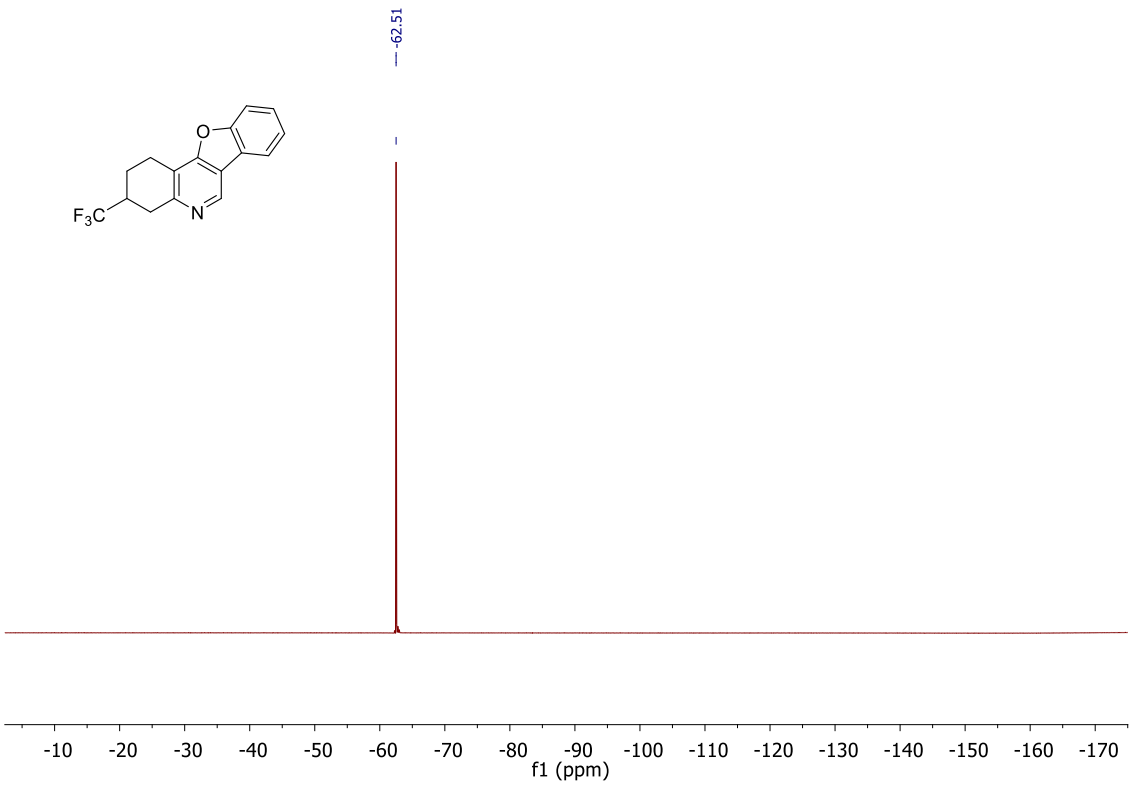

**3-(Trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 300 MHz, $CDCl_3$ (2c)**



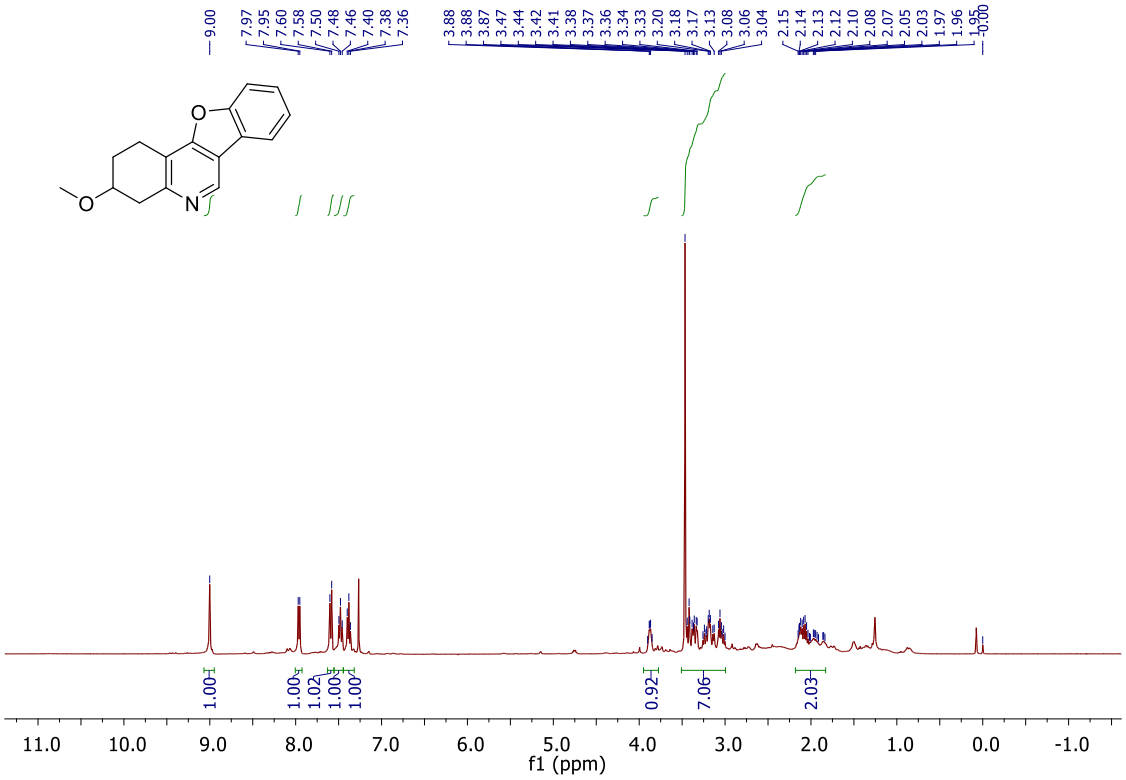
**3-(Trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 75 MHz, $CDCl_3$ (2c)**



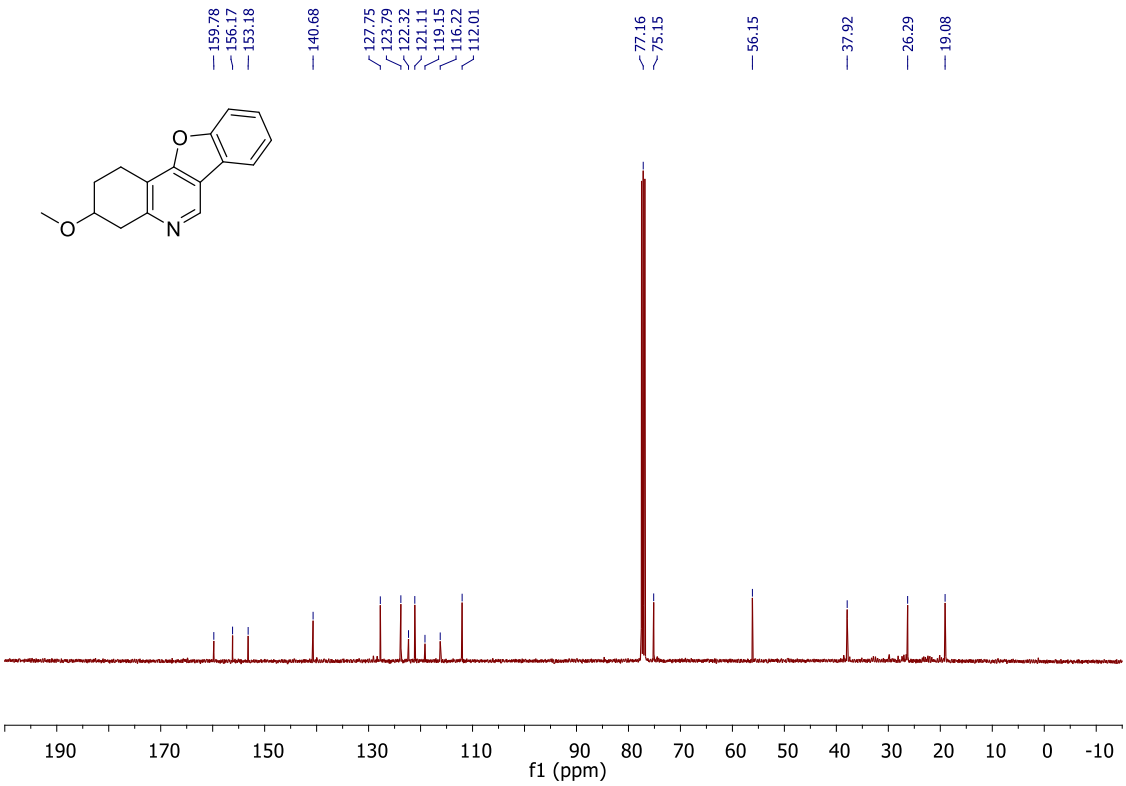

**3-(Trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline 19F NMR, 376 MHz, $CDCl_3$ (2c)**



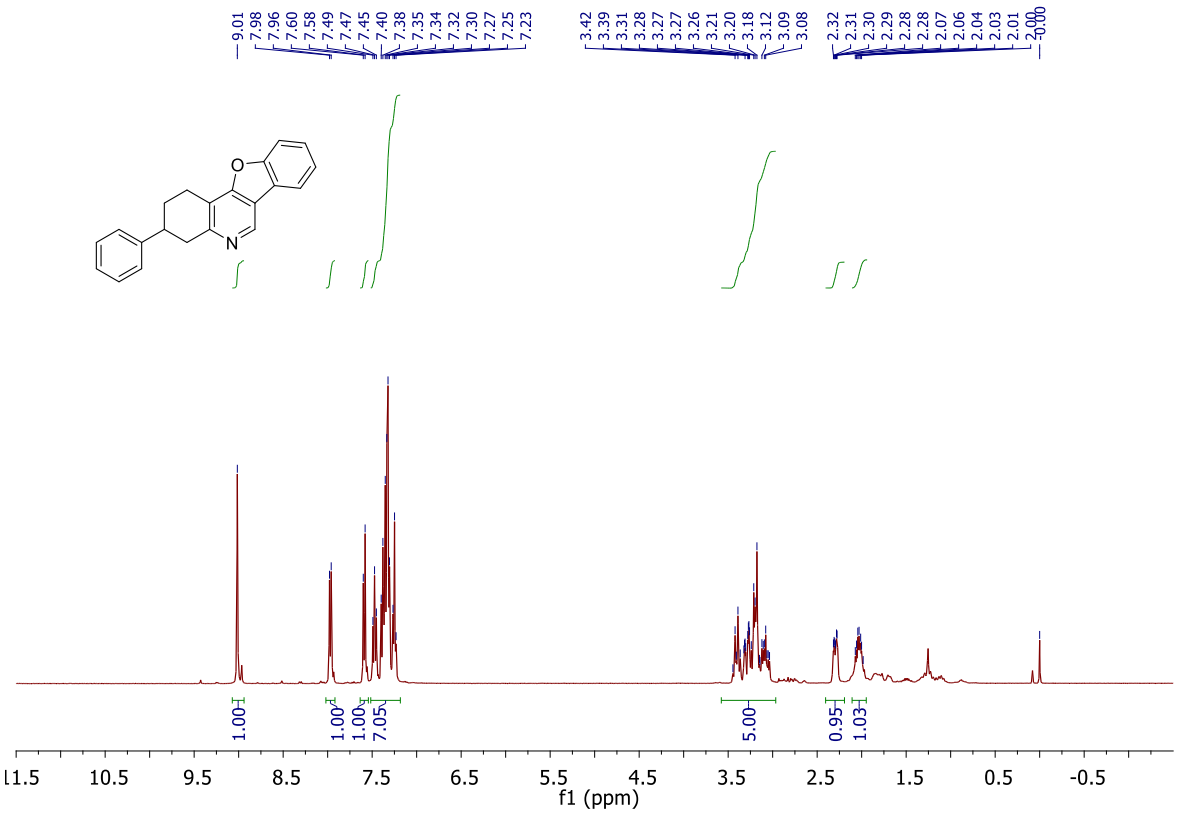
**3-Methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (2d)**



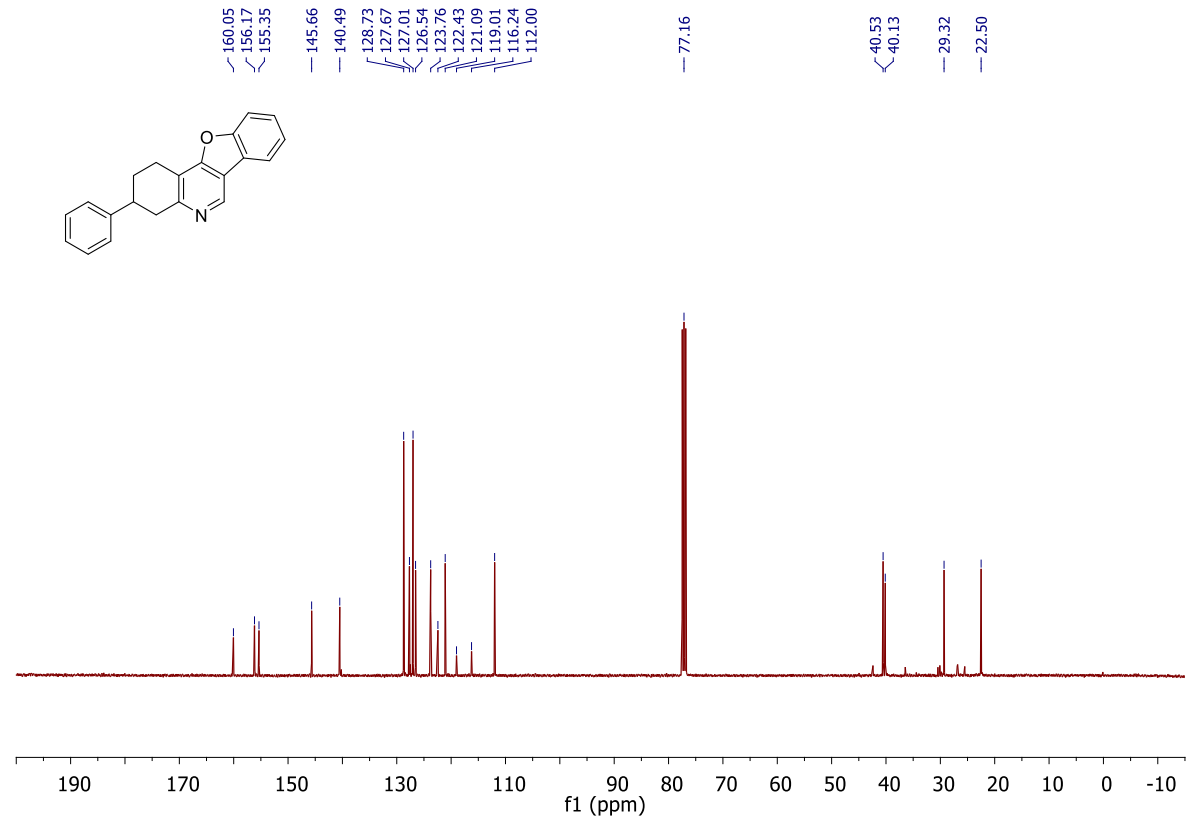

**3-Methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 100 MHz, $CDCl_3$ (2d)**



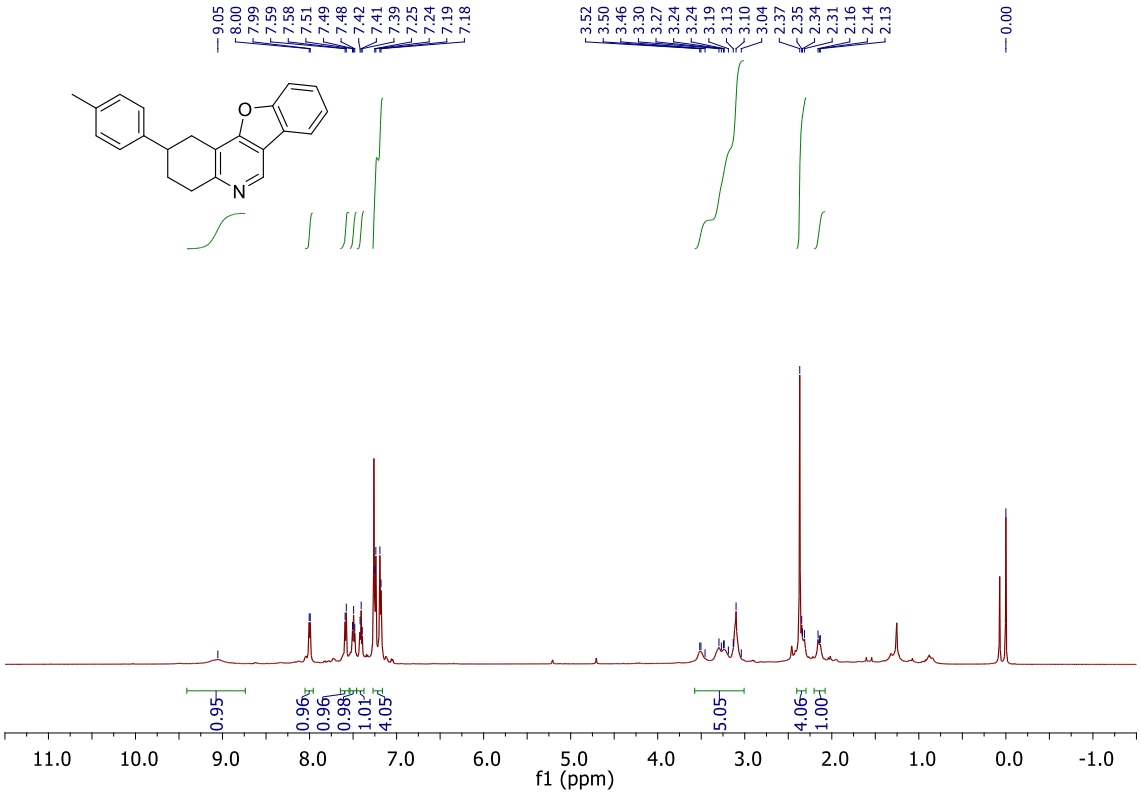
**3-Phenyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (2e)**



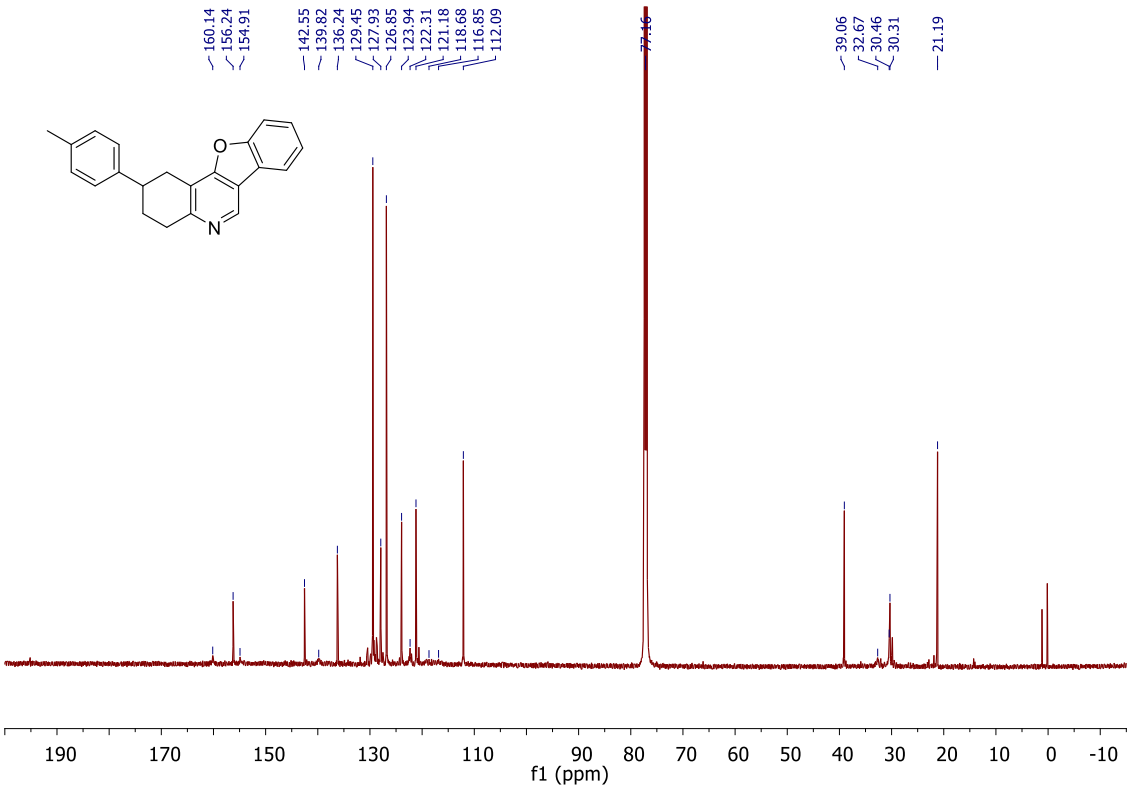

**3-Phenyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 100 MHz, $CDCl_3$ (2e)**



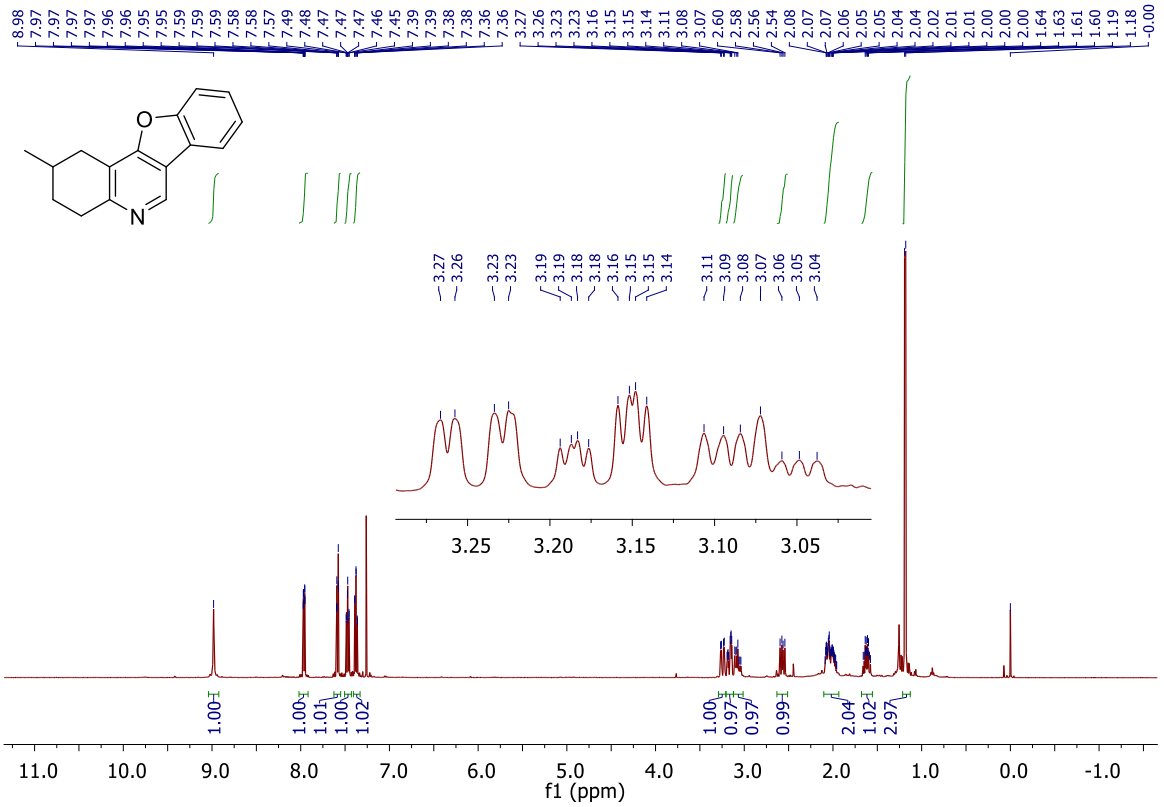
**2-(*p*-Tolyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 600 MHz, $CDCl_3$ (2f)**



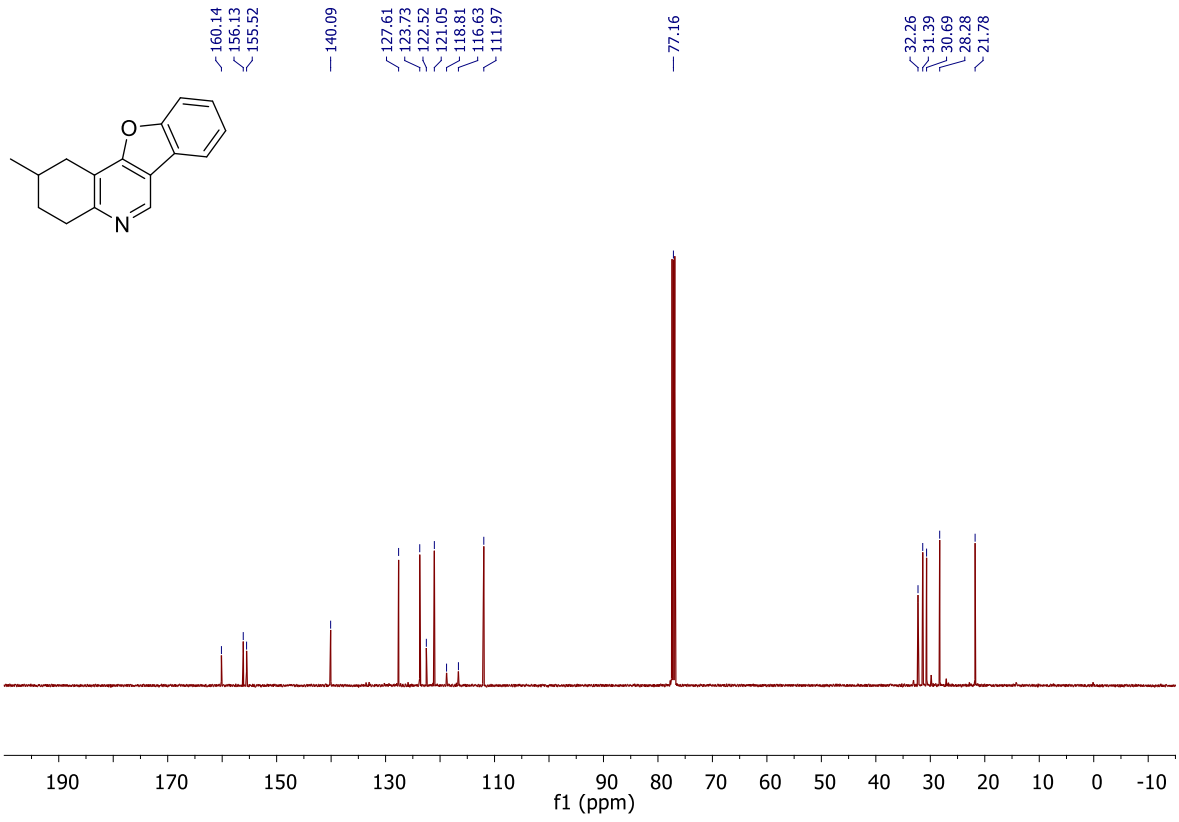

**2-(*p*-Tolyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 150 MHz, $CDCl_3$ (2f)**



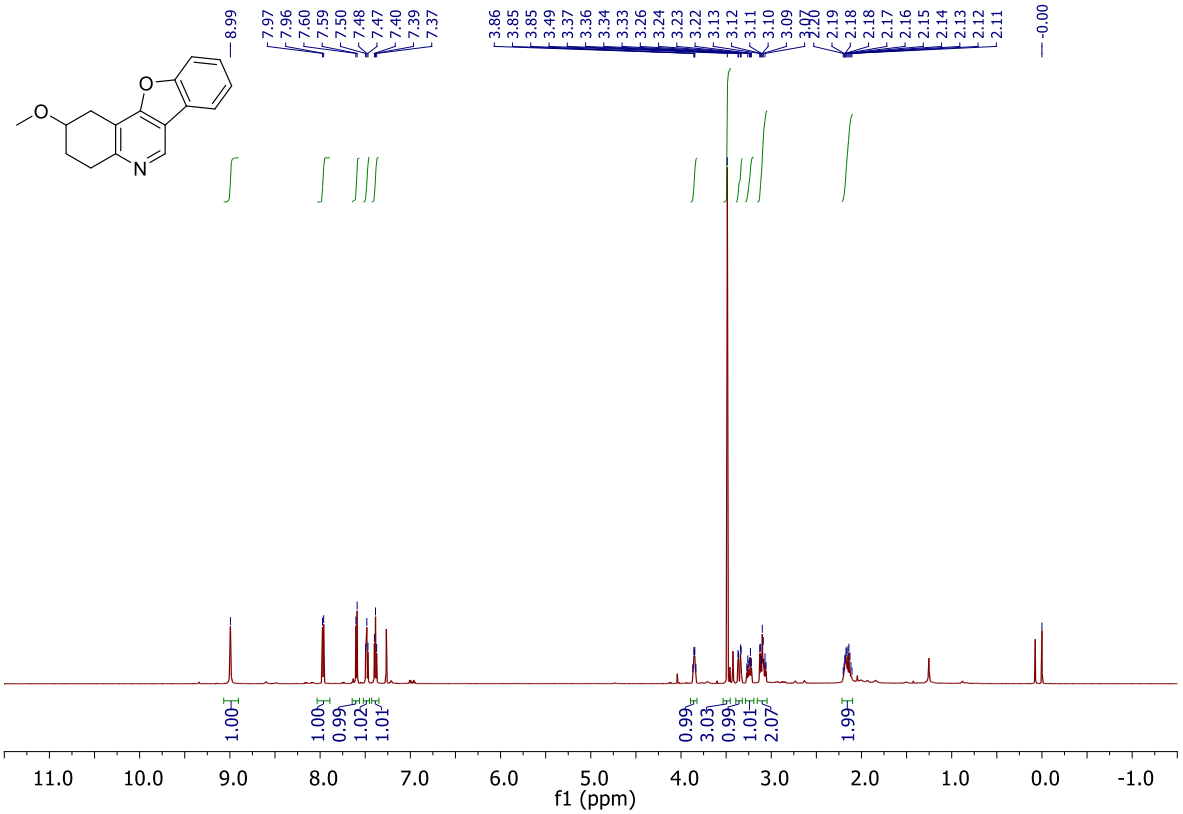
**2-Methyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (2g)**



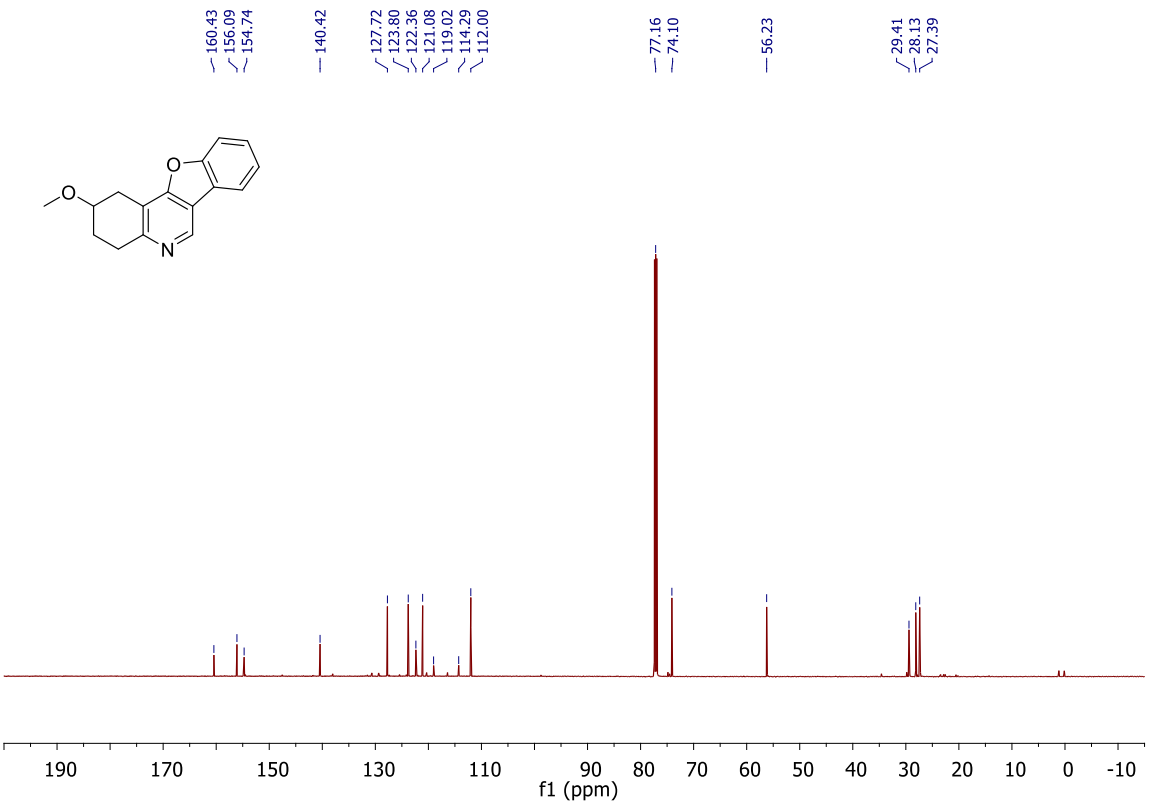

**2-Methyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 125 MHz, $CDCl_3$ (2g)**



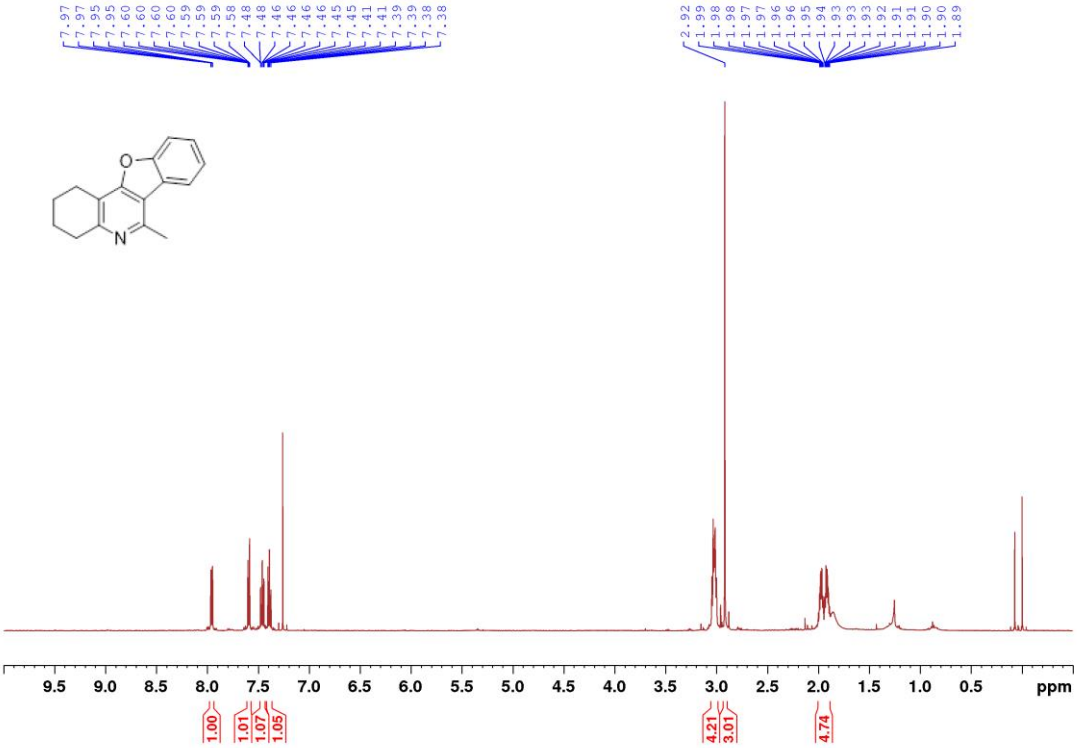
**2-Methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 600 MHz, $CDCl_3$ (2h)**



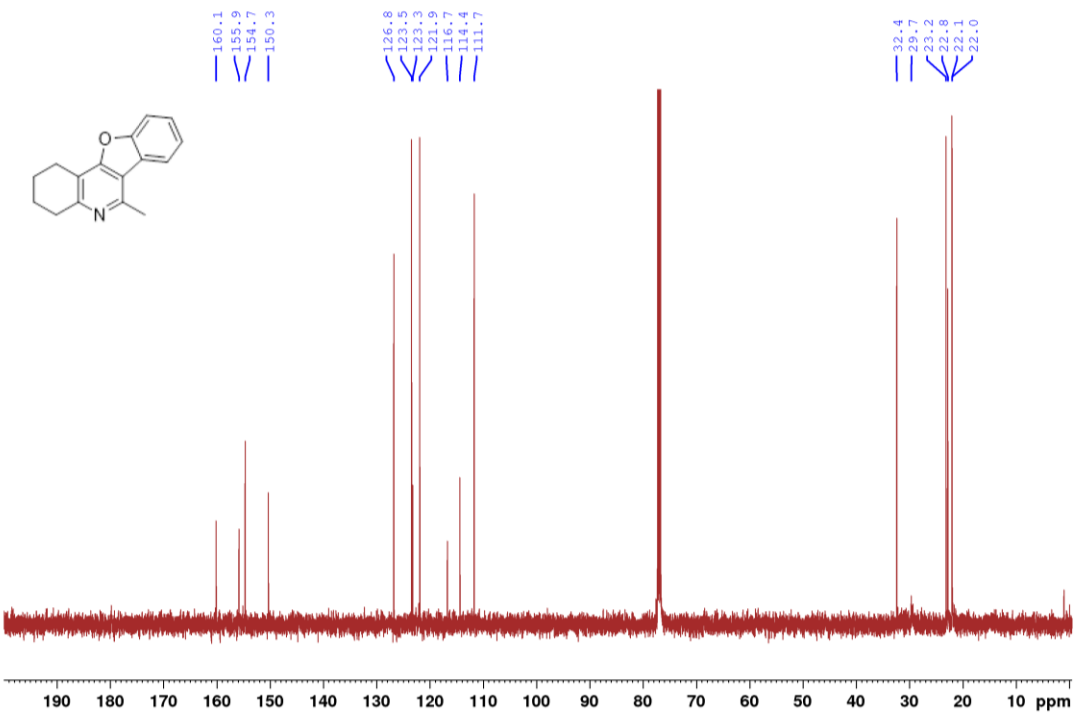

**2-Methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 150 MHz, $CDCl_3$ (2h)**



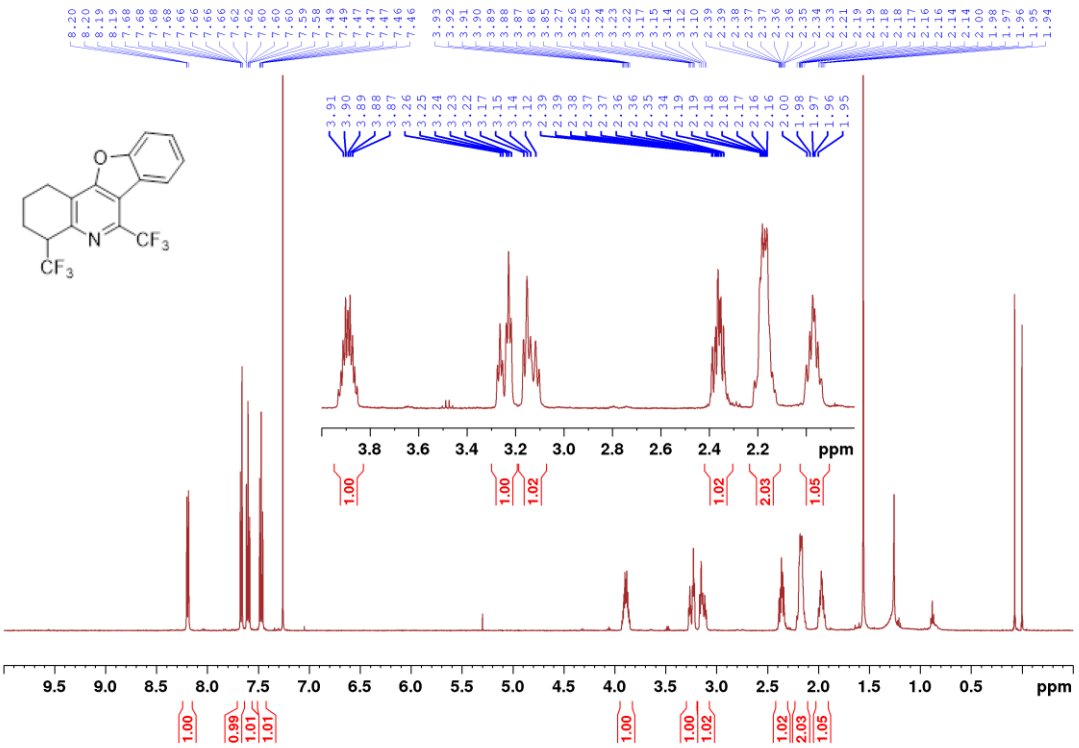
**6-Methyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (2i)**



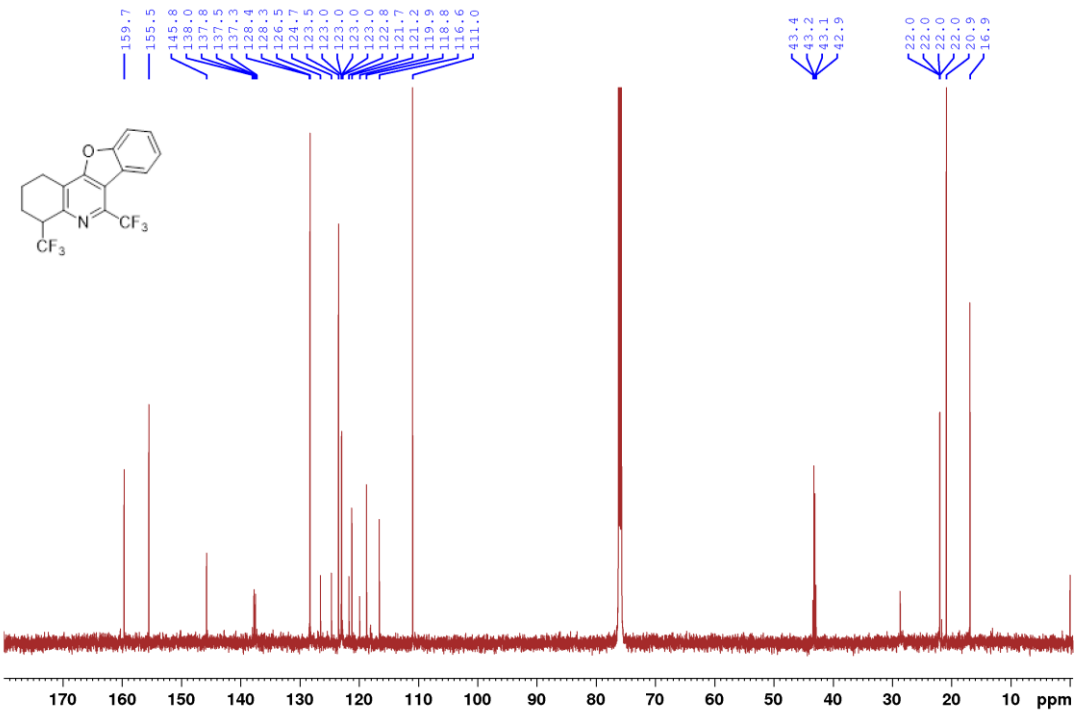

**6-Methyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 125 MHz, $CDCl_3$ (2i)**



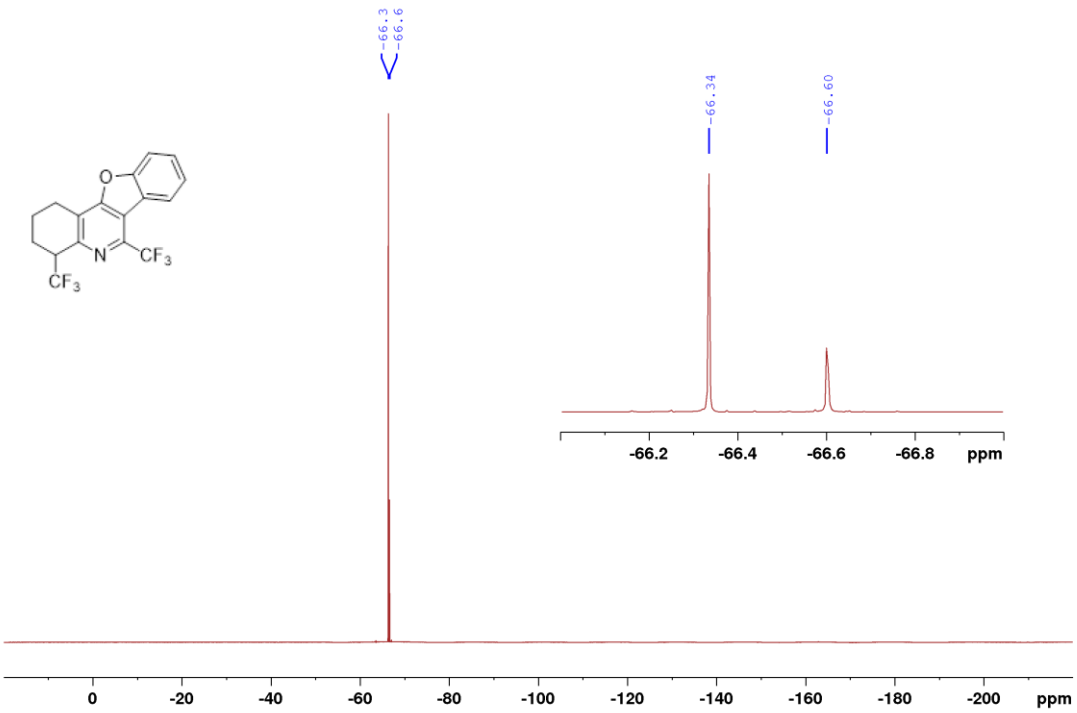
**4,6-Bis(trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline 1H NMR, 500 MHz, $CDCl_3$ (2j)**



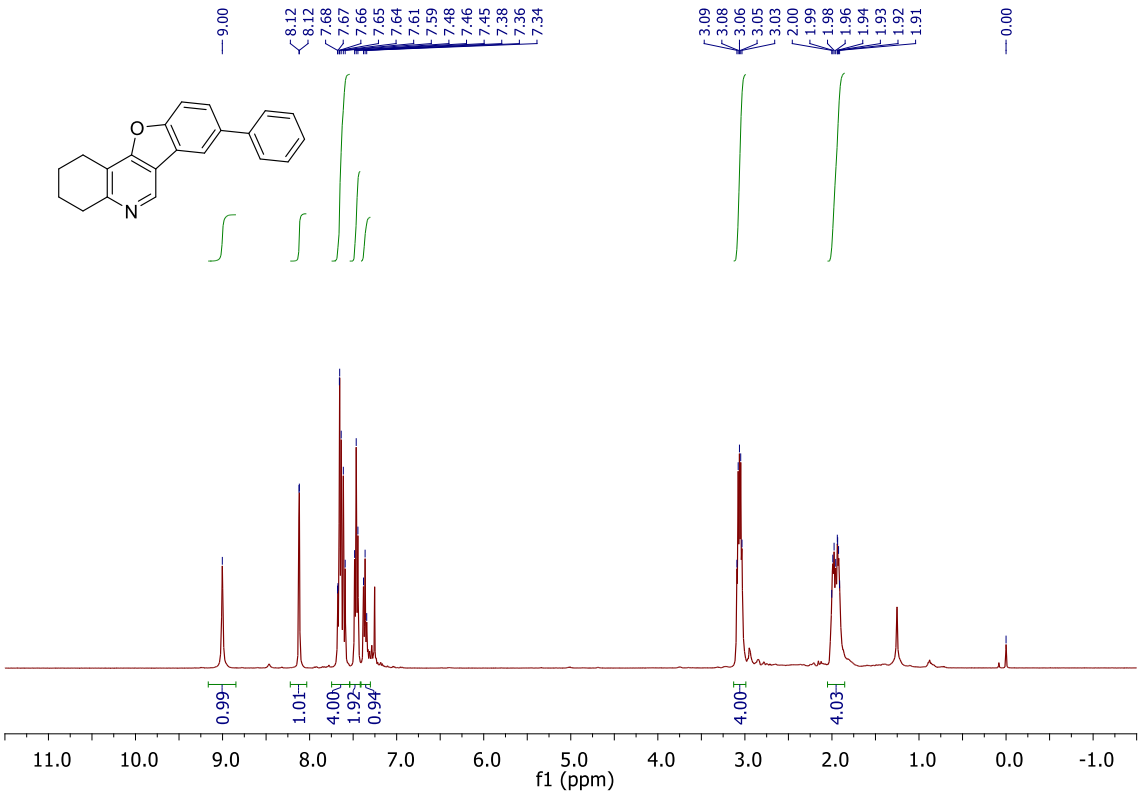
**4,6-Bis(trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 150 MHz, $CDCl_3$ (2j)**



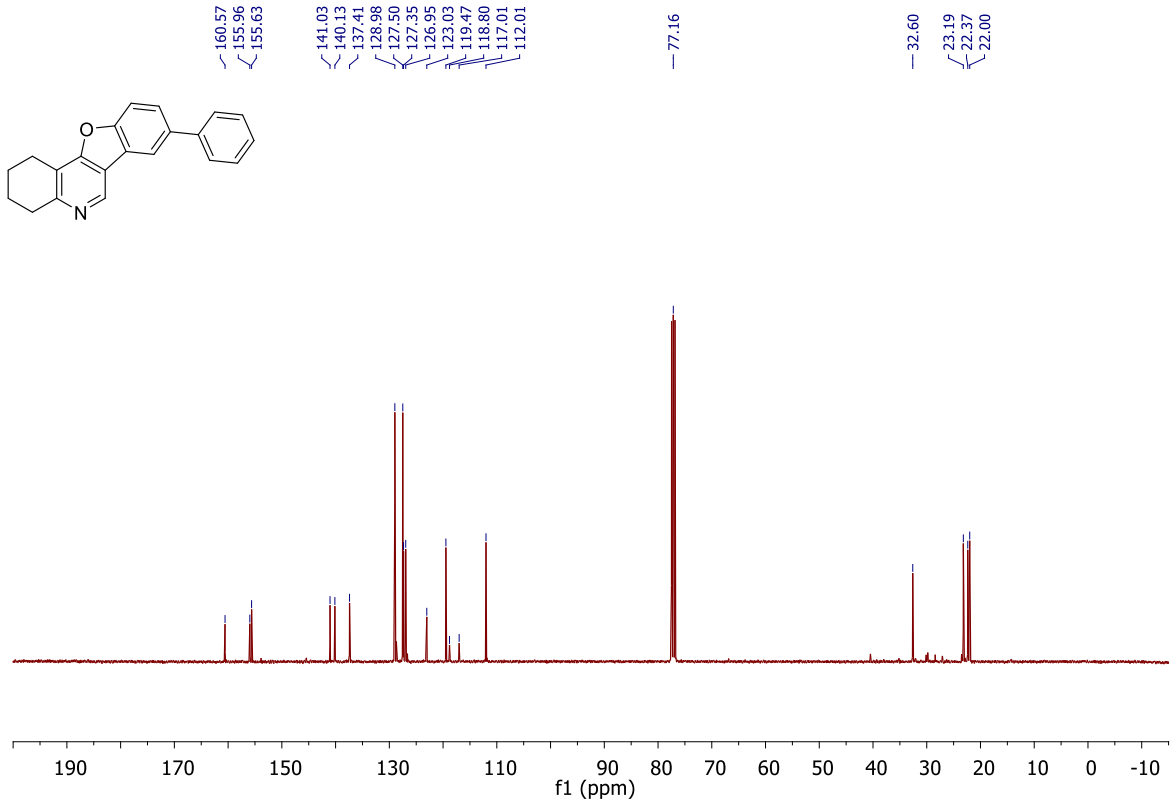
**4,6-Bis(trifluoromethyl)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 471 MHz, $CDCl_3$ (2j)**



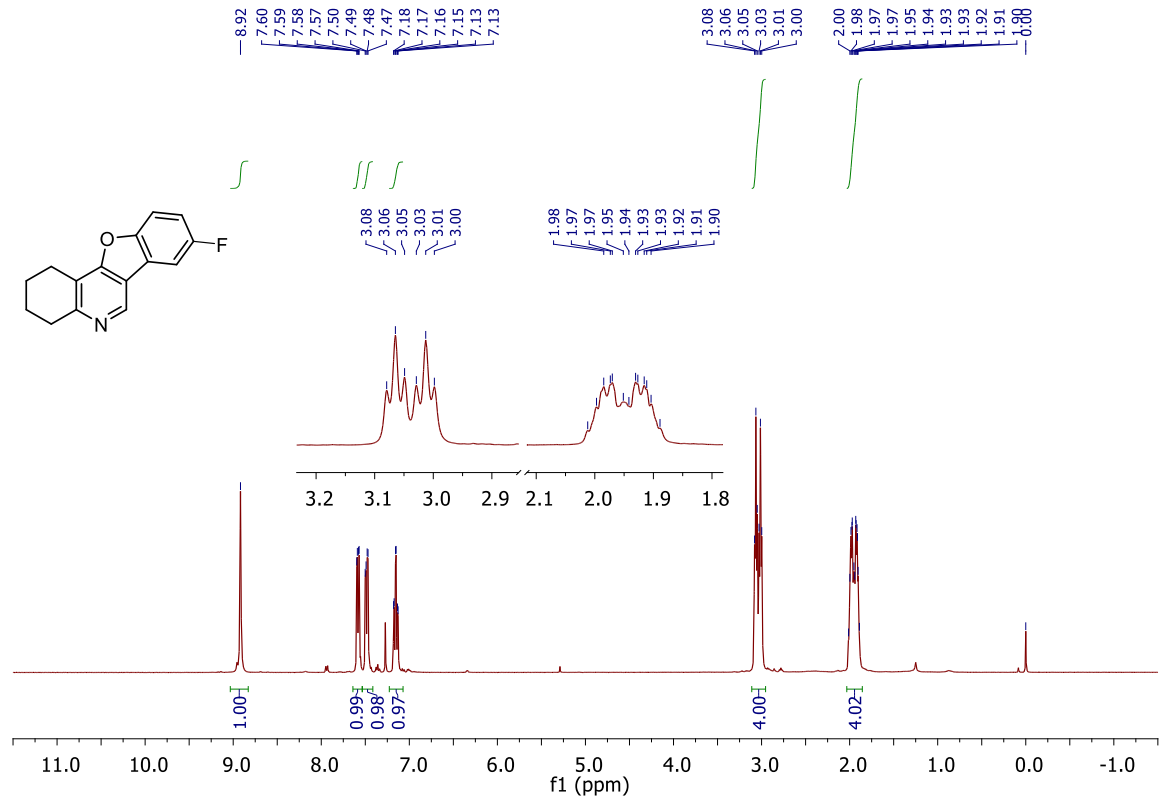

**8-Phenyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 400 MHz, $CDCl_3$ (2k)**



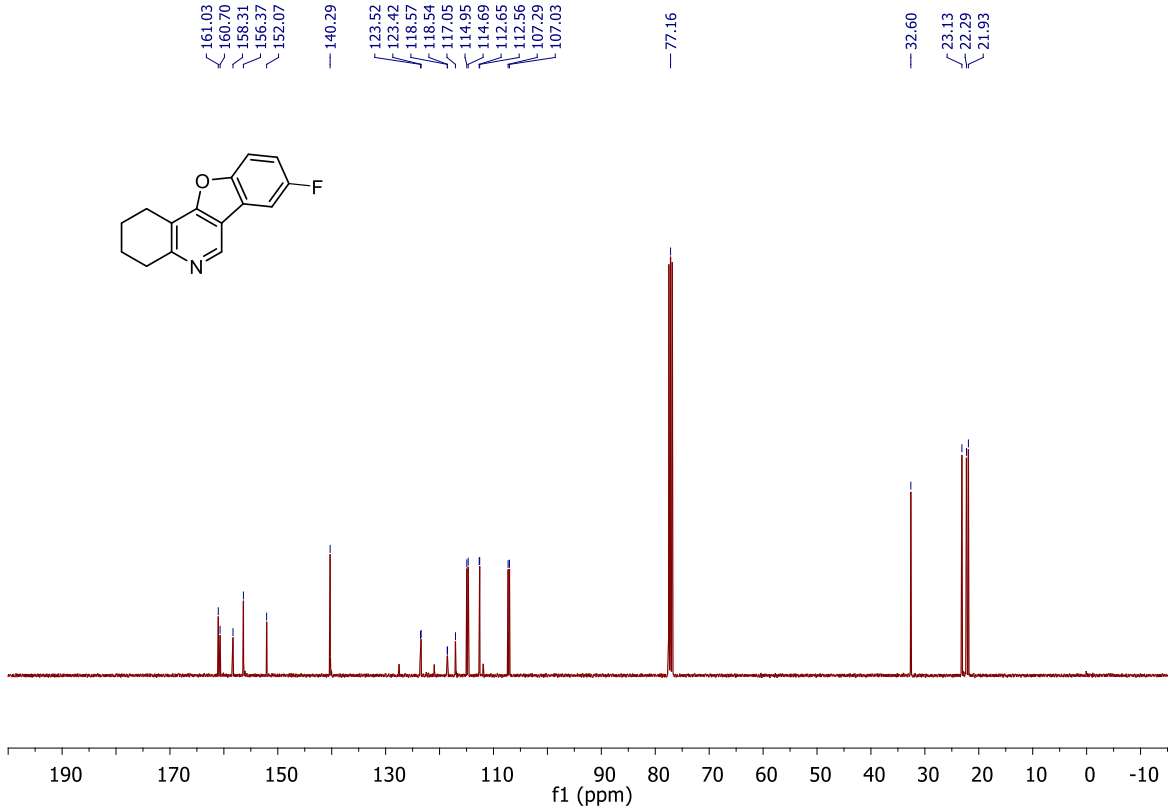
**8-Phenyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 100 MHz, $CDCl_3$ (2k)**



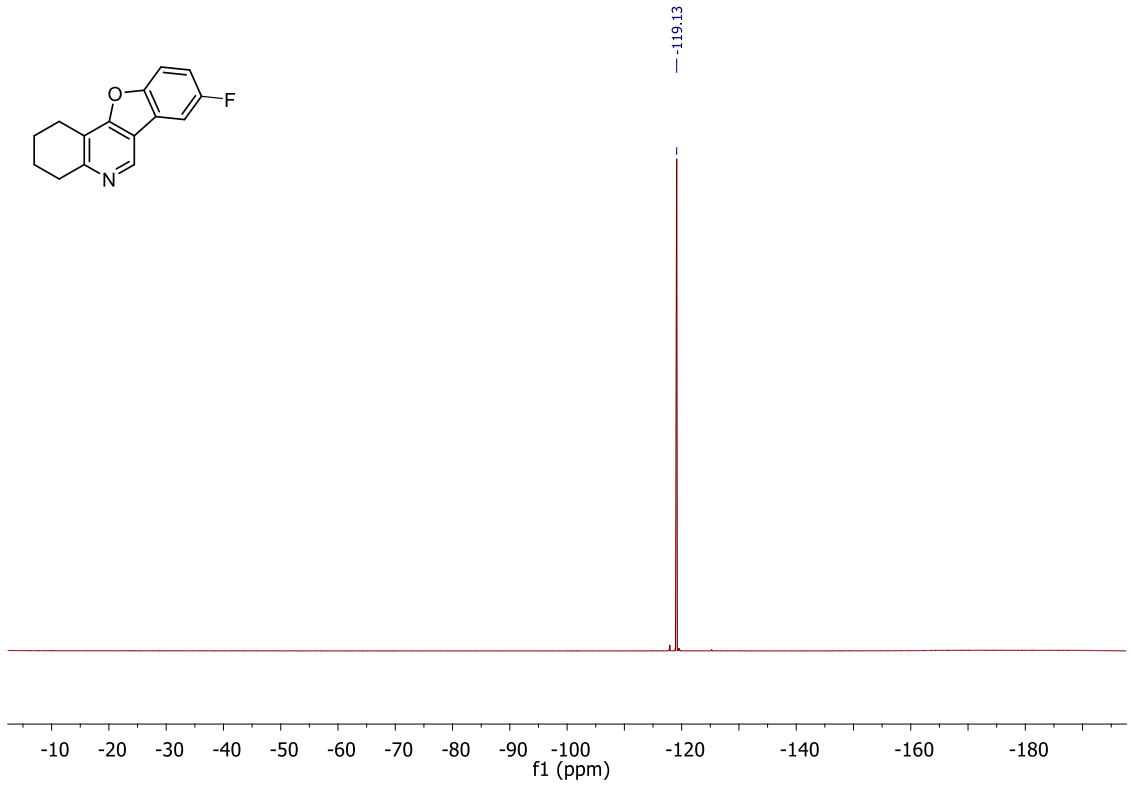

**14-Fluoro-5,6,7,8-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (2l)**



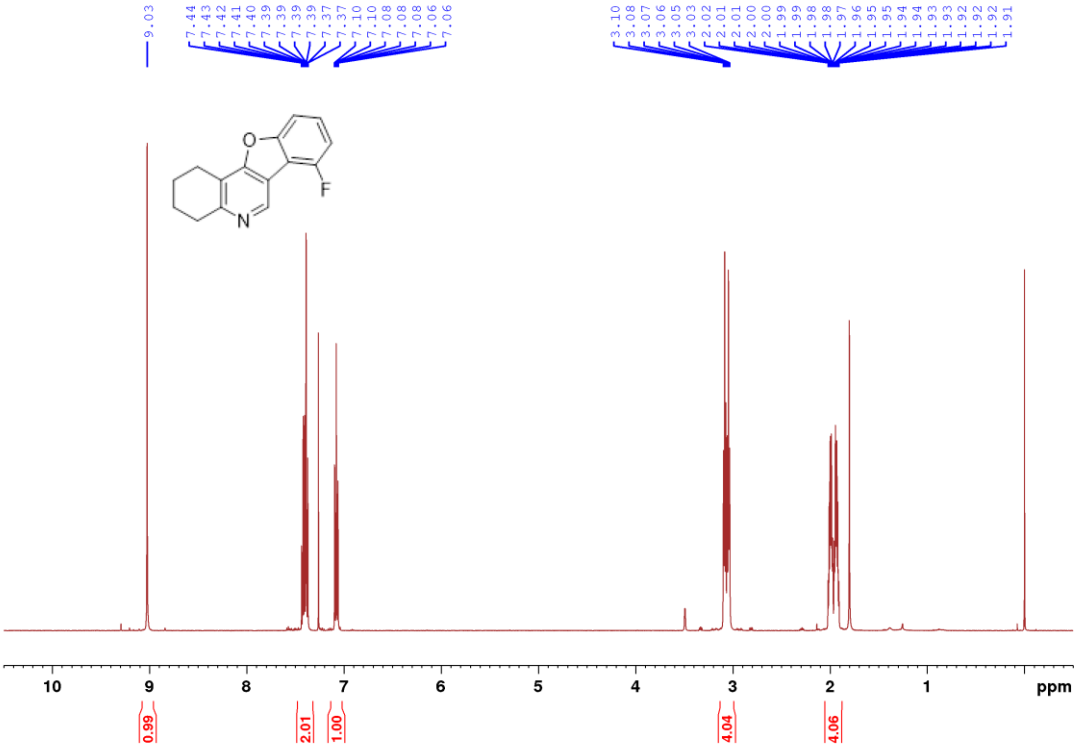
**14-Fluoro-5,6,7,8-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 100 MHz, $CDCl_3$ (2l)**



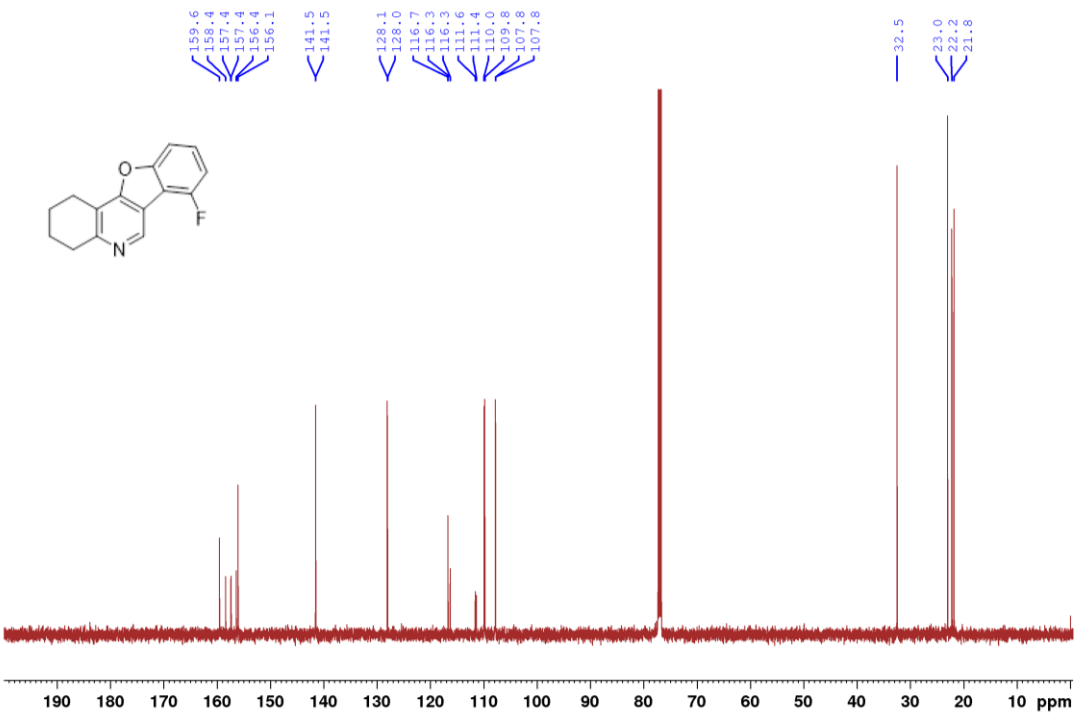

**14-Fluoro-5,6,7,8-tetrahydrobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 376 MHz, $CDCl_3$ (2l)**



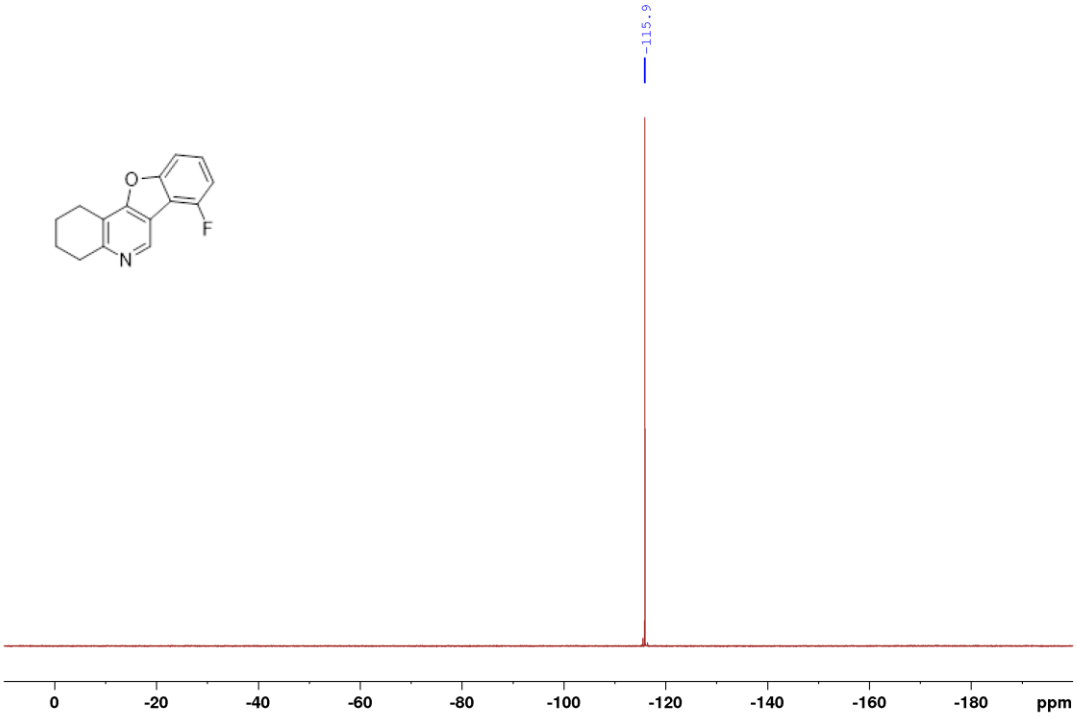
**7-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (2m)**



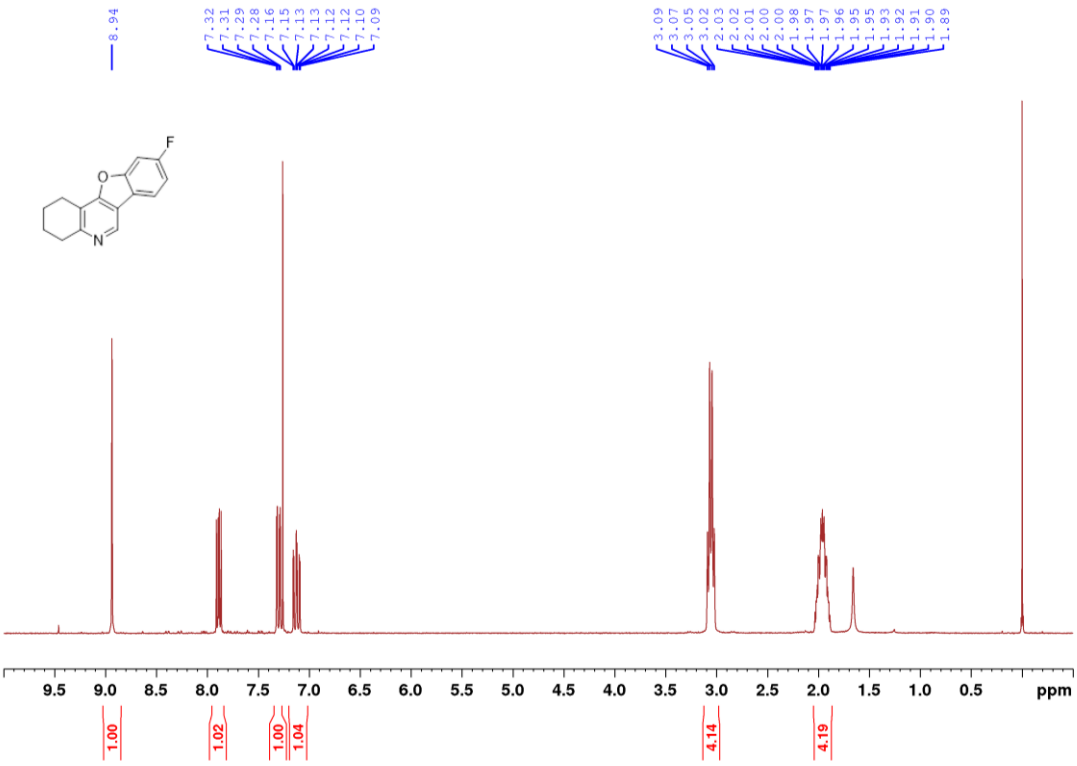

**7-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 125 MHz, $CDCl_3$ (2m)**



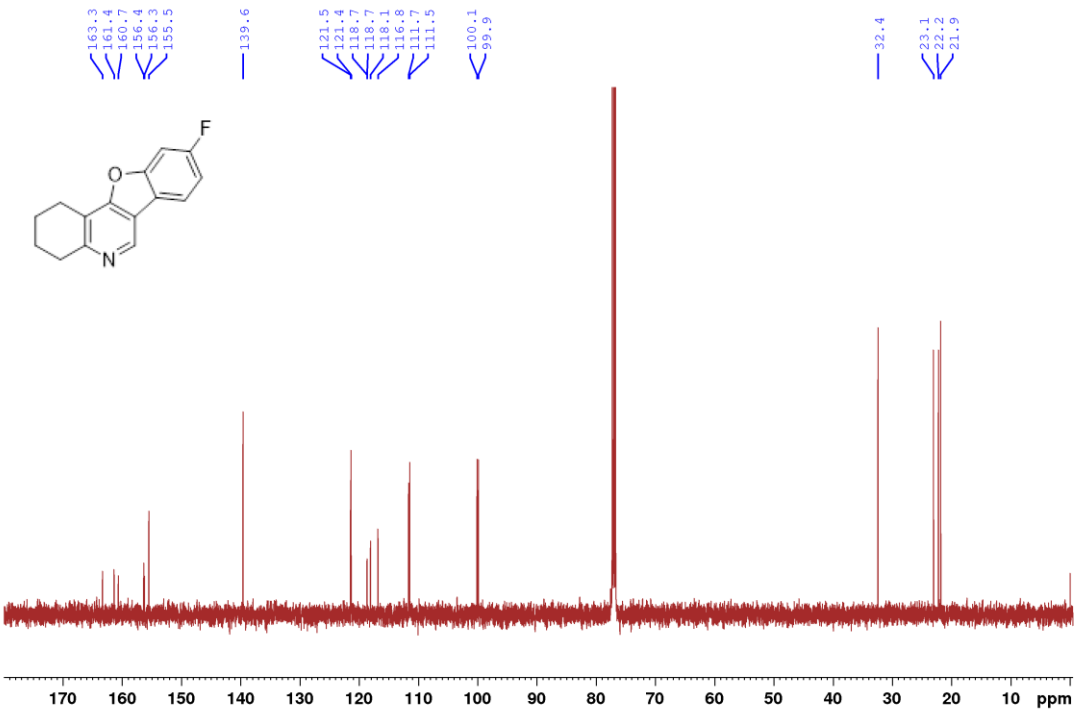
**7-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{19}$F NMR, 282 MHz, $CDCl_3$ (2m)**



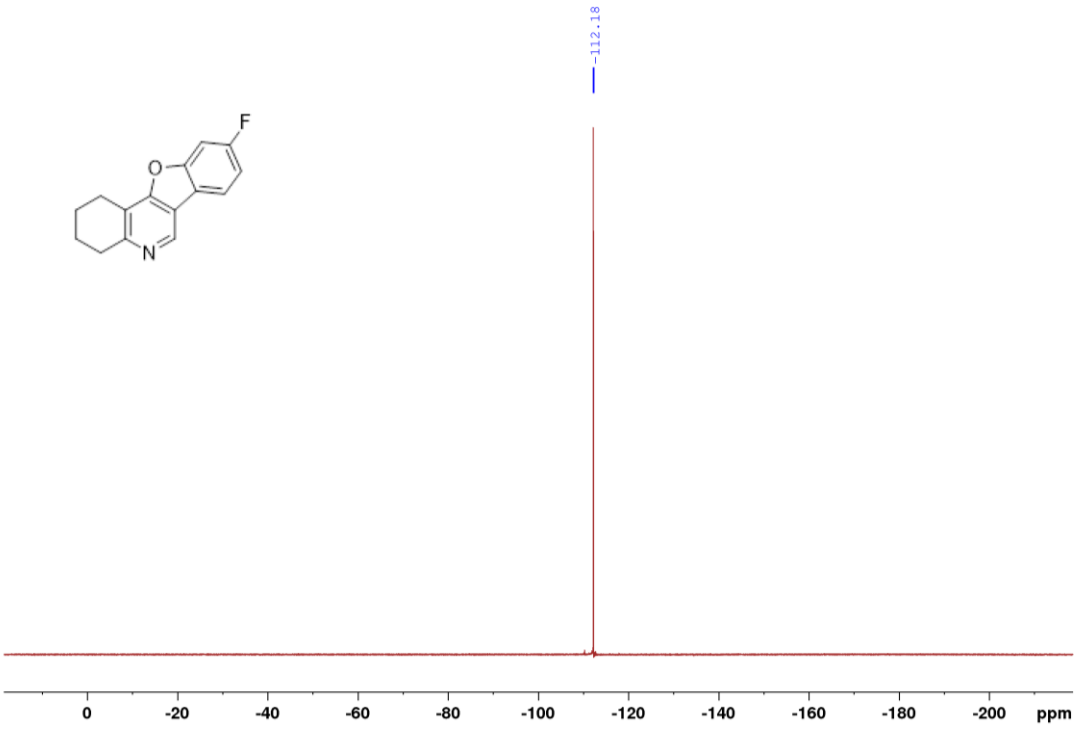

**9-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 500 MHz, $CDCl_3$ (2n)**



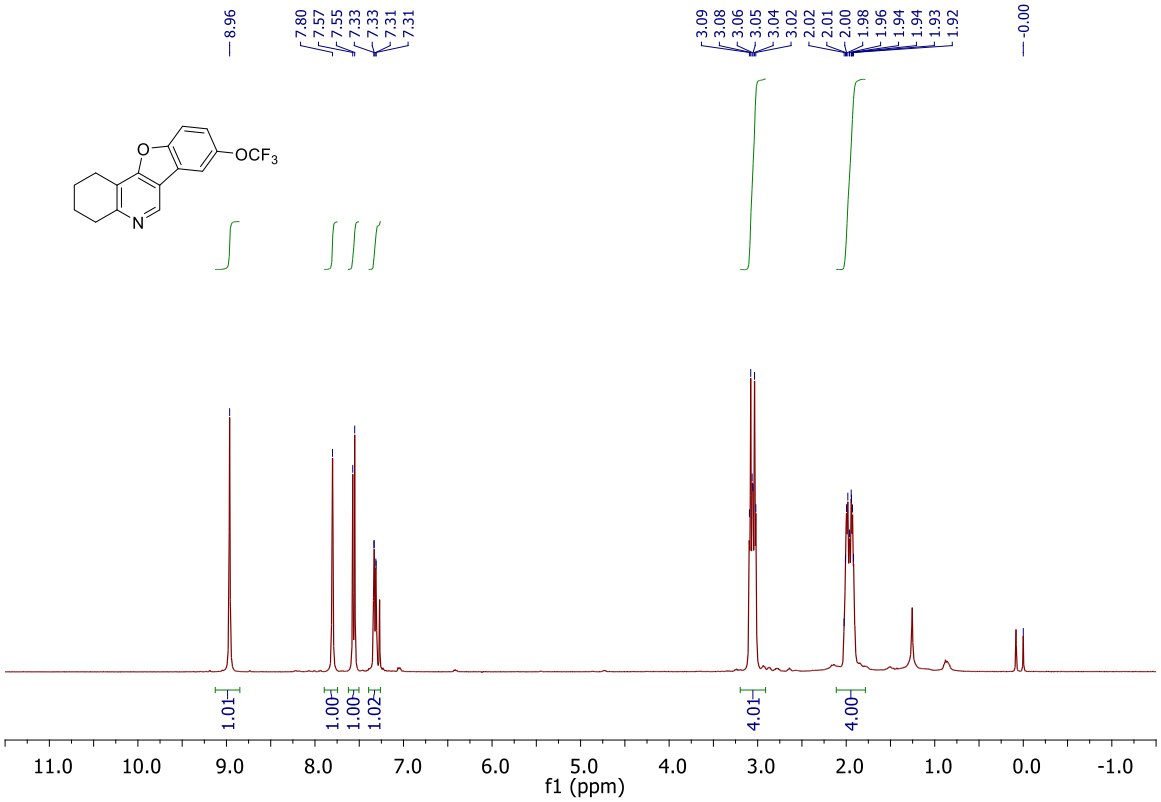
**9-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (2n)**



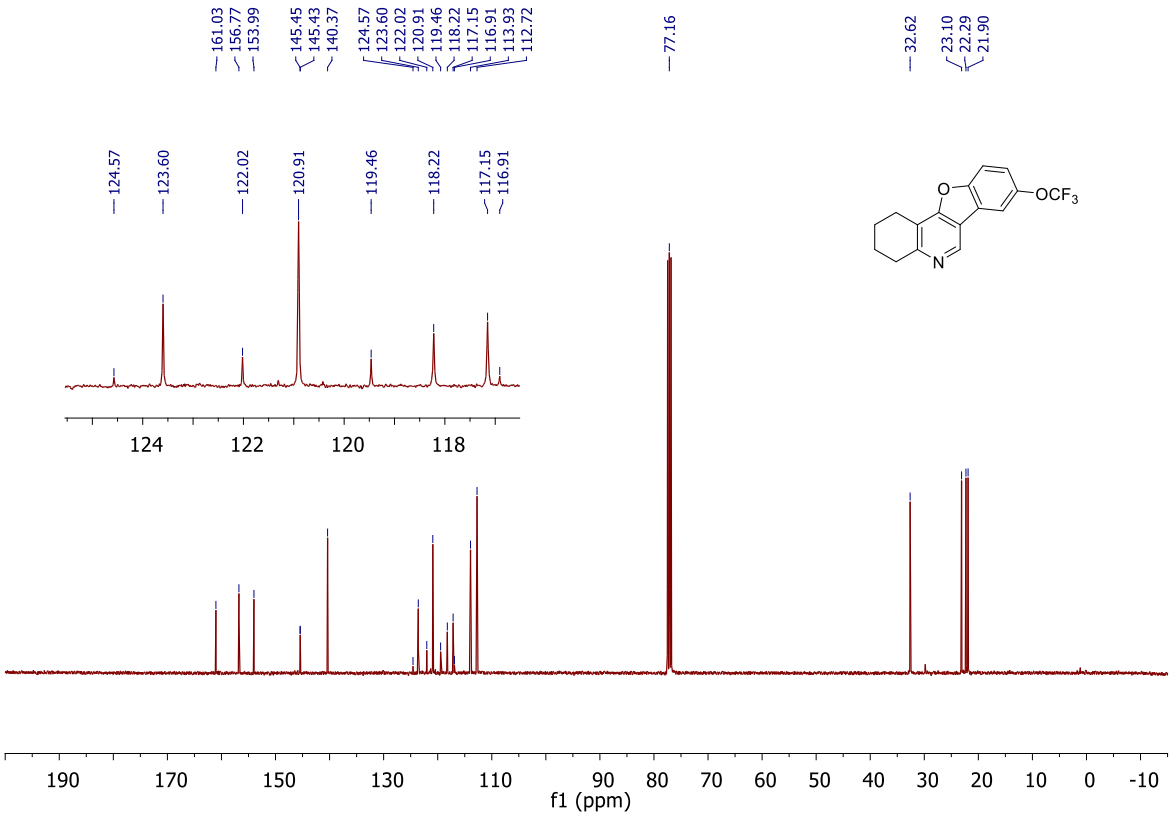

**9-Fluoro-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 282 MHz, $CDCl_3$ (2n)**



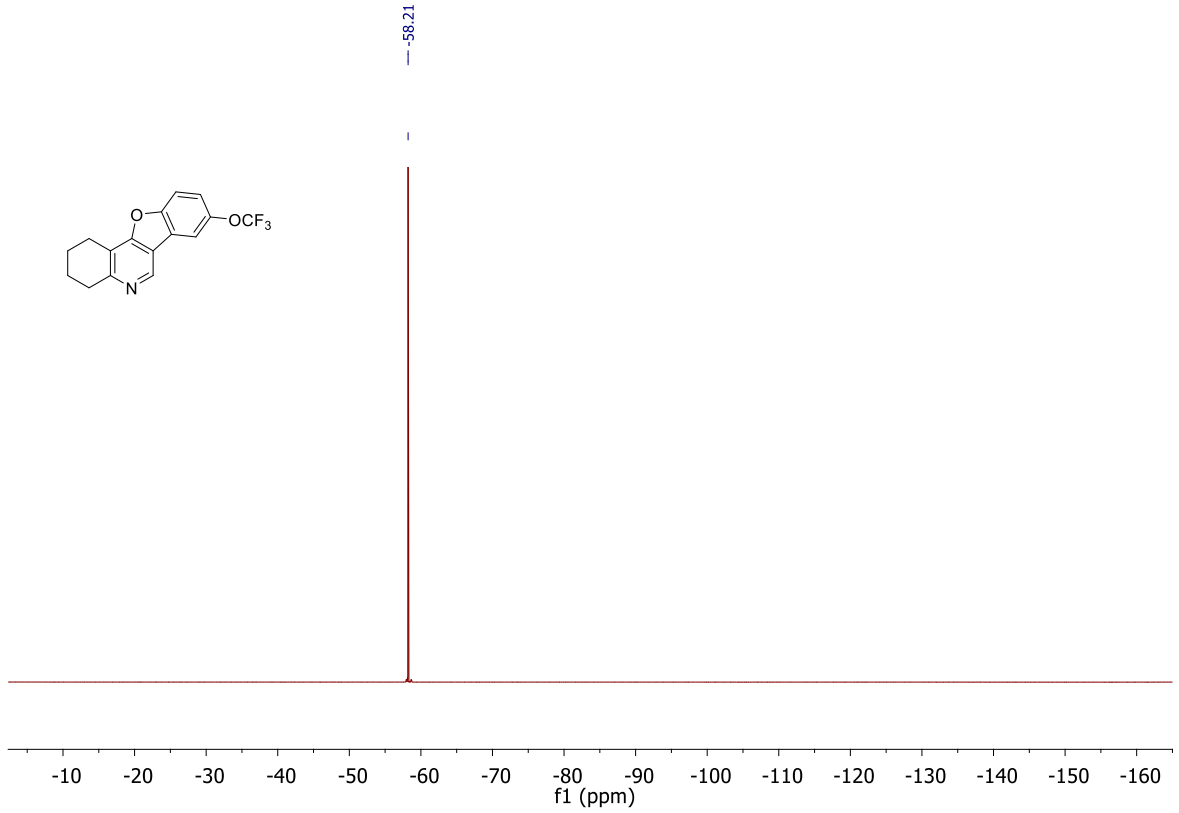
**8-(Trifluoromethoxy)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (2o)**



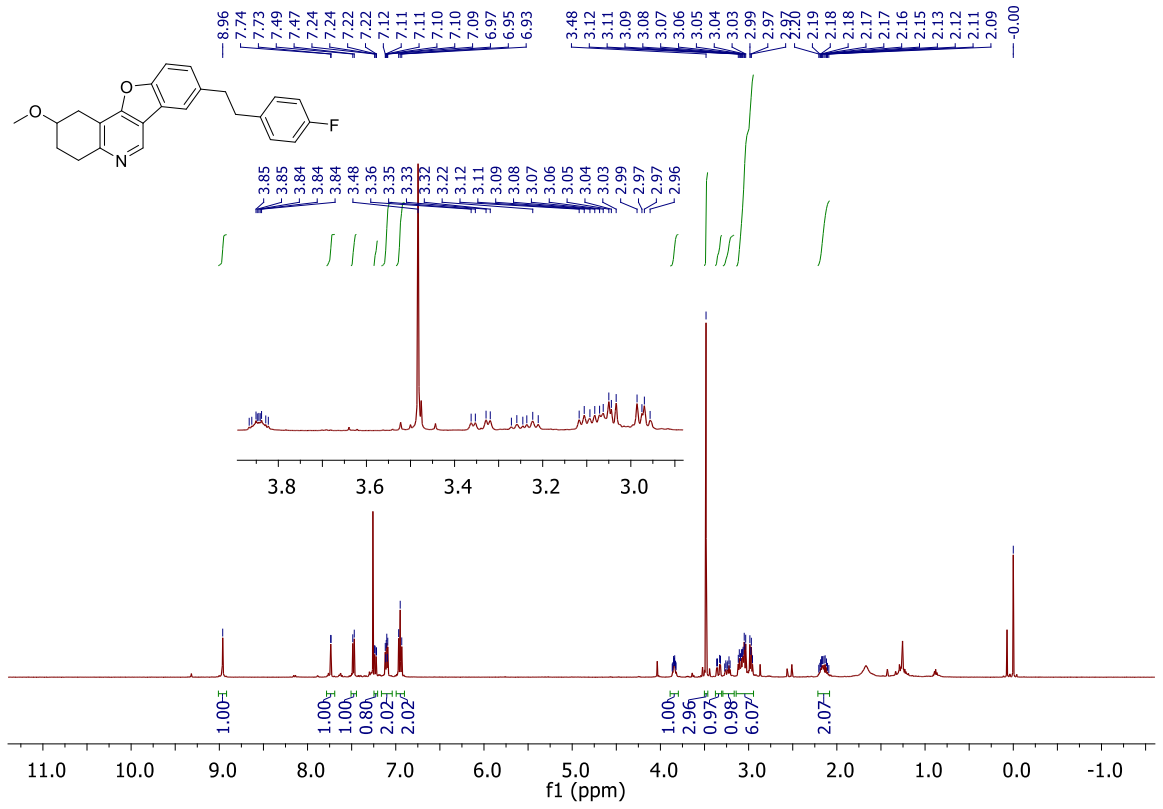

**8-(Trifluoromethoxy)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 100 MHz, $CDCl_3$ (2o)**



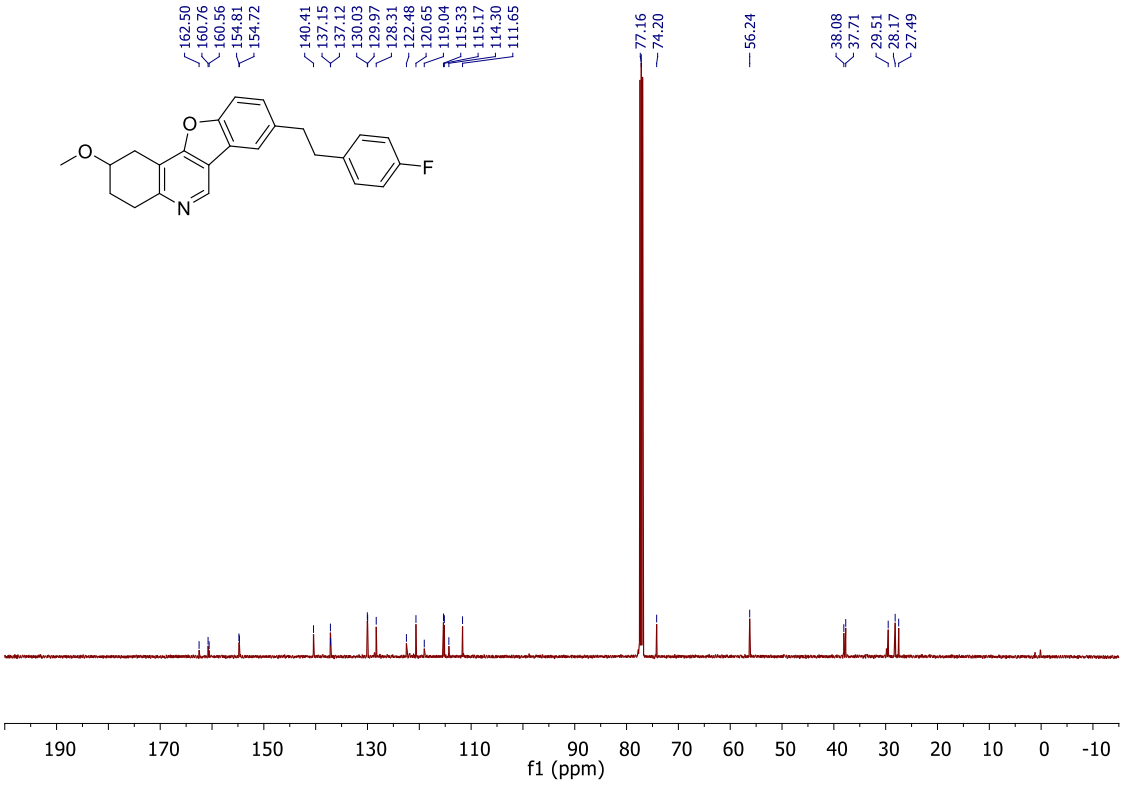
**8-(Trifluoromethoxy)-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 376 MHz, $CDCl_3$ (2o)**



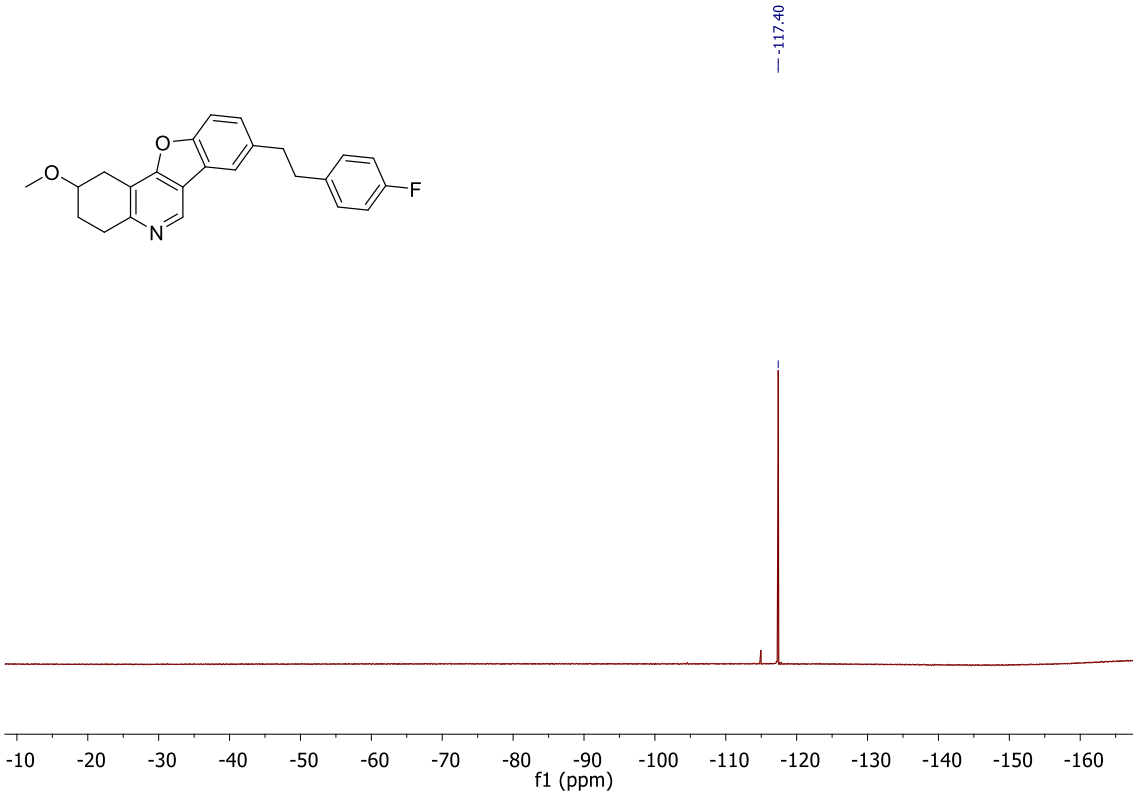

**8-(4-fluorophenethyl)-2-methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}H$ NMR, 500 MHz, $CDCl_3$ (4a)**



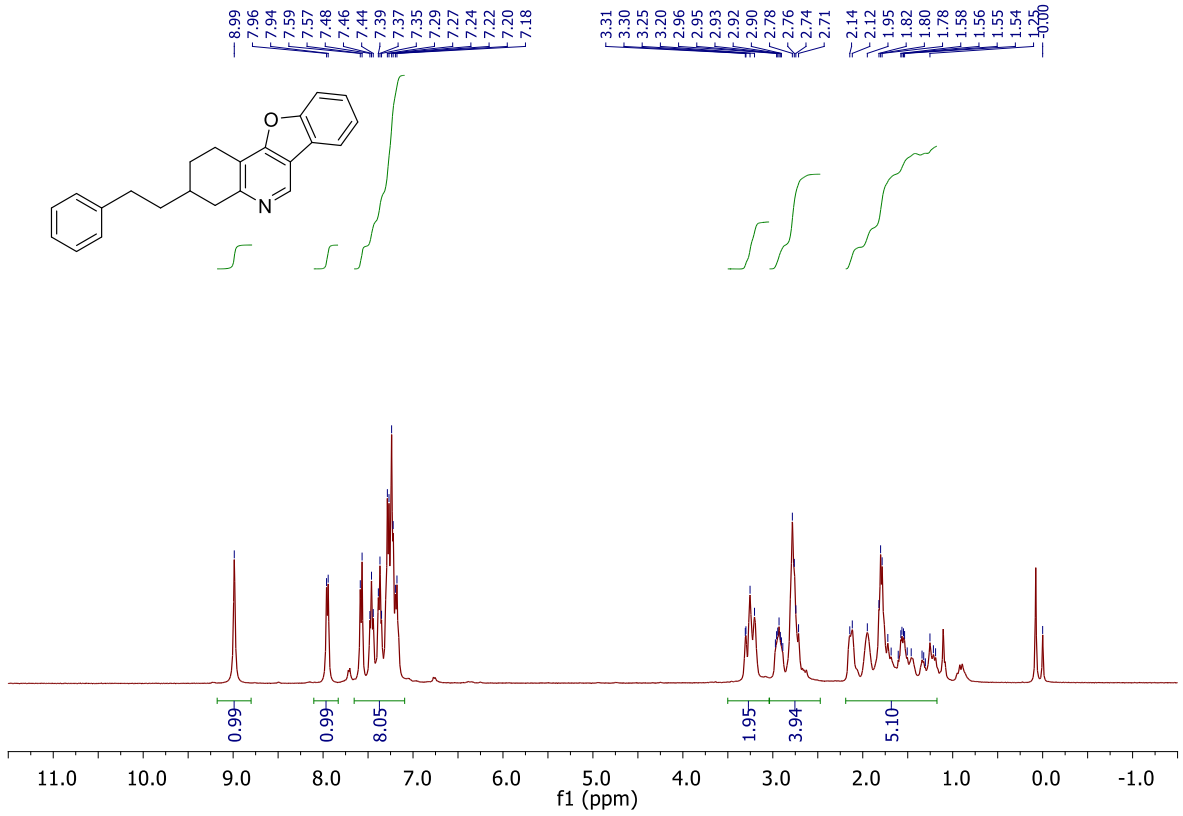
**8-(4-fluorophenethyl)-2-methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 125 MHz, $CDCl_3$ (4a)**



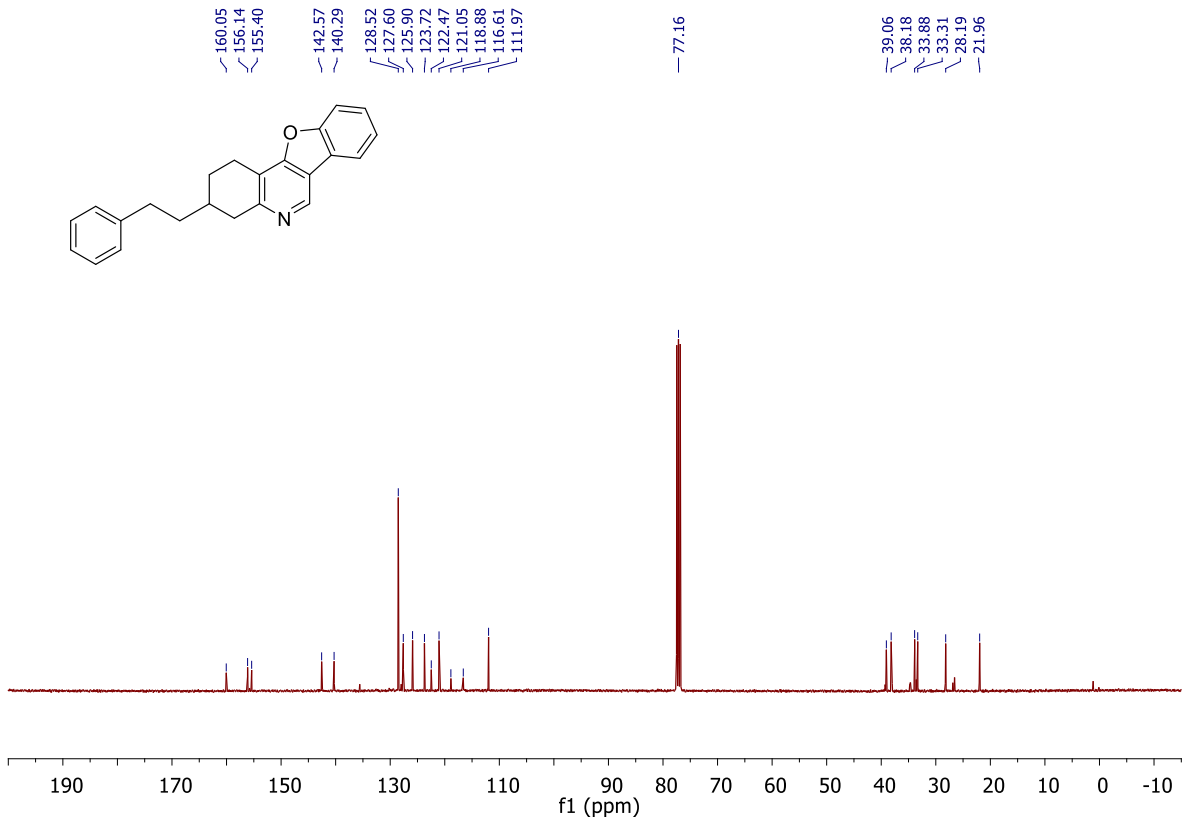

**8-(4-Fluorophenethyl)-2-methoxy-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline 19F NMR, 376 MHz, $CDCl_3$ (4a)**



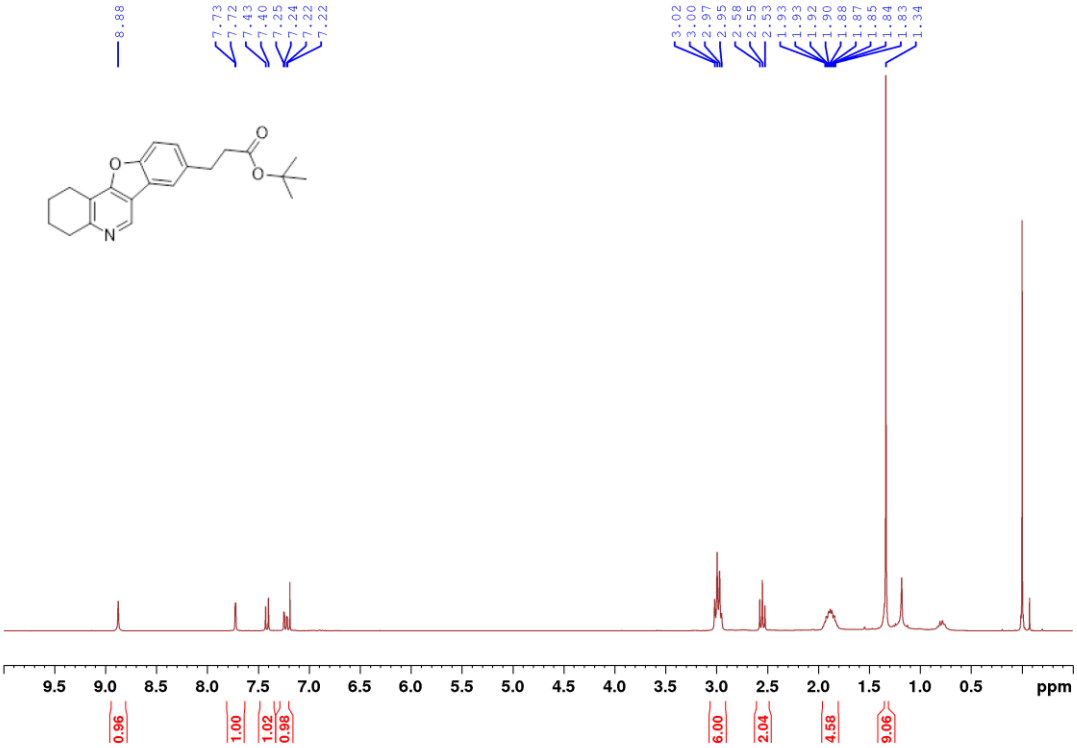
**3-Phenethyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 400 MHz, $CDCl_3$ (4b)**



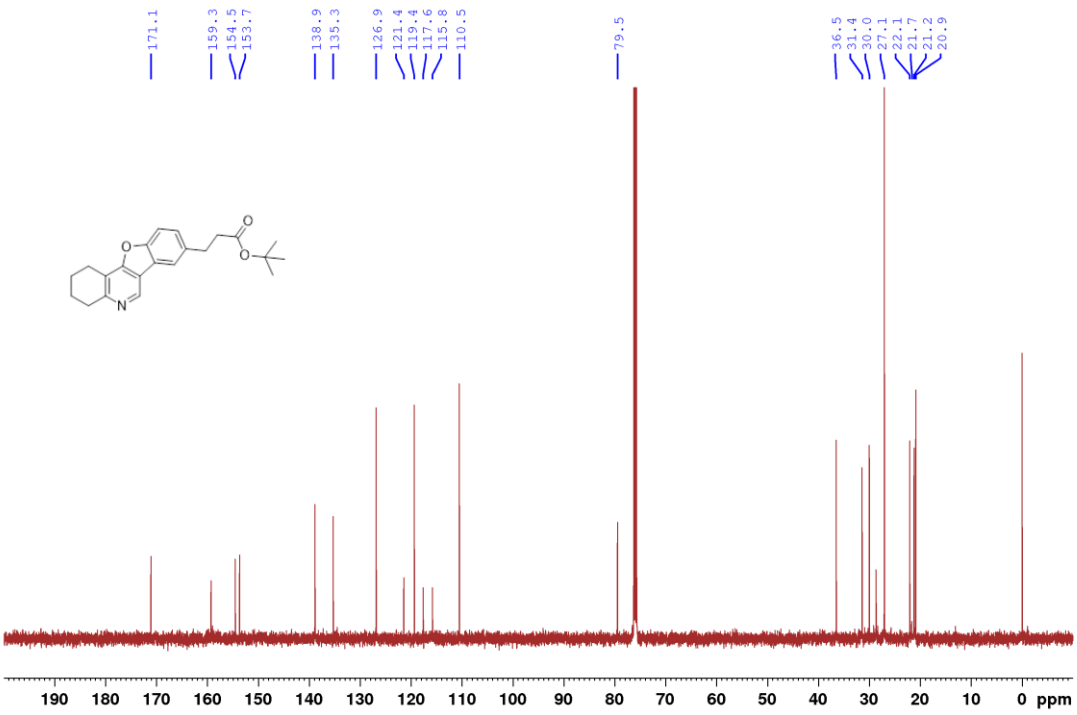

**3-Phenethyl-1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 100 MHz, $CDCl_3$ (4b)**



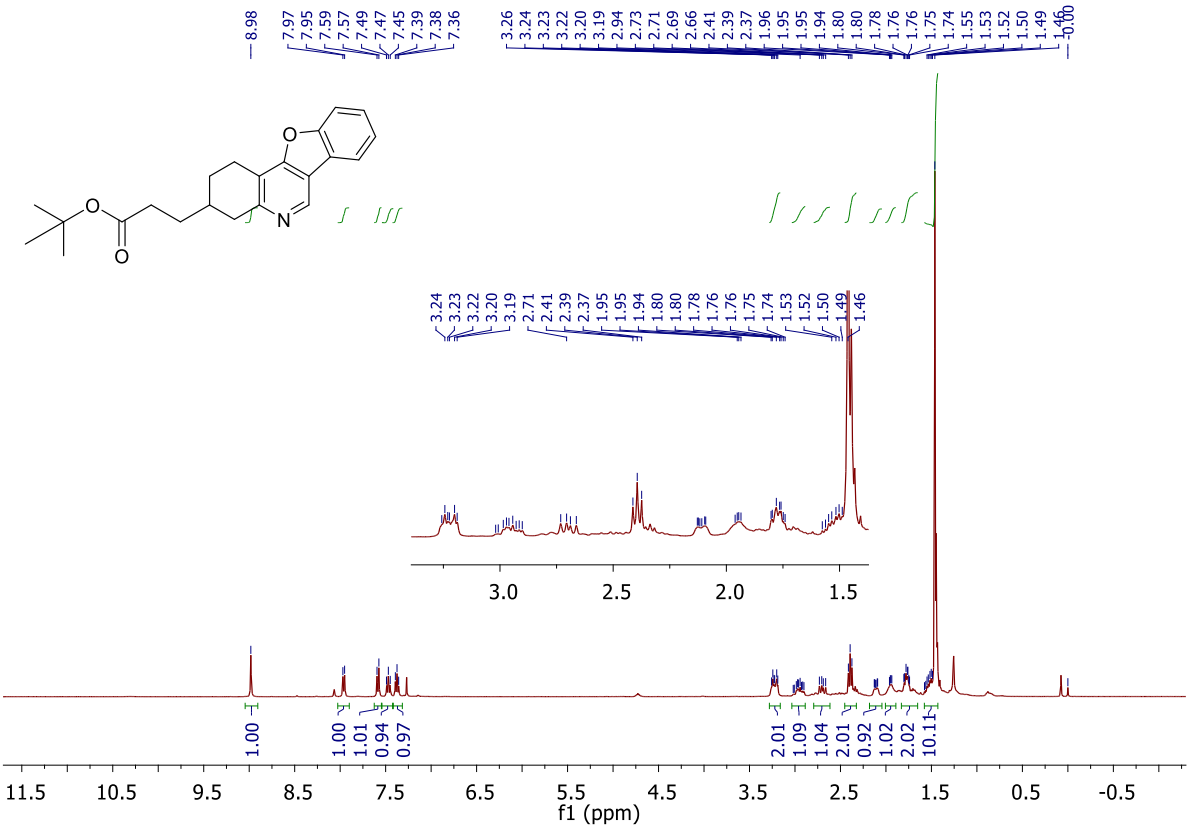
***tert*-Butyl 3-(1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinolin-8-yl)propanoate $^{1}$H NMR, 300 MHz, $CDCl_3$ (4c)**



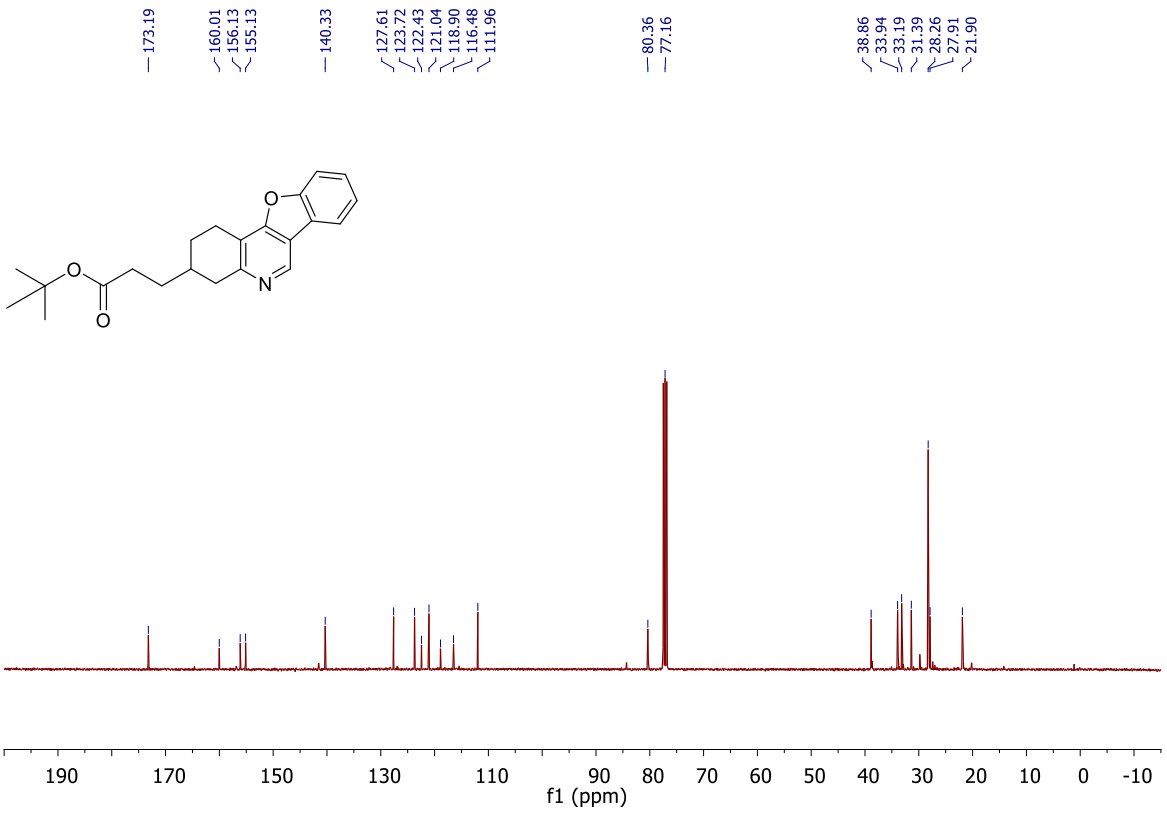

***tert*-Butyl 3-(1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinolin-8-yl)propanoate $^{13}$C NMR, 125 MHz, $CDCl_3$ (4c)**



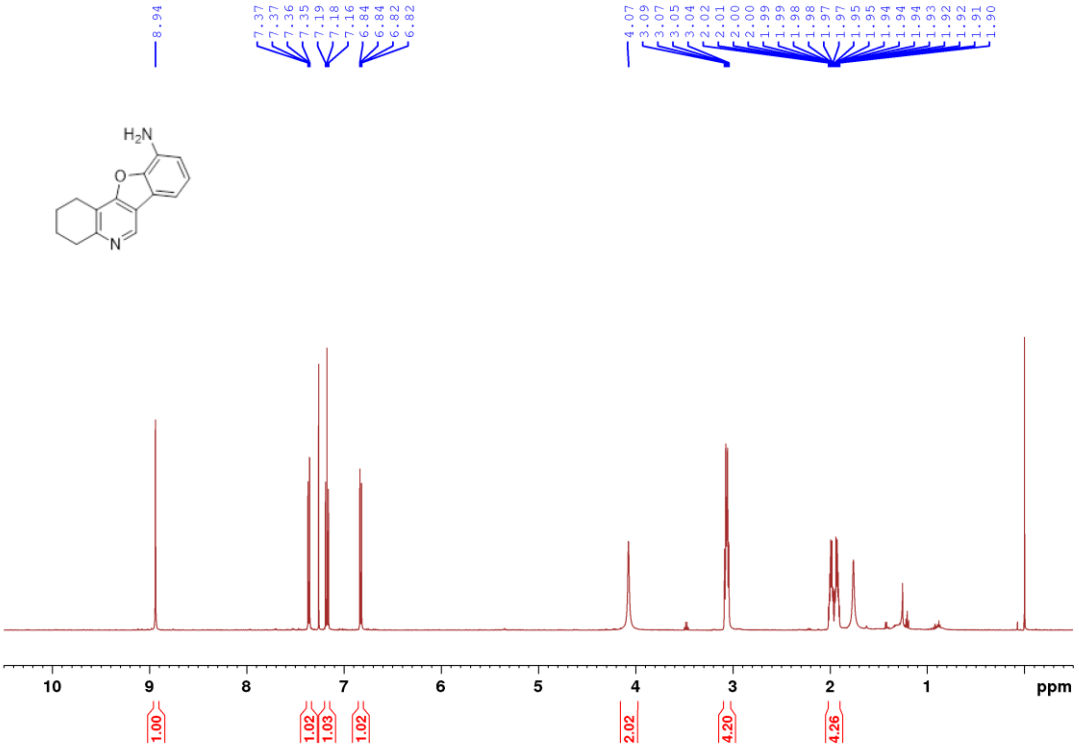
***tert*-Butyl 3-(1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinolin-3-yl)propanoate $^{1}$H NMR, 400 MHz, $CDCl_3$ (4d)**



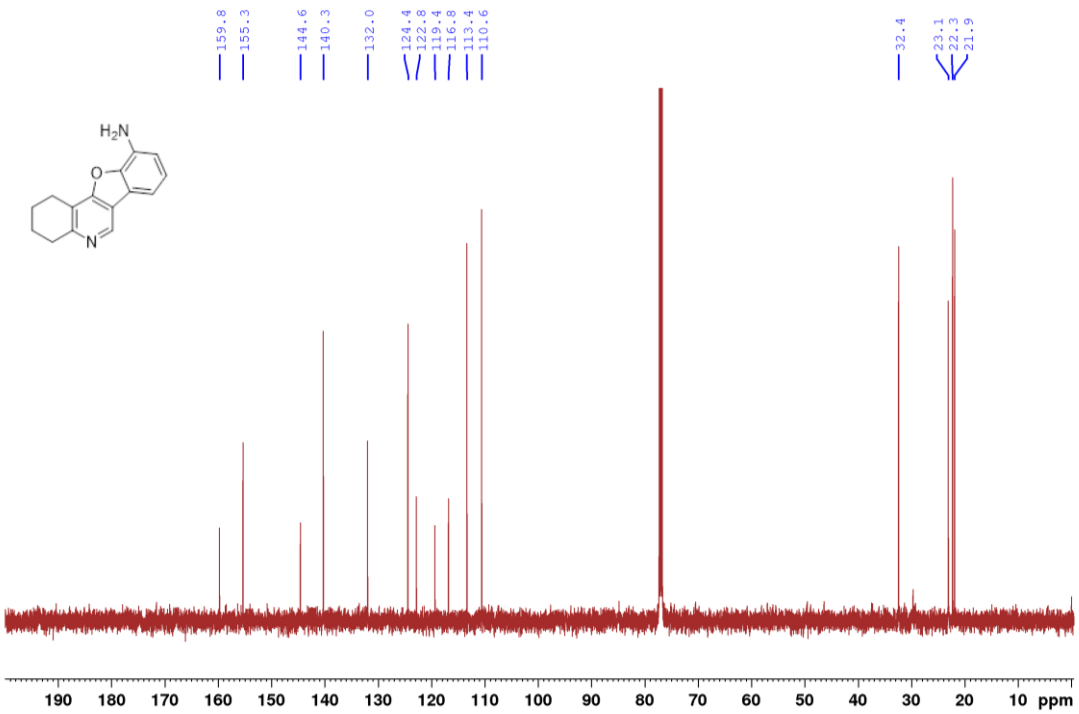

***tert*-Butyl 3-(1,2,3,4-tetrahydrobenzofuro[3,2-*c*]quinolin-3-yl)propanoate $^{13}$C NMR, 100 MHz, $CDCl_3$ (4d)**



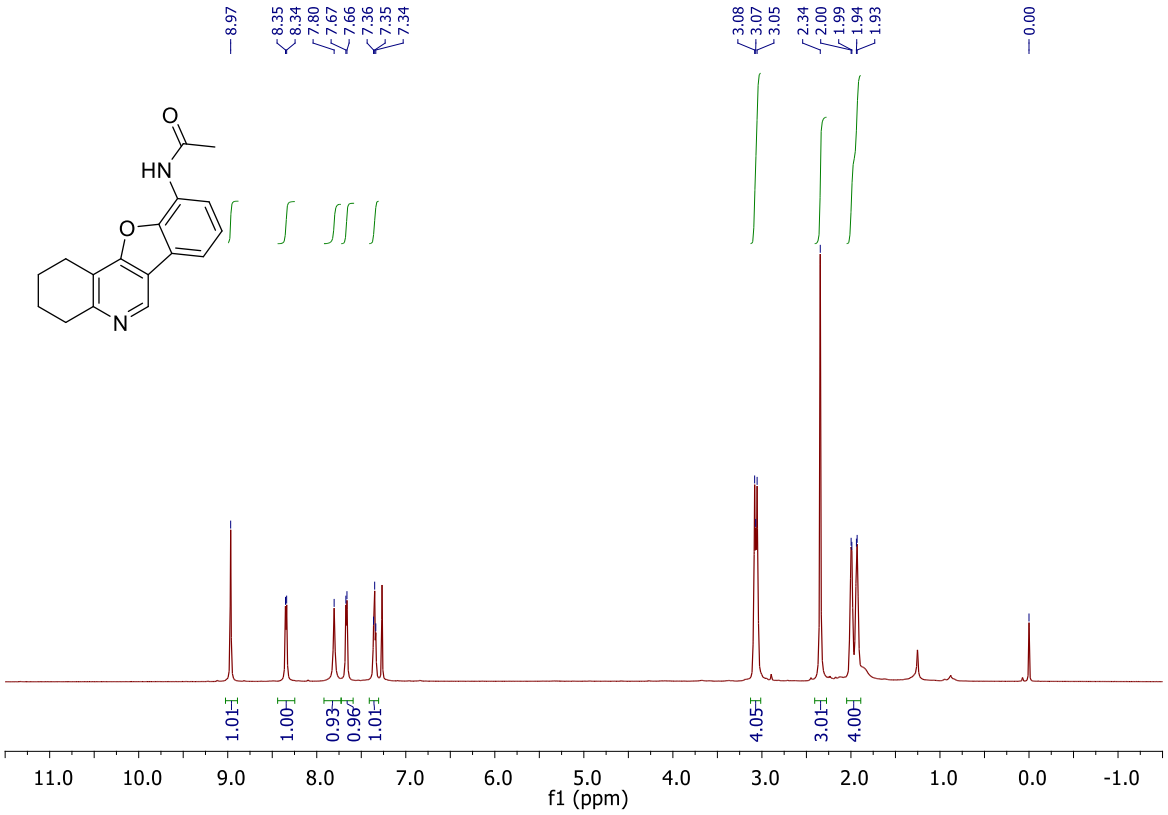
**1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinolin-10-amine $^{1}$H NMR, 500 MHz, $CDCl_3$ (6a)**



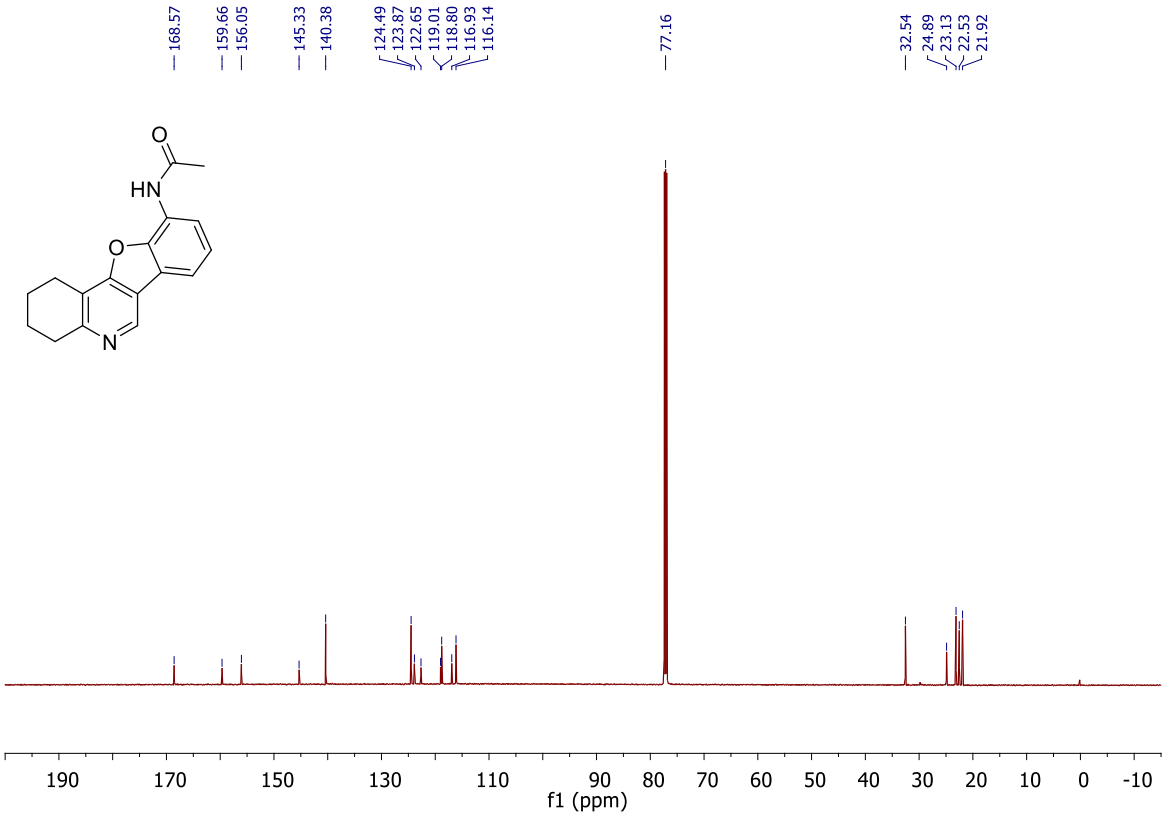

**1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinolin-10-amine $^{13}$C NMR, 125 MHz, $CDCl_3$ (6a)**



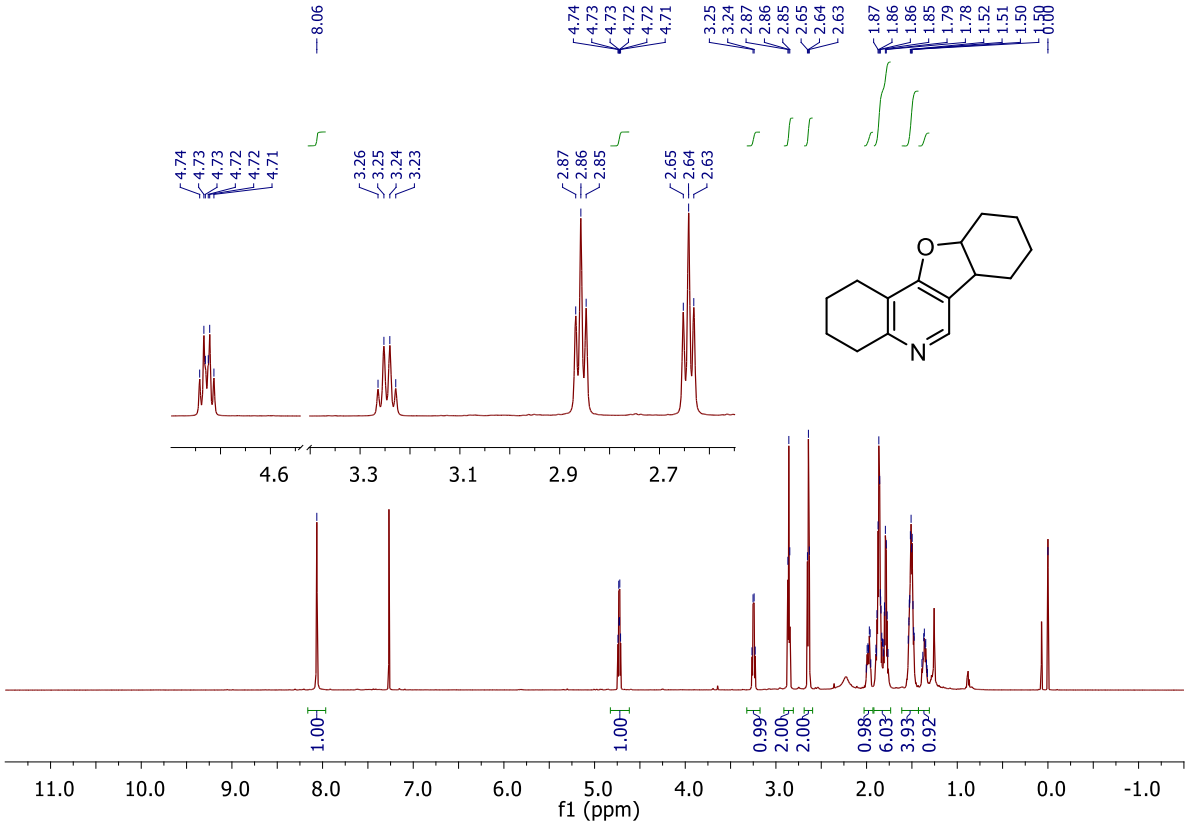
***N*-(1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinolin-10-yl)acetamide $^{1}$H NMR, 600 MHz, $CDCl_3$ (6b)**



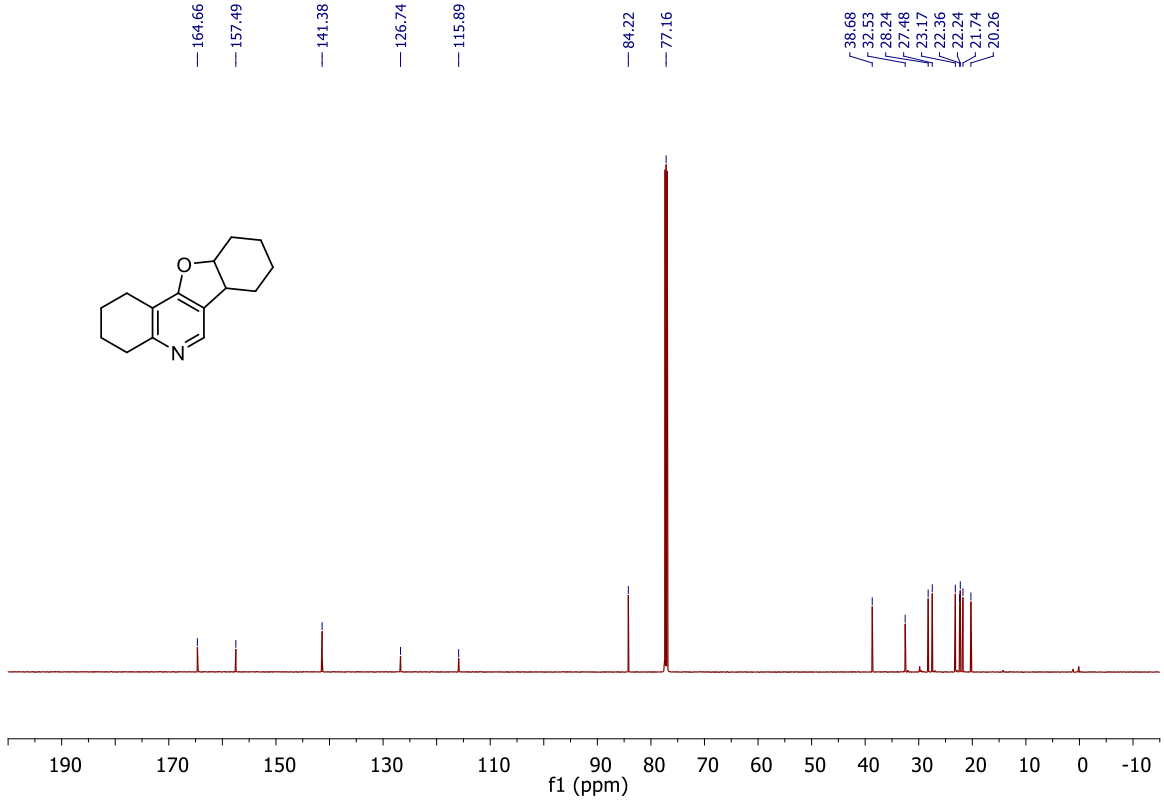

***N*-(1,2,3,4-Tetrahydrobenzofuro[3,2-*c*]quinolin-10-yl)acetamide $^{13}$C NMR, 150 MHz, $CDCl_3$ (6b)**



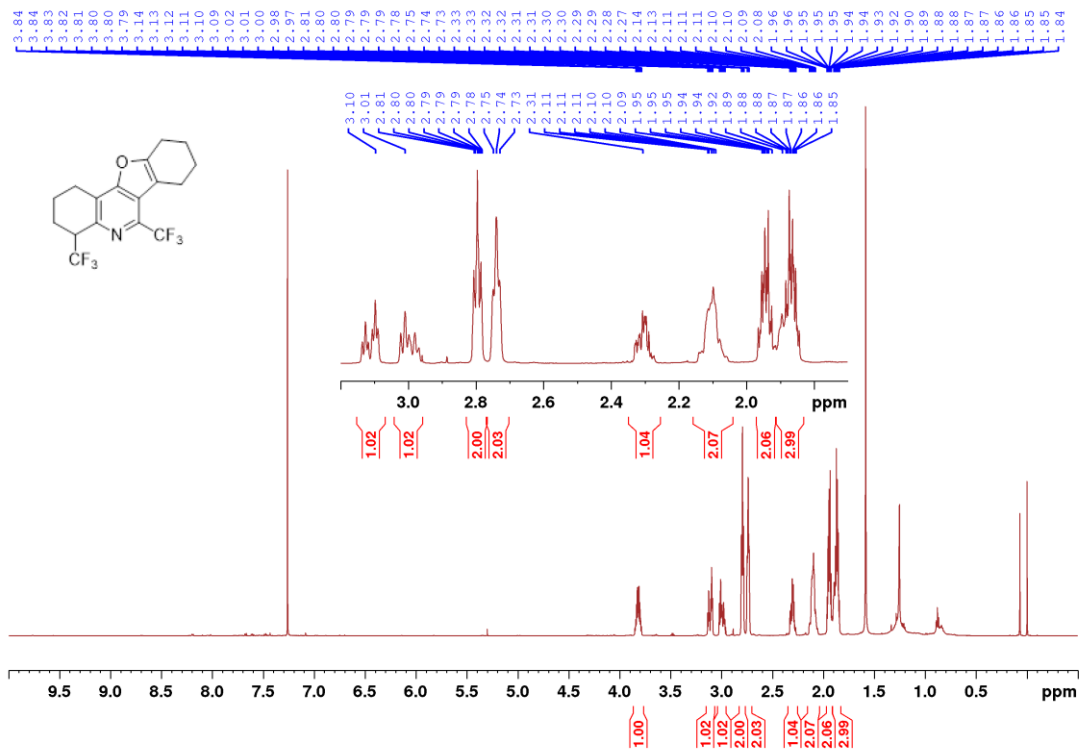
**1,2,3,4,6b,7,8,9,10,10a-Decahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 600 MHz, $CDCl_3$ (7a)**



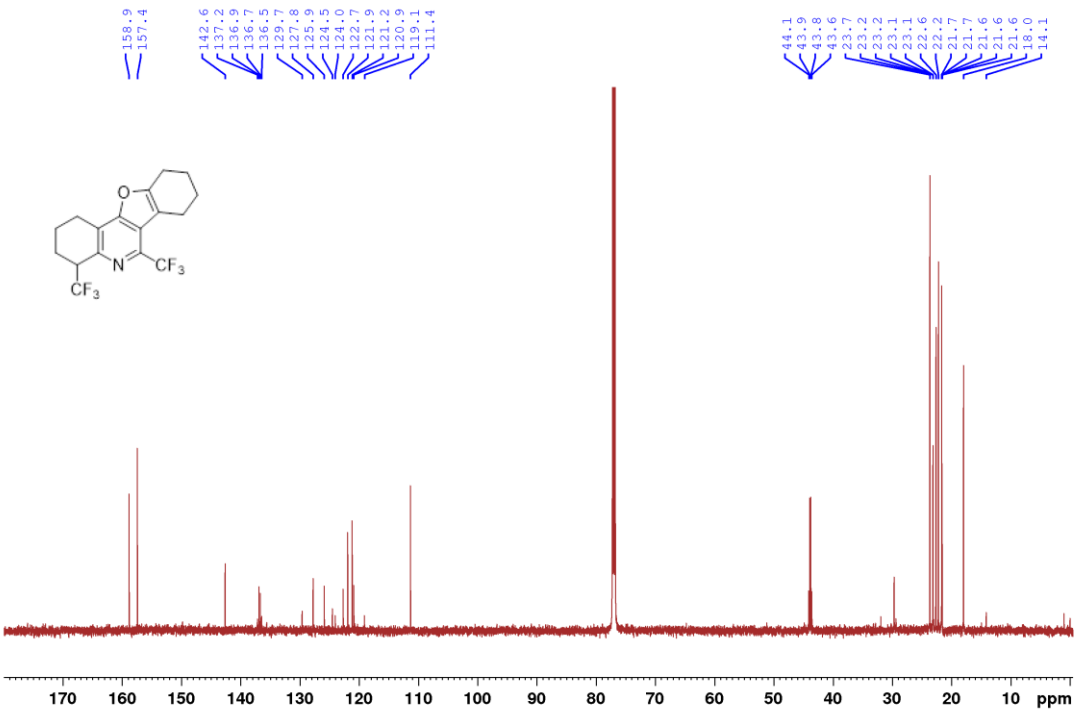
**1,2,3,4,6b,7,8,9,10,10a-Decahydrobenzofuro[3,2-*c*]quinoline $^{13}$C NMR, 150 MHz, $CDCl_3$ (7a)**



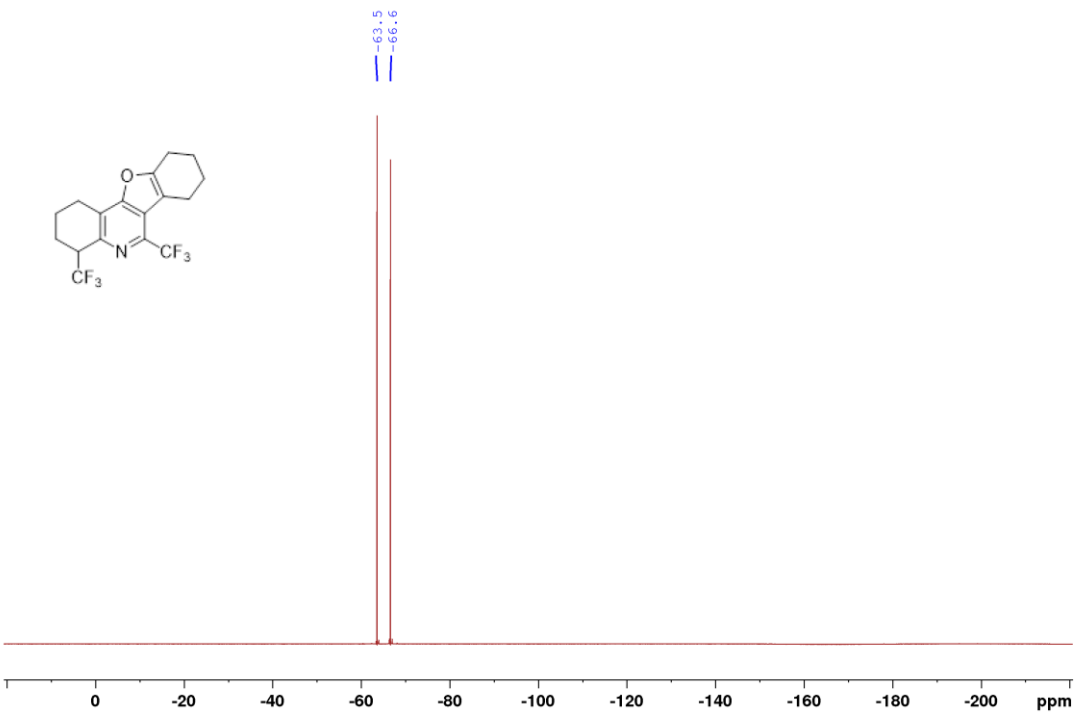

**4,6-Bis(trifluoromethyl)-1,2,3,4,6b,7,8,9,10,10a-decahydrobenzofuro[3,2-*c*]quinoline $^{1}$H NMR, 600 MHz, $CDCl_3$ (7b)**



**4,6-Bis(trifluoromethyl)-1,2,3,4,6b,7,8,9,10,10a-decahydrobenzofuro[3,2-*c*]quinoline $^{13}C$ NMR, 150 MHz, $CDCl_3$ (7b)**




**4,6-Bis(trifluoromethyl)-1,2,3,4,6b,7,8,9,10,10a-decahydrobenzofuro[3,2-*c*]quinoline $^{19}F$ NMR, 471 MHz, $CDCl_3$ (7b)**



X-Ray Crystalography Methods

Single crystals were obtained from a saturated solution of methanol or DCM by slow evaporation. A suitable crystal was selected on mounted on a **MITIGEN** holder with silicon oil. Data were collected using a ROD, Synergy Custom system, **HyPix** diffractometer equipped with an Oxford Cryosystems low temperature device operating at a steady temperature of *T* = 100(2) K. Data were measured using *w* scans with Cu $K_\alpha$/ Mo $K_\alpha$ radiation. The diffraction pattern was indexed and the total number of runs, and images was based on the strategy calculation from the program **CrysAlisPro** 1.171.41.93a (Rigaku OD, 2022). A multi-scan absorption correction was performed using CrysAlisPro 1.171.41.93a.[39] Empirical absorption correction using spherical harmonics, implemented in SCALE3 ABSPACK scaling algorithm. The absorption coefficient of these materials is obtained at $\lambda$ = 1.54184Å.

The structures were solved, and the space group determined by the **ShelXT**[40] structure solution program using dual methods and by using and by using **Olex2**[41] as the graphical interface. These models were refined by full matrix least squares minimisation on $F^2$ version 2016/6 of **ShelXL**.[42] All nonhydrogen atoms were refined anisotropically. Hydrogen atom positions were calculated geometrically and refined using the riding model.

*_exptl_absorpt_process_details*: CrysAlisPro 1.171.41.93a[39] using spherical harmonics, implemented in SCALE3 ABSPACK scaling algorithm.

**Crystal Data**

There is a single molecule in the asymmetric unit for compounds **2a, 2m** and **6b** which is represented by the reported sum formula. In other words: Z is 4 and Z' is 1.

There is a single molecule in the asymmetric unit for compounds **2n,** which is represented by the

reported sum formula. In other words: Z is 2 and Z' is 1.

For compound **2b** and **2o,** the value of Z' is 4. This means that there are four independent molecules in the asymmetric unit.

For **6a,** the value of Z is 2 and the value of Z’ is 0.5. This means that only half of the formula unit is present in the asymmetric unit, with the other half consisting of symmetry equivalent atoms.

**CCDC**

X-ray crystallographic data for compounds **2a** [CCDC 2115483], **2b** [CCDC 2288736], **2m** [CCDC 2304121], **2n** [CCDC 2267614], **2o** [CCDC 2288587], **6a** [CCDC 2298734], **6b** [CCDC 2267627].

## Table 3S: X-ray-crystallographic data

| **Compound** | **2a** | **2b** | **2m** | **2n** | **2o** | **6a** | **6b** |
|---|---|---|---|---|---|---|---|
| **Formula** | $C_{15}H_{13}NO$ | $C_{22}H_{19}NO$ | $C_{15}H_{12}FNO$ | $C_{15}H_{12}FNO$ | $C_{16}H_{12}F_3NO_2$ | $C_{30}H_{30}N_4O_3$ | $C_{17}H_{16}N_2O_2$ |
| **Moity Formula** | - | - | - | - | - | $2(C_{15}H_{14}N_2O)$, $H_2O$ | - |
| $D_{calc.}$**/ g cm$^{-3}$** | 1.391 | 1.299 | 1.470 | 1.448 | 1.516 | 1.362 | 1.381 |
| ***m*/mm$^{-1}$** | 0.087 | 0.079 | 0.104 | 0.102 | 0.128 | 0.089 | 0.740 |
| **Formula Weight** | 223.26 | 313.38 | 241.26 | 241.26 | 307.27 | 494.58 | 280.32 |
| **Colour** | clear colourless | clear colourless | clear light yellow | clear colourless | clear colourless | Clear colourless | clear colourless |
| **Shape** | block-shaped | block-shaped | prism-shaped | prism-shaped | plate-shaped | plate shaped | plate-shaped |
| **Size/mm$^3$** | 0.24×0.07×0.07 | 0.32×0.27×0.21 | 0.39×0.33×0.18 | 0.34×0.25×0.08 | 0.31×0.16×0.05 | 0.25×0.12×0.08 | 0.35×0.08×0.05 |
| ***T*/K** | 100(2) | 100(2) | 100(2) | 100.00(10) | 100(2) | 100(2) | 100(2) |
| **Crystal System** | monoclinic | monoclinic | monoclinic | triclinic | triclinic | orthorhombic | orthorhombic |
| **Flack Parameter** | - | 0.16(18) | - | - | - | -0.2(3) | -0.02(11) |
| **Hooft Parameter** | - | 0.12(17) | - | - | - | -0.1(3) | 0.04(8) |
| **Space Group** | $P2_1/n$ | $Cc$ | $P2_1/n$ | $P$-1 | $P$-1 | $P2_12_12$ | $Pca2_1$ |
| ***a*/Å** | 6.3620(2) | 18.4541(3) | 6.47150(10) | 6.4065(2) | 8.31680(10) | 19.8325(5) | 16.0017(2) |
| ***b*/Å** | 13.7876(4) | 10.4924(2) | 13.8628(2) | 8.1840(2) | 12.97700(10) | 12.1409(3) | 9.58830(10) |
| ***c*/Å** | 12.2250(3) | 33.1638(5) | 12.2344(2) | 11.1469(4) | 25.7022(3) | 5.00950(10) | 8.78600(10) |
| ***a*/°** | 90 | 90 | 90 | 80.146(2) | 92.3890(10) | 90 | 90 |
| ***b*/°** | 96.314(2) | 93.1390(10) | 96.8270(10) | 73.974(3) | 93.2610(10) | 90 | 90 |
| ***g*/°** | 90 | 90 | 90 | 86.980(2) | 103.1990(10) | 90 | 90 |
| **V/Å$^3$** | 1065.83(5) | 6411.80(19) | 1089.80(3) | 553.43(3) | 2692.04(5) | 1206.21(5) | 1348.03(3) |
| ***Z*** | 4 | 16 | 4 | 2 | 8 | 2 | 4 |
| ***Z'*** | 1 | 4 | 1 | 1 | 4 | 0.5 | 1 |
| **Wavelength/Å** | 0.71073 | 0.71073 | 0.71073 | 0.71073 | 0.71073 | 0.71073 | 1.54184 |
| **Radiation type** | Mo $K_\alpha$ | Mo $K_\alpha$ | Mo $K_\alpha$ | Mo $K_\alpha$ | Mo $K_\alpha$ | Mo $K_\alpha$ | Cu $K_\alpha$ |
| $Q_{min}$**/°** | 2.234 | 2.211 | 2.229 | 1.927 | 1.839 | 1.967 | 4.612 |
| $Q_{max}$**/°** | 28.497 | 30.491 | 33.624 | 28.494 | 36.209 | 32.271 | 76.799 |
| **Measured Refl's.** | 16387 | 70366 | 35257 | 44256 | 222974 | 17067 | 12298 |
| **Indep't Refl's** | 2708 | 16238 | 3981 | 2798 | 24401 | 3691 | 2201 |
| **Refl's I≥2 *s*(I)** | 2375 | 15124 | 3679 | 2519 | 16973 | 3493 | 2165 |
| $R_{int}$ | 0.0483 | 0.0207 | 0.0218 | 0.0825 | 0.0524 | 0.0250 | 0.0250 |
| **Parameters** | 154 | 901 | 163 | 163 | 800 | 180 | 195 |
| **Restraints** | 0 | 40 | 0 | 0 | 5 | 0 | 1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Largest Peak** | 0.357 | 0.654 | 0.525 | 0.359 | 0.615 | 0.347 | 0.167 |
| **Deepest Hole** | -0.236 | -0.403 | -0.238 | -0.243 | -0.335 | -0.183 | -0.188 |
| **GooF** | 1.071 | 1.020 | 1.082 | 1.089 | 1.016 | 1.035 | 1.036 |
| ***wR*$_2$ (all data)** | 0.1069 | 0.1163 | 0.1024 | 0.1159 | 0.1396 | 0.0884 | 0.0709 |
| ***wR*$_2$** | 0.1038 | 0.1140 | 0.1006 | 0.1128 | 0.1245 | 0.0868 | 0.0706 |
| ***R*$_1$ (all data)** | 0.0435 | 0.0485 | 0.0367 | 0.0444 | 0.0809 | 0.0346 | 0.0273 |
| ***R*$_1$** | 0.0385 | 0.0446 | 0.0346 | 0.0407 | 0.0490 | 0.0327 | 0.0268 |

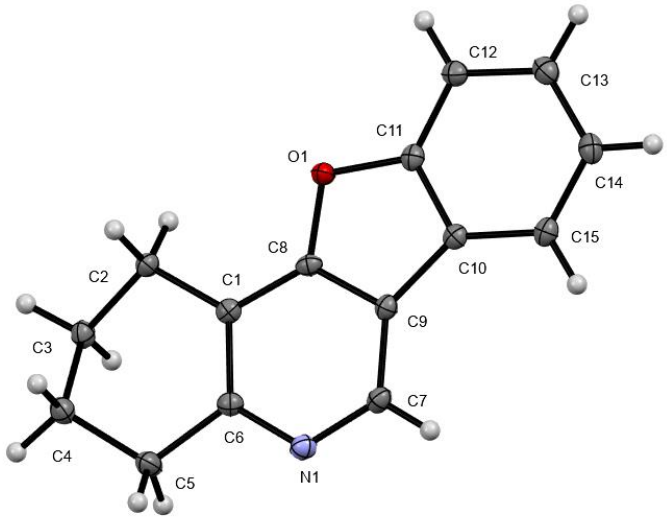



**Figure 3S**: Thermal ellipsoid of compound **2a** drawn at the 50% probability level

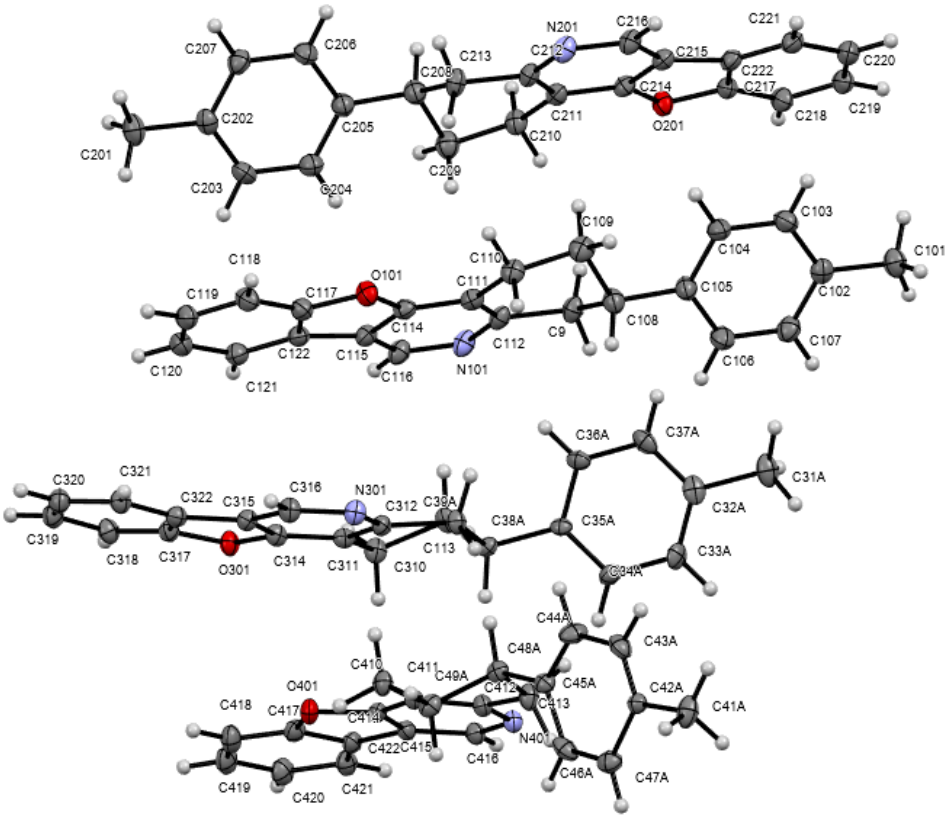



**Figure 4S**: Thermal ellipsoids of compound **2b** drawn at the 50% probability level

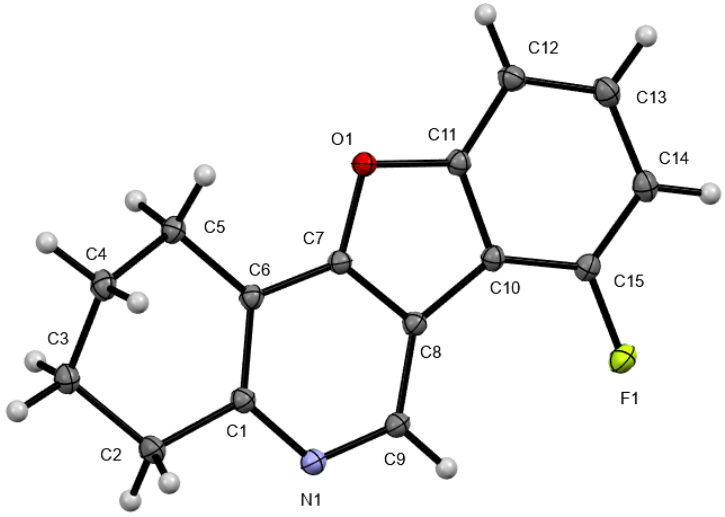



**Figure 5S**: Thermal ellipsoids of compound **2m** drawn at the 50% probability level

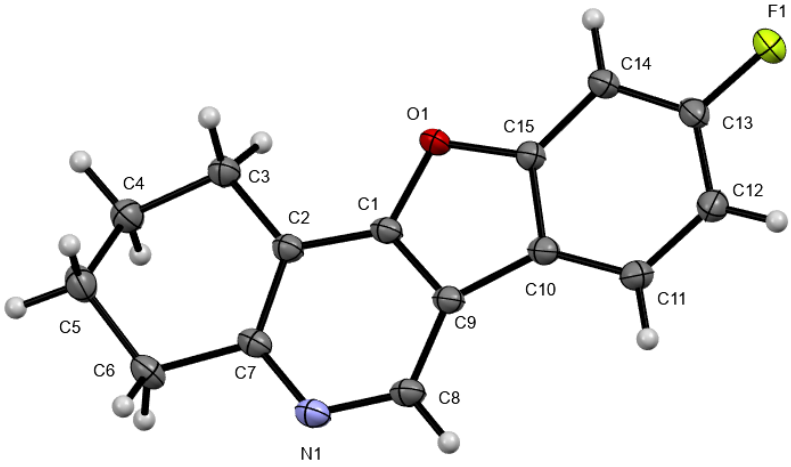



**Figure 6S**: Thermal ellipsoid of compound **2n** drawn at the 50% probability level

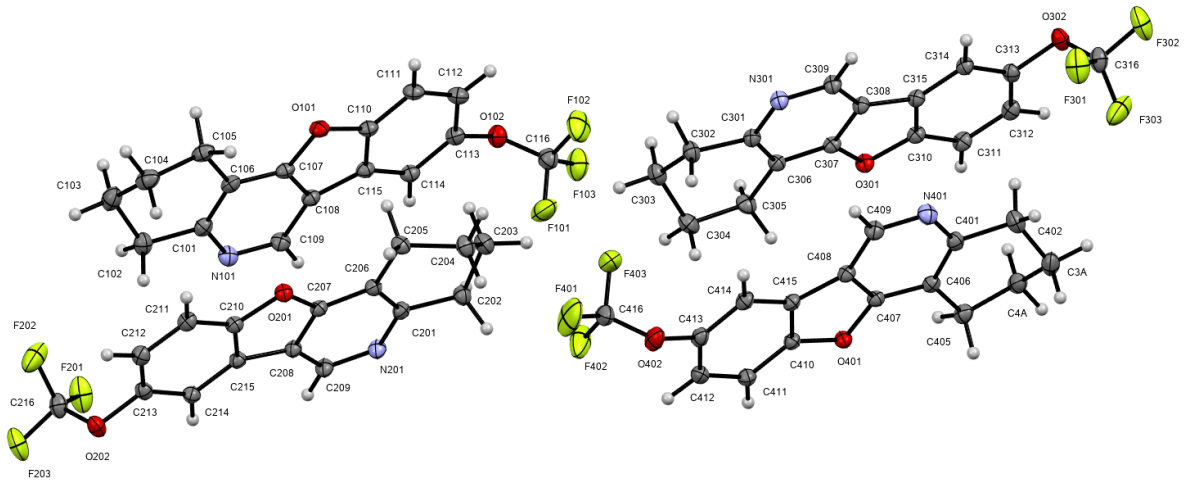



**Figure 7S**: Thermal ellipsoids of compound **2o** drawn at the 50% probability level

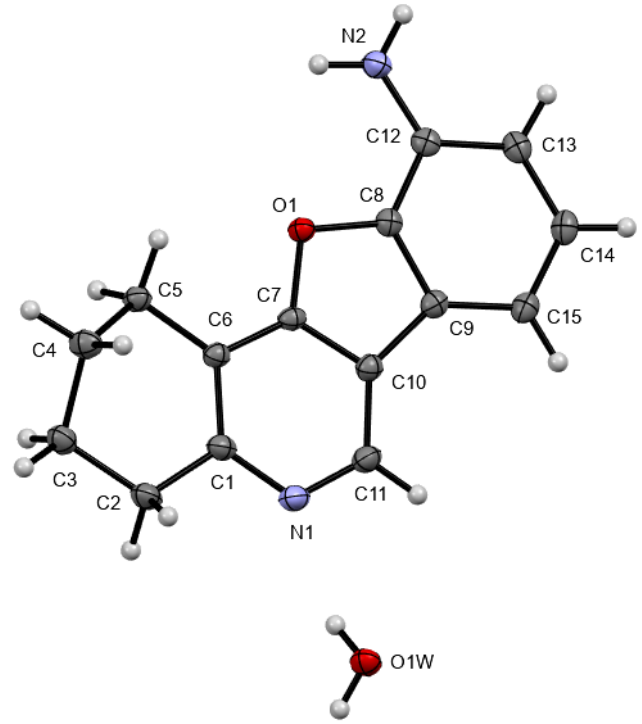



**Figure 8S**: Thermal ellipsoid of compound **6a** drawn at the 50% probability level

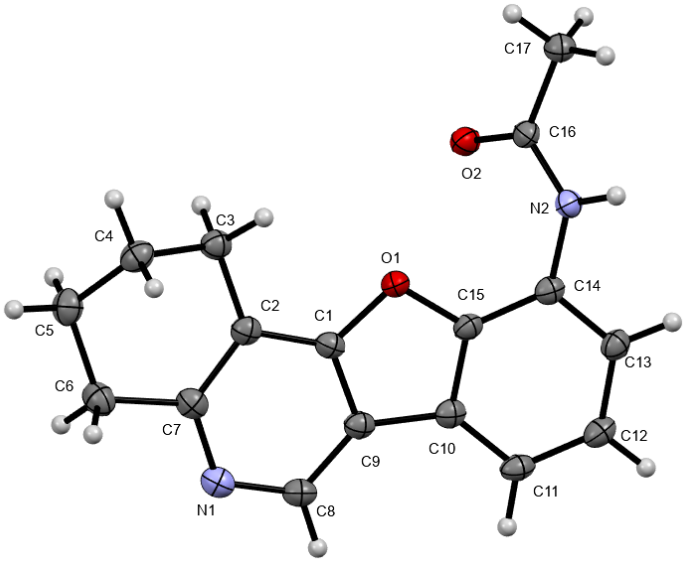



**Figure 9S**: Thermal ellipsoid of compound **6b** drawn at the 50% probability level

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