Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Supporting information

Palladium-Catalyzed Three-Component Carbonylative Synthesis of 2-(Trifluoromethyl)quinazolin-4(3*H*)-ones from Trifluoroacetimidoyl Chlorides and Amines

Zhengkai Chen,[a] Le-Cheng Wang,[a] Jiajun Zhang,[a] Xiao-Feng Wu*[a,b]

a. Department of Chemistry, Zhejiang Sci-Tech University, Hangzhou 310018, China

b. Leibniz-Institut für Katalyse e. V. an der Universität Rostock, Albert-Einstein-Straβe 29a, 18059 Rostock, Germany

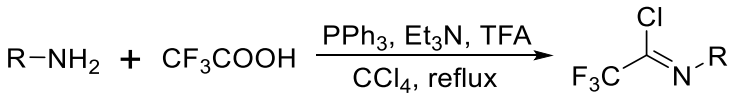
E-mail: *xiao-feng.wu@catalysis.de*

Contents

1. General Information

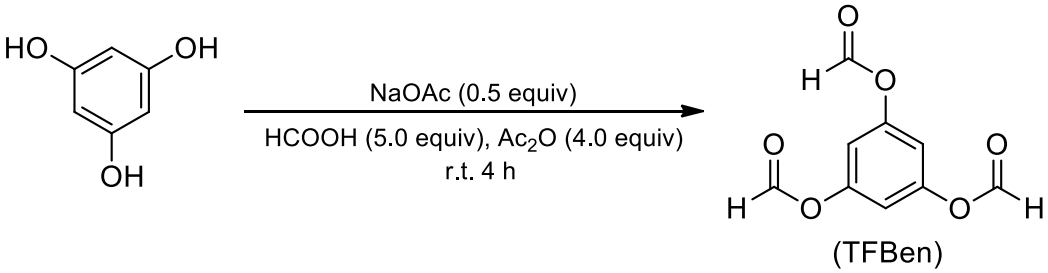
Unless otherwise noted, all reactions were carried out under air atmosphere. All reagents were from commercial sources and used as received without further purification. All solvents were dried by standard techniques and distilled prior to use. Column chromatography was performed on silica gel (200-300 meshes) using petroleum ether (bp. 60~90 °C) and ethyl acetate as eluent. ^{1}NMR spectra were recorded on a Bruker Avance operating at for ^{1}H NMR at 400 MHz, ^{13}C NMR at 100 MHz and ^{19}F NMR at 377 MHz and spectral data were reported in ppm relative to tetramethylsilane (TMS) as internal standard and $CDCl_3$ (^{1}H NMR δ 7.26, ^{13}C NMR δ 77.16), DMSO - D_6 (^{1}H NMR δ 2.50, ^{13}C NMR δ 39.52) as solvent. All coupling constants (*J*) are reported in Hz. The following abbreviations were used to describe peak splitting patterns when appropriate: s = singlet, d = doublet, dd = double doublet, ddd = double doublet of doublets, t = triplet, dt = double triplet, q = quatriplet, m = multiplet, br = broad. Gas chromatography (GC) analyses were performed on a Shimadzu GC-2014C chromatograph equipped with a FID detector. Mass spectra (MS) were measured on spectrometer by direct inlet at 70 eV. Mass spectroscopy data of the products were collected on an HRMS-TOF instrument or Waters TOFMS GCT Premier using EI or ESI ionization. Melting points were measured with WRR digital point apparatus and not corrected.

1.1 **Preparation of Fluorinated Imidoyl Chlorides**[1]



A 200 mL two-necked flask equipped with a septum cap, a condenser, and a Teflon coated magnetic stir bar was charged with PPh_3 (34.5 g, 132 mmol), Et_3N (7.3 mL, 53 mmol), CCl_4 (21.1 mL, 220 mmol), and TFA (3.4 mL, 44 mmol). After the solution was stirred for about 10 min (ice bath), amine (53 mmol) dissolved in CCl_4 (21.1 mL, 220 mmol) was added. The mixture was then refluxed under stirring (3 h). After the reaction was completed, residual solid Ph_3PO, PPh_3 and Et_3N-HC1 were washed with hexane several times. Then the hexane was filtered and concentrated under vacuum. The crude product was purified by column chromatography on silica gel or neutral alumina to afford the corresponding trifluoroacetimidoyl chloride product.

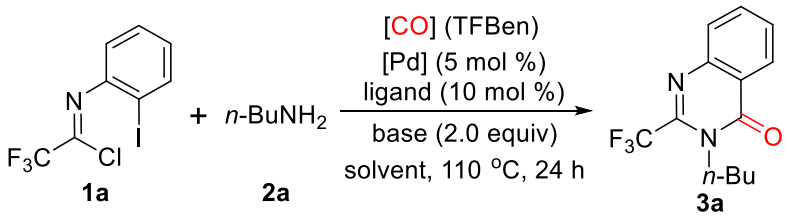
1.2 **Preparation of TFBen**[2]



Formic acid (8.4 mL, 222.8 mmol, 5.0 equiv.) was added to acetic anhydride (16.8 mL, 178.2 mmol, 4.0 equiv.) at rt. The mixture was stirred at 60 °C for 1 h and cooled to rt. The resulting solution was poured into a flask containing 1,3,5-trihydroxybenzene (5.62 g, 44.6 mmol, 1.0 equiv.) and NaOAc (1.83 g, 22.3 mmol, 0.5 equiv.). The mixture was stirred for 4 h in a water bath and then diluted with toluene (100 mL), washed with H_2O (50 mL) twice. The organic phase was kept in fridge (2-8 °C) overnight, then filtered and dried in vacuo to afford the desired product benzene-1,3,5-triyl triformate (TFBen) (5.1 g, 55%) as a white solid.

2. Experimental Procedures

2.1 Optimization of the Reaction Conditions



2.1.1 Screening of Catalysts[a]

Entry	Cat.	Yield (%)[b]
1	$Pd(OAc)_2$	29
2	$Pd(PPh_3)_2Cl_2$	69
3	$Pd(PPh_3)_4$	71
4	$Pd(CH_3CN)_2Cl_2$	91
5	$PdCl_2$	73
6	**$Pd(TFA)_2$**	**95**

[a]Reaction conditions: **1a** (0.20 mmol), **2a** (0.50 mmol, 2.5 equiv), [M] (5 mol%), PPh_3 (10

mol%), Na_2CO_3 (0.40 mmol, 2.0 equiv), TFBen (1.0 mmol, 5.0 equiv), THF (2.0 mL), 110 °C, 24 h. [b]Yields determined by GC analysis using dodecane as an internal standard.

2.1.2 Screening of Ligands[a]

Entry	Ligand	Yield (%)[b]
1	Tris(p-methoxyphenyl)phosphine	13
2	Tris(4-fluorophenyl)phosphine	82
3	Xphos	41
4	DPPP	94
5	DPPF	87
6	Xantphos	90

[a]Reaction conditions: **1a** (0.20 mmol), **2a** (0.50 mmol, 2.5 equiv), $Pd(TFA)_2$ (5 mol%), ligand (10 mol%), Na_2CO_3 (0.40 mmol, 2.0 equiv), TFBen (1.0 mmol, 5.0 equiv), THF (2.0 mL), 110 °C, 24 h. [b]Yields determined by GC analysis using dodecane as an internal standard.

2.1.3 Screening of Solvents[a]

Entry	Solvent	Yield (%)[b]
1	THF	95
2	**1,4-dioxane**	**97 (95)[c]**
3	CH_3CN	88
4	toluene	82
5	DMF	85

[a]Reaction conditions: **1a** (0.20 mmol), **2a** (0.50 mmol, 2.5 equiv), $Pd(TFA)_2$ (5 mol%), PPh_3 (10 mol%), Na_2CO_3 (0.40 mmol, 2.0 equiv), TFBen (1.0 mmol, 5.0 equiv), solvent (2.0 mL), 110 °C, 24 h. [b]Yields determined by GC analysis using dodecane as an internal standard. [c]Isolated yield.

2.1.4 Screening of Bases[a]

Entry	Base	Yield (%)[b]
1	$NaHCO_3$	94
2	K_2CO_3	93
3	NaOAc	95

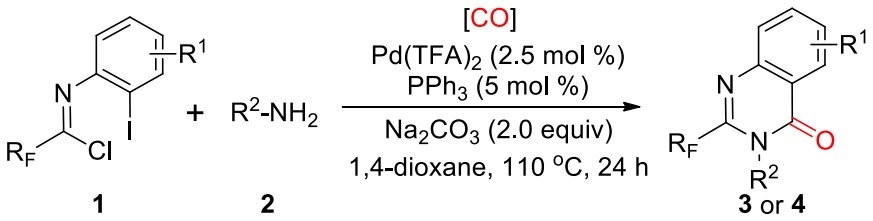
[a]Reaction conditions: **1a** (0.20 mmol), **2a** (0.50 mmol, 2.5 equiv), $Pd(TFA)_2$ (5 mol%), PPh_3 (10 mol%), base (0.40 mmol, 2.0 equiv), TFBen (1.0 mmol, 5.0 equiv), 1,4-dioxane (2.0 mL), 110 °C, 24 h. [b]Yields determined by GC analysis using dodecane as an internal standard.

2.1.5 Screening the amount of $Pd(TFA)_2$ and PPh_3.[a]

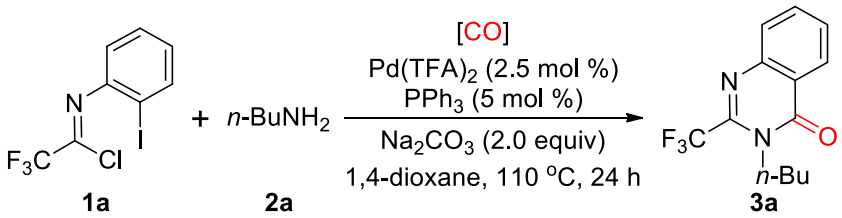
Entry	$Pd(TFA)_2$	PPh_3	Yield (%)[b]
1	**2.5 mol%**	**5 mol%**	**99 (98)[c]**

[a]Reaction conditions: **1a** (0.20 mmol), **2a** (0.50 mmol, 2.5 equiv), $Pd(TFA)_2$ (2.5 mol%), PPh_3 (5 mol%), Na_2CO_3 (0.40 mmol, 2.0 equiv), TFBen (1.0 mmol, 5.0 equiv), 1,4-dioxane (2.0 mL), 110 °C, 24 h. [b]Yields determined by GC analysis using dodecane as an internal standard. [c]Isolated yield.

2.2 General Procedure for the Synthesis of 3/4

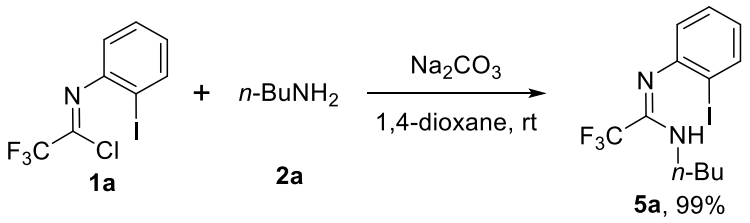


Under N_2 atmosphere, $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.2 mg, 0.4 mmol, 2.0 eq), and a 2.5 mL vial containing TFBen (210.0 mg, 1.0 mmol, 5.0 equiv), **1** (0.2 mmol, 1.0 equiv), **2** (0.5 mmol, 2.5 equiv), 1,4-dioxane (2.0 mL) (extra dry) were added to an oven-dried 15 mL *In-Ex* tube. Then the tube was sealed and the mixture was stirred at 110 °C (oil bath) for 24 h. After the reaction was completed, the mixture was slowly cooled to room temperature, the reaction mixture was filtered and concentrated under vacuum. The residue was purified by column chromatography on silica gel (Petroleum Ether/EtOAc) to yield the product **3** or **4**.



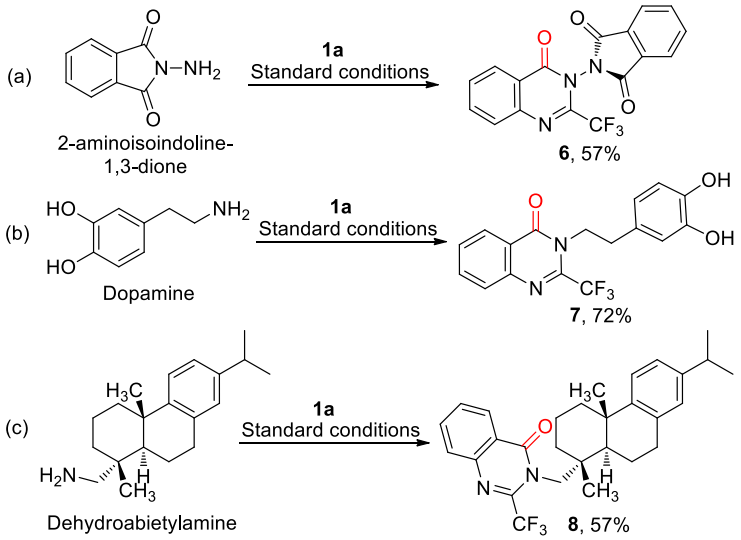
Scale-up reaction: Under N_2 atmosphere, $Pd(TFA)_2$ (8.5 mg, 0.025 mmol, 2.5 mol %), PPh_3 (13.0 mg, 005 mmol, 5 mol%), Na_2CO_3 (211 mg, 2.0 mmol, 2.0 eq), and a 2.5 mL vial containing TFBen (420.0 mg, 2.0 mmol, 2.0 equiv), **1a** (1.0 mmol, 335.0 mg 1.0 equiv), **2a** (2.5 mmol, 190.0 mg, 2.5 equiv), 1,4-dioxane (4.0 mL) (extra dry) were added to an oven-dried 15 mL *In-Ex* tube. Then the tube was sealed and the mixture was stirred at 110 °C (oil bath) for 24 h. After the reaction was completed, the mixture was slowly cooled to room temperature, the reaction mixture was filtered and concentrated under vacuum. The residue was purified by column chromatography on silica gel (Petroleum Ether/EtOAc) to yield the product **3** or **4**.

2.3 General Procedure for the Synthesis of 5a



Under air atmosphere, Na_2CO_3 (211 mg, 2.0 mmol, 2.0 eq.), **1a** (333.0 mg, 1.0 mmol, 1.0 eq.), **2a** (182.5 mg, 2.5 mmol, 2.5 eq.), 1,4-dioxane (10.0 mL) (extra dry) were added to a 50 mL round-bottomed flask. Then the tube was sealed and the mixture was stirred at rt. for 2 h. After the reaction was completed, the mixture was slowly cooled to room temperature. After the reaction was completed, the reaction mixture was filtered and concentrated under vacuum. The residue was purified by column chromatography on silica gel (Petroleum Ether/EtOAc) to yield the product **5a** as a yellow solid in 99% yield.

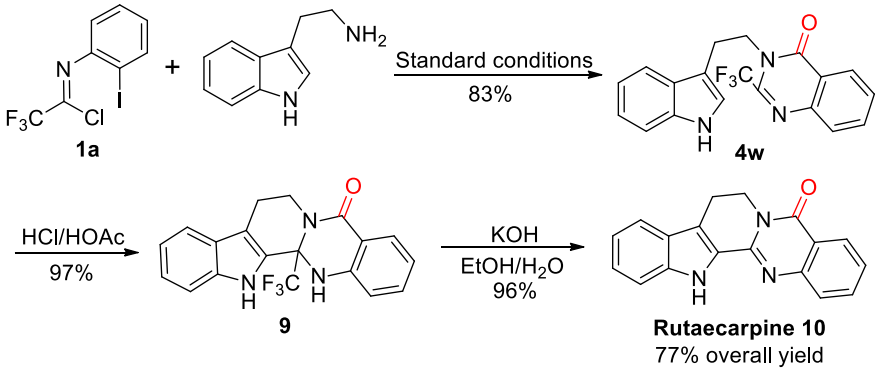
2.4 Late-stage Modification of Natural Complex Molecules



Under N_2 atmosphere, $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.2 mg, 0.4 mmol, 2.0 eq), and a 2.5 mL vial containing TFBen (210.0 mg, 1.0 mmol, 5.0 equiv), **1a** (0.2 mmol, 1.0 equiv), amine (0.24 mmol, 1.2 equiv), 1,4-dioxane (2.0 mL) (extra dry) were added to an oven-dried 15 mL *In-Ex* tube. Then the tube was sealed and the mixture was stirred at 110 °C (oil bath) for 24 h. After the reaction was completed, the mixture was slowly cooled to room temperature, the reaction mixture was filtered and concentrated under vacuum. The

residue was purified by column chromatography on silica gel (Petroleum Ether/EtOAc) to yield the product **6, 7** and **8** in 57%, 72% and 57% yields, respectively.

2.5 Synthetic Application for the Synthesis of Bioactive Molecule Rutaecarpine

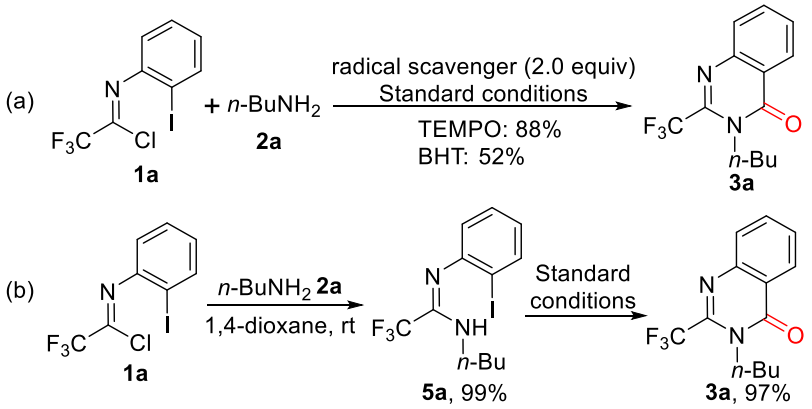


Under N_2 atmosphere, $Pd(TFA)_2$ (8.5 mg, 0.025 mmol, 2.5 mol %), PPh_3 (13.0 mg, 0.05 mmol, 5 mol%), Na_2CO_3 (211.0 mg, 2.0 mmol, 2.0 eq), and a 2.5 mL vial containing TFBen (420.0 mg, 1.0 mmol, 2.0 equiv), **1a** (333.0 mg, 1.0 mmol, 1.0 equiv), tryptamine (192.0 mg, 1.2 mmol, 1.2 equiv), 1,4-dioxane (4.0 mL) (extra dry) were added to an oven-dried 15 mL *In-Ex* tube. Then the tube was sealed and the mixture was stirred at 110 °C (oil bath) for 24 h. After the reaction was completed, the mixture was slowly cooled to room temperature, the reaction mixture was filtered and concentrated under vacuum. The residue was purified by column chromatography on silica gel (Petroleum Ether/EtOAc) to yield the product **4w** in 83% yield**.**

Compound **4w** (357.0 mg, 1.0 mmol, 1.0 eq.) was refluxed in a mixture of acetic acid (3.0 mL) and hydrochloric acid (0.5 mL) for 30 min. The resulting mixture was diluted with water (20 mL) and the solid collected, washed with water, and dried to directly give the product **9** in 97% yield (346.3 mg).

Compound **9** (357.0 mg, 1.0 mmol, 1.0 eq.) was added to a hot well-stirred solution of KOH (297.0 mg, 3.5 mmol, 3.5 equiv) in ethanol (5.0 mL) and water (1.5 mL). The starting material gradually went into solution, and after 10 min a clear solution was obtained from which suddenly rutaecarpine appeared as needles. The reflux was continued for 15 minutes, then the mixture was cooled and the crystals were collected, washed, and dried to directly give the product **10** in 96% yield (275.5 mg).

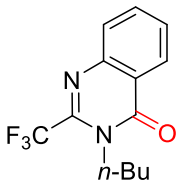
3 The Mechanistic Investigations



Eq a: Under N_2 atmosphere, $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 001 mmol, 5 mol%), Na_2CO_3 (42.2 mg, 0.4 mmol, 2.0 eq), and a 2.5 mL vial containing TFBen (210.0 mg, 1.0 mmol, 5.0 equiv), **1a** (0.2 mmol, 66.6 mg, 1.0 equiv), **2a** (36.5 mg, 0.5 mmol, 2.5 equiv), TEMPO (62.5 mg, 0.4 mmol, 2.0 eq.) or BHT (88.1mg, 0.4 mmol, 2.0 eq.), 1,4-dioxane (2 mL) (extra dry) were added to an oven-dried 15 mL *In-Ex* tube. Then the tube was sealed and the mixture was stirred at 110 °C (oil bath) for 24 h. After the reaction was completed, the mixture was slowly cooled to room temperature. After the reaction was completed, the reaction mixture was filtered and concentrated under vacuum. The residue was purified by column chromatography on silica gel (Petroleum Ether/EtOAc) to yield the product **3a** as yellow oil in 88% (TEMPO) and 52% (BHT) yield.

Eq b: Under air atmosphere, **5a** (74.0 mg, 0.2 mmol, 1.0 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 001 mmol, 5 mol%), Na_2CO_3 (42.2 mg, 0.4 mmol, 2.0 eq), and a 2.5 mL vial containing TFBen (210.0 mg, 1.0 mmol, 5.0 equiv), 1,4-dioxane (2 mL) (extra dry) were added to an oven-dried 15 mL *In-Ex* tube. Then the tube was sealed and the mixture was stirred at 110 °C (oil bath) for 24h. After the reaction was completed, the product **3a** was observed in 97% yield. (Yields determined by GC analysis using dodecane as an internal standard).

4 Characterization Data of the Corresponding Products



3-Butyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3a**)

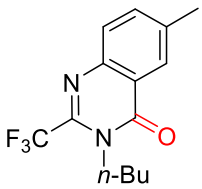
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3a** as a yellow oil (52.9 mg, 98%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 7.9 Hz, 1H), 7.89 - 7.77 (m, 2H), 7.62 - 7.58 (m, 1H), 4.12 (t, *J* = 8.1 Hz, 2H), 1.90 - 1.65 (m, 2H), 1.58 - 1.38 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.4, 145.1, 142.2 (q, $J_{(C-F)}$ = 35.6 Hz), 134.8, 129.2, 128.4, 127.0, 121.9, 118.3 (q, $J_{(C-F)}$ = 276.9 Hz), 45.2, 30.7, 20.2, 13.5.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{14}F_3N_2O^+$, 271.1053, found 271.1060.



3-Butyl-6-methyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3b**)

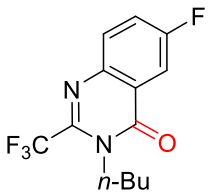
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1b** (69.4 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3b** as a yellow oil. (49.4 mg, 87%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.69 (d, *J* = 8.3 Hz, 1H), 7.62 (d, *J* = 8.3 Hz, 1H), 4.11 (t, *J* = 8.1, 2H), 2.51 (s, 3H), 1.72 (m, 2H), 1.59 - 1.36 (m, 2H), 0.97 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.4, 143.0, 141.5 (q, $J_{(C-F)}$ = 35.3 Hz), 139.8, 136.2, 128.2, 126.4, 121.6, 118.4 (q, $J_{(C-F)}$ = 276.8 Hz), 45.2, 30.7, 21.5, 20.2, 13.6.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.7.

HRMS (ESI): [M+H]+ calcd. for $C_{14}H_{16}F_3N_2O^+$, 285.1209, found 285.1222.



3-Butyl-6-fluoro-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3c**)

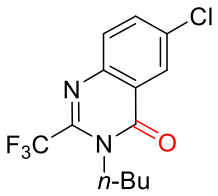
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1c** (70.2 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.3) to give the titled product **3c** as a yellow oil. (55.3 mg, 96%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 - 7.88 (m, 1H), 7.8. -7.80 (m, 1H), 7.55 - 7.50 (m, 1H), 4.11 (t, *J* = 8.1 Hz, 2H), 1.73 (m, 2H), 1.62 - 1.32 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.4 (d, $J_{(C-F)}$ = 252.1 Hz), 161.2, 160.9, 141.8, 131.2 (d, $J_{(C-F)}$ = 8.5 Hz), 123.6, 123.6 (d, $J_{(C-F)}$ = 24.2 Hz), 118.4 (q, $J_{(C-F)}$ = 276.8 Hz), 112.2 (d, $J_{(C-F)}$ = 24.0 Hz), 45.6, 30.7, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8, -108.5.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{13}F_4N_2O^+$, 289.0959, found 289.0970.



3-Butyl-6-chloro-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3d**)

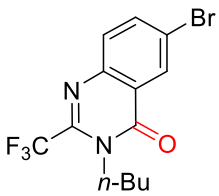
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1d** (73.4 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.3) to give the titled product **3d** as a yellow oil. (56.6 mg, 93%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.25 (s, 1H), 7.74 (d, *J* = 1.3 Hz, 2H), 4.11 (t, *J* = 8.1 Hz, 2H), 2.08 - 1.63 (m, 2H), 1.59 - 1.36 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 160.5, 143.7, 142.6 (q, $J_{(C-F)}$ = 35.8 Hz), 135.4, 130.2, 126.6, 123.1, 118.3 (q, $J_{(C-F)}$ = 277.0 Hz), 45.6, 30.7, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{13}ClF_3N_2O^+$, 305.0663, found 305.0671.



6-Bromo-3-butyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3e**)

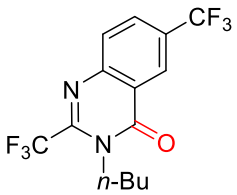
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1e** (82.2 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3e** as a yellow oil. (61.2 mg, 88%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.44 (s, 1H), 7.90 (d, *J* = 2.3 Hz, 1H), 7.68 (d, *J* = 8.7 Hz, 1H), 4.12 (t, *J* = 8.1 Hz, 2H), 1.76 - 1.69 (m, 2H), 1.58 - 1.38 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 160.4, 144.0, 142.7 (q, $J_{(C-F)}$ = 35.8 Hz), 138.2, 130.3, 129.8, 123.3, 118.4 (q, $J_{(C-F)}$ = 277.0 Hz), 45.7, 45.6, 30.8, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{13}BrF_3N_2O^+$, 349.0158, found 349.0162.



3-Butyl-2,6-bis(trifluoromethyl)quinazolin-4(3*H*)-one (**3f**)

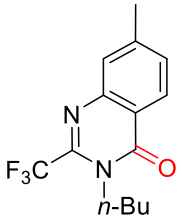
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1f** (80.2 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.3) to give the titled product **3f** as a yellow oil. (62.9 mg, 93%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.59 (s, 1H), 8.01 (d, *J* = 8.6 Hz, 1H), 7.92 (d, *J* = 8.5 Hz, 1H), 4.14 (t, *J* = 8.1 Hz, 2H), 1.74 (m, 2H), 1.55 - 1.34 (m, 2H), 0.99 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 160.8, 147.3, 144.3 (q, $J_{(C-F)}$ = 35.9 Hz), 133.9, 131.2 (q, $J_{(C-F)}$ = 33.6 Hz), 129.6, 125.1, 123.5 (q, $J_{(C-F)}$ = 272.8 Hz), 122.1, 118.3 (q, $J_{(C-F)}$ = 277.4 Hz), 45.7, 30.8, 20.3, 13.6.

^{19}F NMR (377 MHz, $CDCl_3$) δ -62.7, 66.0.

HRMS (ESI): [M+H]+ calcd. for $C_{14}H_{13}F_6N_2O^+$, 339.0927, found 339.0933.



3-Butyl-7-methyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3g**)

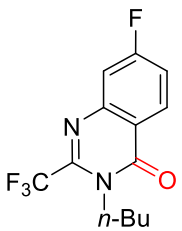
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1g** (69.4 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3g** as a yellow oil. (50.6 mg, 89%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.17 (d, *J* = 8.2 Hz, 1H), 7.58 (s, 1H), 7.40 (d, *J* = 7.4 Hz, 1H), 4.10 (t, *J* = 8.1 Hz, 2H), 2.50 (s, 3H),1.95 - 1.60 (m, 2H), 1.60 - 1.32 (m, 2H), 0.97 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.4, 146.1, 145.3, 142.4 (q, $J_{(C-F)}$ = 35.5 Hz), 130.8, 128.3, 126.9, 119.6,118.5 (q, $J_{(C-F)}$ = 277.0 Hz), 45.2, 30.9, 21.9, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

HRMS (ESI): [M+H]+ calcd. for $C_{14}H_{16}F_3N_2O^+$, 285.1209, found 285.1218.



3-Butyl-7-fluoro-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3h**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1h** (70.2 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via

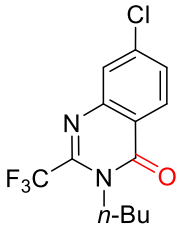
flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.3) to give the titled product **3h** as a yellow oil. (52.4 mg, 91%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.15 - 8.11 (m, 1H), 7.27 - 7.24 (m, 1H), 7.15 - 7.10 (m, 1H), 3.92 (t, *J* = 8.1 Hz, 2H), 1.57 - 1.49 (m, 2H), 1.45 - 1.19 (m, 2H), 0.78 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 166.7 (d, $J_{(C-F)}$ = 256.0 Hz), 160.8, 147.3 (d, $J_{(C-F)}$ = 13.2 Hz), 143.6 (q, $J_{(C-F)}$ = 35.7 Hz), 129.9 (d, $J_{(C-F)}$ = 10.1 Hz), 118.8, 118.3 (q, $J_{(C-F)}$ = 277.3 Hz), 118.2 (d, $J_{(C-F)}$ = 23.4 Hz), 114.0 (d, $J_{(C-F)}$ = 22 Hz), 45.5, 30.8, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.9, -101.8.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{13}F_4N_2O^+$, 289.0959, found 289.0967.



3-Butyl-7-chloro-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3i**)

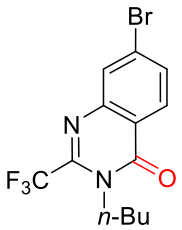
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1i** (73.4 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.3) to give the titled product **3i** as a yellow oil. (51.1 mg, 84%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 (s, 1H), 7.79 (d, *J* = 1.9 Hz, 1H), 7.53 (d, *J* = 8.6 Hz, 1H), 4.10 (t, *J* = 8.1 Hz, 2H), 1.89 - 1.61 (m, 2H), 1.59 - 1.37 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 160.9, 146.1, 143.5 (q, $J_{(C-F)}$ = 35.8 Hz), 141.3, 129.9, 128.5, 128.1, 120.4, 118.3 (q, $J_{(C-F)}$ = 277.3 Hz), 46.0, 30.8, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -66.0.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{13}ClF_3N_2O^+$, 305.0663, found 305.0670.



7-Bromo-3-butyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3j**)

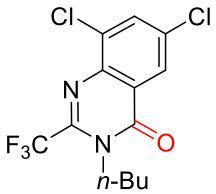
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1j** (82.2 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3j** as a yellow oil. (62.6 mg, 90%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.16 (s, 1H), 8.00 (d, *J* = 1.8 Hz, 1H), 7.71 (d, *J* = 8.5, 1H), 4.11 (t, *J* = 8.1 Hz, 2H), 1.77 - 1.69 (m, 2H), 1.57 - 1.37 (m, 2H), 0.98 (t, *J* = 7.4 Hz,3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.1, 146.1, 143.5 (q, $J_{(C-F)}$ = 36.1 Hz), 132.8, 131.3, 129.7, 128.5, 120.8, 118.3 (q, $J_{(C-F)}$ = 277.3 Hz), 45.5, 30.8, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.9.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{13}BrF_3N_2O^+$, 349.0158, found 349.0166.



3-Butyl-6,8-dichloro-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**3k**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1k** (80.2 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3k** as a white solid (55.4 mg, 82%).

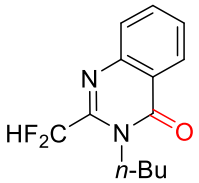
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.19 (s, 1H), 7.86 (s, 1H), 4.13 (t, *J* = 8.1 Hz, 2H), 1.82 - 1.63 (m, 2H), 1.59 - 1.33 (m, 2H), 0.99 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 160.1, 143.0 (q, $J_{(C-F)}$ = 36.3 Hz), 140.9, 135.3, 135.1, 134.6, 125.4, 124.2, 118.2 (q, $J_{(C-F)}$ = 277.4 Hz), 45.9, 30.7, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

M.p. 121 - 122 °C

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{12}Cl_2F_3N_2O^+$, 339.0273, found 339.0284.



3-Butyl-2-(difluoromethyl)quinazolin-4(3*H*)-one (**3l**)

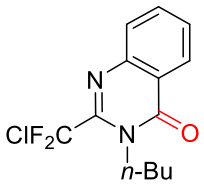
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1l** (63.0 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3l** as a yellow oil. (48.4 mg, 96%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.30 (d, *J* = 9.0 Hz, 1H), 7.78 (t, *J* = 6.9 Hz, 1H), 7.71 (d, *J* = 7.7 Hz, 1H), 7.56 (t, *J* = 8.0 Hz, 1H), 6.60 (t, *J* = 53.6 Hz, 1H), 4.18 (t, *J* = 8.1 Hz, 2H), 1.98 - 1.57 (m, 2H), 1.56 - 1.33 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.8, 146.8 (t, $J_{(C-F)}$ = 26.1 Hz), 146.1, 134.6, 128.8, 128.0, 127.0, 121.9, 114.8 (q, $J_{(C-F)}$ = 245.8 Hz), 44.4, 30.9, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -115.3, -115.4.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{15}F_2N_2O^+$, 253.1147, found 253.1156.



3-Butyl-2-(chlorodifluoromethyl)quinazolin-4(3*H*)-one (**3m**)

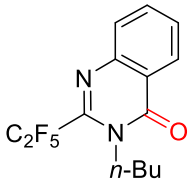
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1m** (70.0 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3m** as a yellow oil. (46.9 mg, 82%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.30 (d, *J* = 8.0 Hz, 1H), 7.99 - 7.67 (m, 2H), 7.60 - 7.56 (m, 1H), 4.21 (t, *J* = 8.1 Hz, 2H), 1.70 - 1.73 (m, 2H), 1.57 - 1.33 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.8, 145.6 (q, $J_{(C-F)}$ = 28.3 Hz), 145.1, 134.9, 129.2, 128.5, 127.1, 123.4, 120.5 (q, $J_{(C-F)}$ = 293.7 Hz), 45.7, 30.7, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -54.3.

HRMS (ESI): [M+H]+ calcd. for $C1_3H_{14}ClF_2N_2O^+$, 287.0757, found 287.0767.



3-Butyl-2-(perfluoroethyl)quinazolin-4(3*H*)-one (**3n**)

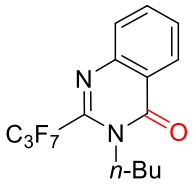
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1n** (76.6 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 m mol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3n** as a yellow oil. (55.7 mg, 87%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (d, *J* = 8.0 Hz, 1H), 7.81 (t, *J* = 8.1 Hz, 1H), 7.77 (d, *J* = 7.7 Hz, 1H), 7.61 (t, *J* = 7.3 Hz, 1H), 4.17 (t, *J* = 8.1 Hz, 2H), 1.98 - 1.65 (m, 2H), 1.58 - 1.36 (m, 2H), 0.99 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.5, 144.8, 142.0 (t, $J_{(C-F)}$ = 27.5 Hz) 134.6, 129.4, 128.5, 126.9, 122.0, 118.3 (qt, $J_{(C-F)}$ = 285.9 Hz, $J_{(C-F)}$ = 33.9 Hz), 111.0 (d, $J_{(C-F)}$ = 36.3 Hz), 44.9, 30.8, 20.2, 13.6.

^{19}F NMR (377 MHz, $CDCl_3$) δ -79.6, -109.8.

HRMS (ESI): [M+H]+ calcd. for $C_{14}H_{14}F_5N_2O^+$, 321.1021, found 321.1030.



3-Butyl-2-(perfluoropropyl)quinazolin-4(3*H*)-one (**3o**)

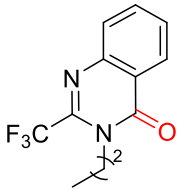
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1o** (86.6 mg, 0.2 mmol, 1.0 eq.), amine **2a** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 m mol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **3o** as a yellow oil. (62.2 mg, 84%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 7.7 Hz, 1H), 7.80 (t, *J* = 7.5 Hz, 1H), 7.76 (d, *J* = 7.2 Hz, 1H), 7.60 (t, *J* = 6.9 Hz, 1H), 4.15 (t, *J* = 8.1 Hz, 2H), 2.04 - 1.65 (m, 2H), 1.61 - 1.28 (m, 2H), 0.98 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6, 144.9, 142.4 (t, $J_{(C-F)}$ = 27.2 Hz), 142.1, 134.8, 129.5, 128.5, 127.1, 122.1, 118.2 (qt, $J_{(C-F)}$ = 19.6 Hz, $J_{(C-F)}$ = 33.8 Hz), 112.7 (q, $J_{(C-F)}$ = 276.3 Hz), 45.2, 31.1, 20.3, 13.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -77.7, -107.0, -121.9.

HRMS (ESI): [M+H]+ calcd. for $C_{15}H_{14}F_7N_2O^+$, 371.0989, found 371.1000.



3-Propyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4a**)

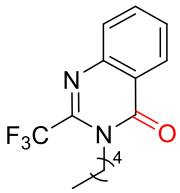
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2b** (29.6 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 m mol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4a** as a yellow oil. (50.7 mg, 99%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 7.9 Hz, 1H), 7.97 - 7.73 (m, 2H), 7.62 - 7.58 (m, 1H), 4.08 (t, *J* = 8.0 Hz, 2H), 2.22 - 1.57 (m, 2H), 1.02 (t, *J* = 7.4 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.5, 145.2, 142.4 (q, $J_{(C-F)}$ = 35.6 Hz), 134.9, 129.3, 128.6, 127.1, 122.0, 118.4 (q, $J_{(C-F)}$ = 277.0 Hz), 47.0, 22.2, 11.3.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

HRMS (ESI): [M+H]+ calcd. for $C_{12}H_{12}F_3N_2O^+$, 257.0896, found 257.0905.



3-Pentyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4b**)

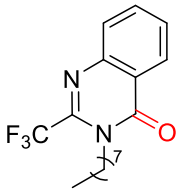
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2c** (44.0 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 m mol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4b** as a yellow oil. (56.3 mg, 99%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 8.2 Hz, 1H), 7.97 - 7.63 (m, 2H), 7.71 - 7.42 (m, 1H), 4.11 (t, *J* = 8.1 Hz, 2H), 1.77 - 1.72 (m, 2H), 1.55 - 1.25 (m, 4H), 0.92 (t, *J* = 7.0 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.5, 145.2, 142.4 (q, $J_{(C-F)}$ = 35.6 Hz), 134.9, 129.3, 128.6, 127.1, 122.0, 118.4 (q, $J_{(C-F)}$ = 277.0 Hz), 45.6, 29.1, 28.5, 22.3, 14.0.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

HRMS (ESI): [M+H]+ calcd. for $C_{14}H_{16}F_3N_2O^+$, 285.1209, found 285.1219.



3-Octyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4c**)

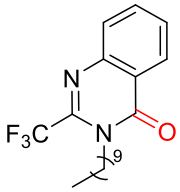
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2d** (64.6 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 m mol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.4) to give the titled product **4c** as a yellow oil. (61.3 mg, 94%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 8.1 Hz, 1H), 7.91 - 7.76 (m, 2H), 7.62 - 7.57 (m, 1H), 4.11 (t, *J* = 8.0 Hz, 2H), 1.97 - 1.50 (m, 2H), 1.57 -1.36 (m, 2H), 1.37 - 1.22 (m, 8H), 0.87 (t, *J* = 6.8 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.5, 145.2, 142. (q, $J_{(C-F)}$ = 35.6 Hz), 134.9, 129.3, 128.6, 127.1, 122.0, 118.5 (q, $J_{(C-F)}$ = 277.0 Hz), 45.7, 31.9, 29.3, 29.2, 28.8, 27.0, 22.7, 14.2.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

HRMS (ESI): [M+H]+ calcd. for $C_{17}H_{22}F_3N_2O^+$, 327.1697, found 327.1687.



3-Decyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4d**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2e** (78.7 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.4) to give the titled product **4d** as a white solid (65.9 mg, 93%).

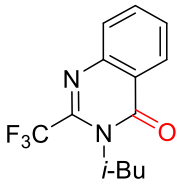
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (d, *J* = 7.8 Hz, 1H), 7.91 - 7.76 (m, 2H), 7.62 - 7.58 (m, 1H), 4.11 (t, *J* = 8.1 Hz, 2H), 1.82 - 1.69 (m, 2H), 1.52 - 1.37 (m, 2H), 1.37 - 1.23 (m, 12H), 0.87 (t, *J* = 6.8 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.5, 145.2, 142.4 (q, $J_{(C-F)}$ = 35.6 Hz), 134.9, 129.3, 128.6, 127.1, 122.1, 118.5 (q, $J_{(C-F)}$ = 277.0 Hz), 45.6, 32.0, 29.6, 29.4, 29.2, 28.8, 27.1, 22.8, 14.2.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.8.

M.p. 71 - 72 °C

HRMS (ESI): [M+H]+ calcd. for $C_{19}H_{26}F_3N_2O^+$, 355.1992, found 355.2000.



3-Isobutyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4e**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2f** (36.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via

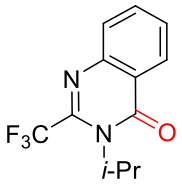
flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4e** as a yellow oil. (48.1 mg, 89%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 7.4 Hz, 1H), 7.93 - 7.75 (m, 2H), 7.63 - 7.59 (m, 1H), 4.04 (d, *J* = 7.5 Hz, 2H), 2.54 - 2.09 (m, 1H), 0.93 (d, *J* = 6.8 Hz, 6H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.0, 145.1, 142.8 (q, $J_{(C-F)}$ = 35.2 Hz), 135.0, 129.4, 128.5, 127.3, 122.0,118.4 (q, $J_{(C-F)}$ = 277.3 Hz), 51.5, 27.8, 20.0.

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.4.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{14}F_3N_2O^+$, 271.1053, found 271.1062.



3-Isopropyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4f**)

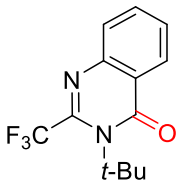
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2g** (29.6 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4e** as a yellow oil. (43 mg, 84%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.27 (d, *J* = 7.9 Hz, 1H), 8.05 - 7.69 (m, 2H), 7.60 - 7.56 (m, 1H), 4.66 - 4.56 (m, 1H), 1.70 (d, *J* = 6.7 Hz, 6H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.0, 144.8, 142.5 (q, $J_{(C-F)}$ = 34.4 Hz), 134.7, 129.3, 128.3, 126.8, 123.3, 118.7 (q, $J_{(C-F)}$ = 277.1 Hz), 53.4, 19.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.7.

HRMS (ESI): [M+H]+ calcd. for $C_{12}H_{12}F_3N_2O^+$, 257.0896, found 257.0903.



3-(*tert*-Butyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4g**)

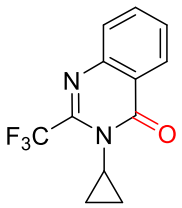
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2h** (29.6 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4g** as a yellow oil. (40 mg, 74%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 7.77 (d, *J* = 6.6 Hz, 1H), 7.24 - 7.19 (m, 1H), 6.73 - 6.63 (m, 2H), 1.52 (s, 9H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 150.0, 140.9 (q, $J_{(C-F)}$ = 28.9 Hz), 140.7, 138.6, 128.4, 123.9, 120.4, 116.8 (q, $J_{(C-F)}$ = 291.4 Hz), 52.7, 28.6.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.3.

HRMS (ESI): [M+H]+ calcd. for $C_{13}H_{14}F_3N_2O^+$, 271.1053, found 271.1069.



3-Cyclopropyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4h**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2i** (28.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4h** as a white solid (46.2 mg, 91%).

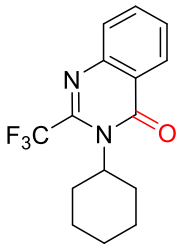
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.26 (d, *J* = 7.6 Hz, 1H), 7.78 - 7.72 (m, 2H), 7.58 - 7.59 (m, 1H), 3.14 (s, 1H), 1.30 - 1.31 (m, 2H), 1.01 - 0.97 (m, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.5, 144.7, 144.3, 134.9, 129.3, 128.4, 127.0, 122.4, 118.5 (q, $J_{(C-F)}$ = 277.4 Hz), 27.8, 9.5.

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.1.

M.p. 121 - 122 °C

HRMS (ESI): [M+H]+ calcd. for $C_{12}H_{10}F_3N_2O^+$, 255.0740, found 255.0748.



3-Cyclohexyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4i**)

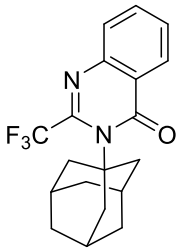
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2j** (49.6 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4i** as a yellow oil. (55.1 mg, 93%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.27 (d, *J* = 7.8 Hz, 1H), 7.84 - 7.75 (m, 2H), 7.60 - 7.56 (m, 1H), 4.16 - 7.09 (m, 1H), 3.01 - 2.49 (m, 2H), 1.94 - 1.88 (m, 2H), 1.78 - 1.69 (m, 4H), 1.37 - 1.32 (m, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.1, 144.7, 142.7 (q, $J_{(C-F)}$ = 34.3 Hz), 134.7, 129.3, 128.3, 126.9, 123.3, 118.7 (q, $J_{(C-F)}$ = 277.1 Hz), 62.0, 28.8, 26.6, 25.1.

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.6.

HRMS (ESI): [M+H]+ calcd. for $C_{15}H_{16}F_3N_2O^+$, 297.1209, found 297.1215.



3-((3s,5s,7s)-Adamantan-1-yl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4j**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2k** (75.6 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4j** as a white solid (41.1 mg, 59%).

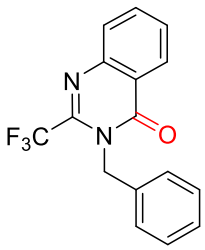
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.17 (d, *J* = 8.2 Hz, 1H), 8.01 (d, *J* = 8.4 Hz, 1H), 7.87 (t, *J* = 7.7 Hz, 1H), 7.63 (t, *J* = 7.6 Hz, 1H), 2.46 (d, *J* = 1.8 Hz, 6H), 2.31 - 2.27 (m, 3H), 1.81 - 1.68 (m, 6H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 167.5, 151.7 (q, $J_{(C-F)}$ = 36.1 Hz), 150.6, 134.2, 128.6, 128.5, 124.3, 120.0 (q, $J_{(C-F)}$ = 275.6 Hz), 118.0, 85.1, 41.4, 36.4, 31.3.

^{19}F NMR (377 MHz, $CDCl_3$) δ -70.9.

M.p. 162 - 163 °C

HRMS (ESI): [M+H]+ calcd. for $C_{19}H_{20}F_3N_2O^+$, 349.1522, found 349.1531.



3-Benzyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4k**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2l** (53.6 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via

flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4k** as a white solid (57.2 mg, 94%).

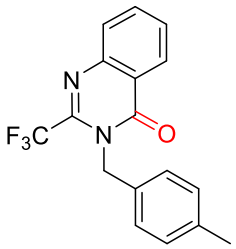
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.34 (d, *J* = 8.1 Hz, 1H), 7.92 - 7.79 (m, 2H), 7.65 - 7.61 (m, 1H), 7.33 - 7.28 (m, 3H), 7.19 - 7.19 (d, *J* = 7.2 Hz, 2H), 5.45 (s, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6, 145.2, 142.5 (q, $J_{(C-F)}$ = 35.9 Hz), 135.6, 135.2, 129.6, 128.8, 128.7, 127.7, 127.5, 126.4, 122.0, 118.3 (q, $J_{(C-F)}$ = 277.4 Hz), 48.0.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.2.

M.p. 97 - 98 °C

HRMS (ESI): [M+H]+ calcd. for $C_{16}H_{12}F_3N_2O^+$, 305.0896, found 305.0903.



3-(4-Methylbenzyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4l**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2m** (60.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4l** as a white solid (55.3 mg, 87%).

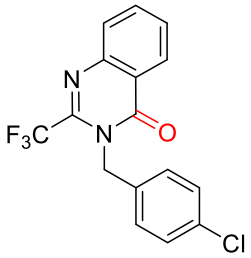
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.34 (d, *J* = 7.8 Hz, 1H), 7.95 - 7.77 (m, 2H), 7.64 - 7.60 (m, 1H), 7.19 - 6.99 (m, 4H), 5.41 (s, 2H), 2.31 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6, 145.2, 142.5 (q, $J_{(C-F)}$ = 35.7 Hz), 137.5, 135.1, 132.6, 129.5, 129.4, 128.7, 127.4, 126.5, 122.1, 118.3 (q, $J_{(C-F)}$ = 277.4 Hz), 47.9, 21.2.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.1.

M.p. 101 - 102 °C

HRMS (ESI): [M+H]+ calcd. for $C_{17}H_{14}F_3N_2O^+$, 319.1053, found 319.1060.



3-(4-Chlorobenzyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4m**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2n** (70.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4m** as a white solid (58.8 mg, 81%).

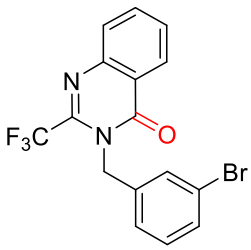
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.33 (d, *J* = 8.0 Hz, 1H), 7.87 (d, *J* = 3.6 Hz, 2H), 7.66 - 7.62 (m, 1H), 7.28 (d, *J* = 8.5 Hz, 2H), 7.14 (d, *J* = 8.5 Hz, 2H), 5.39 (s, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6, 145.1, 142.2 (q, $J_{(C-F)}$ = 35.8 Hz), 135.4, 134.1, 133.7, 129.7, 129.0, 128.8, 128.0, 127.5, 122.0, 118.3 (q, $J_{(C-F)}$ = 277.3 Hz), 47.5.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.2.

M.p. 110 - 111 °C

HRMS (ESI): [M+H]+ calcd. for $C_{16}H_{11}ClF_3N_2O^+$, 339.0507, found 339.0511.



3-(3-Bromobenzyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4n**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2o** (92.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via

flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4n** as a white solid (70.3 mg, 92%).

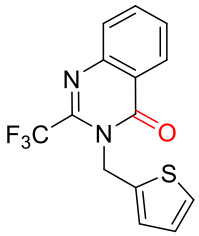
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.33 (d, *J* = 8.0 Hz, 1H), 7.87 (d, *J* = 4.4 Hz, 2H), 7.66 - 7.63 (m, 1H), 7.40 (d, *J* = 7.9 Hz, 1H), 7.33 (s, 1H), 7.18 (t, *J* = 7.8 Hz, 1H), 7.10 (d, *J* = 7.8 Hz, 1H), 5.40 (s, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.5, 145.1, 142.1 (q, $J_{(C-F)}$ = 39.8 Hz), 137.9, 135.4, 131.0, 130.3, 129.7, 129.5, 128.8, 127.5, 125.1, 122.9, 121.9, 118.3 (q, $J_{(C-F)}$ = 275.5 Hz), 47.3.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.2.

M.p. 109 - 110 °C

HRMS (ESI): [M+H]+ calcd. for $C_{16}H_{11}BrF_3N_2O^+$, 383.0001, found 383.0004.



3-(Thiophen-2-ylmethyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4o**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2p** (59.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4o** as a white solid (55.2 mg, 89%).

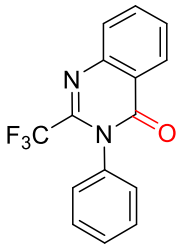
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.36 (d, *J* = 7.8 Hz, 1H), 7.90 - 7.72 (m, 2H), 7.64 - 7.60 (m, 1H), 7.24 (d, *J* = 5.1 Hz, 1H), 7.15 (d, *J* = 3.3 Hz, 1H), 6.98 - 6.91 (m, 1H), 5.53 (s, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6, 145.0 141.6 (q, $J_{(C-F)}$ = 35.9 Hz), 137.0, 135.2, 129.6, 128.7, 128.4, 127.3, 126.7, 126.5, 122.0, 118.4 (q, $J_{(C-F)}$ = 277.4 Hz), 43.4.

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.6.

M.p. 98 - 99 °C

HRMS (ESI): [M+H]+ calcd. for $C_{14}H_{10}F_3N_2OS^+$, 311.0460, found 311.0465.



3-Phenyl-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4p**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2q** (46.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4p** as a white solid (48.7 mg, 84%).

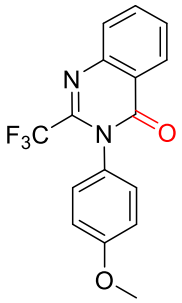
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.33 (d, *J* = 7.8 Hz, 1H), 7.99 - 7.80 (m, 2H), 7.65 (t, *J* = 8.1 Hz, 1H), 7.60 - 7.50 (m, 3H), 7.30 - 4.32 (m, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.8, 145.4, 142.4 (q, $J_{(C-F)}$ = 35.5 Hz), 135.3, 134.9, 130.1, 129.7, 129.4, 129.2, 128.8, 127.5, 122.3, 118.0 (q, $J_{(C-F)}$ = 277.5 Hz).

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.0.

M.p. 121 - 122 °C

HRMS (ESI): [M+H]+ calcd. for $C_{15}H_{10}F_3N_2O^+$, 291.0740, found 291.0752.



3-(4-Methoxyphenyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4q**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2r** (61.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4q** as a white solid (51.2 mg, 80%).

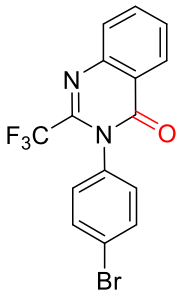
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.33 (d, *J* = 7.8 Hz, 1H), 8.13 - 7.82 (m, 2H), 7.66 - 7.62 (m, 1H), 7.21 (d, *J* = 8.4 Hz, 2H), 7.03 (d, *J* = 8.9 Hz, 2H), 3.88 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.2, 160.6, 145.4, 142.7 (q, $J_{(C-F)}$ = 35.0 Hz), 135.3, 130.3, 129.6, 128.8, 127.6, 127.2, 122.3, 118.0 (q, $J_{(C-F)}$ = 277.5 Hz), 114.7, 55.7.

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.1.

M.p. 177 - 178 °C

HRMS (ESI): [M+H]+ calcd. for $C_{16}H_{12}F_3N_2O_2^+$, 321.0845, found 321.0852.



3-(4-Bromophenyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4r**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2s** (85.8 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4r** as a white solid (64.0 mg, 87%).

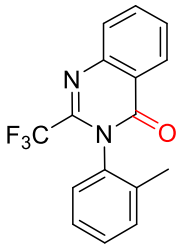
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (d, *J* = 8.4 Hz, 1H), 7.98 - 7.79 (m, 2H), 7.69 - 7.58 (m, 3H), 7.19 (d, *J* = 8.2 Hz, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6, 145.2, 141.9 (q, $J_{(C-F)}$ = 35.6 Hz), 135.5, 133.9, 132.8, 130.9, 129.9, 128.9, 127.6, 124.5, 122.1, 117.9 (q, $J_{(C-F)}$ = 277.6 Hz).

^{19}F NMR (377 MHz, $CDCl_3$) δ -63.9.

M.p. 154 - 155 °C

HRMS (ESI): [M+H]+ calcd. for $C_{15}H_9BrF_3N_2O^+$, 368.9845, found 368.9851.



3-(*o*-Tolyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4s**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2t** (53.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4s** as a white solid (49.9 mg, 82%).

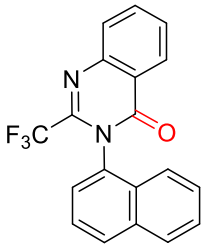
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.36 (d, *J* = 7.8 Hz, 1H), 7.93 - 7.88 (m, 2H), 7.66 (t, *J* = 8.2 Hz, 1H), 7.45 (t, *J* = 7.4 Hz, 1H), 7.40 - 7.34 (m, 2H), 7.21 (d, *J* = 7.8 Hz, 1H), 2.13 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.1, 145.5, 142.5 (q, $J_{(C-F)}$ = 35.4 Hz), 137.0, 135.4, 134.0, 131.1, 130.4, 129.7, 129.2, 128.9, 127.6, 127.0, 122.2, 117.9 (q, $J_{(C-F)}$ = 277.4 Hz), 17.6.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.5.

M.p. 122 - 123 °C

HRMS (ESI): [M+H]+ calcd. for $C_{16}H_{12}F_3N_2O^+$, 305.0896, found 305.0904.



3-(Naphthalen-1-yl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4t**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2u** (71.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **4t** as a white solid (61.2 mg, 90%).

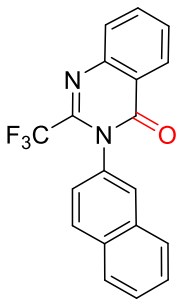
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.38 (d, *J* = 8.0 Hz, 1H), 8.00 - 7.95 (m, 1H), 7.98 (t, *J* = 7.5 Hz, 2H), 7.93 (t, *J* = 7.7 Hz, 1H), 7.69 (t, *J* = 7.5 Hz, 1H), 7.61 (t, *J* = 7.8 Hz, 1H), 7.55 (t, *J* = 6.9 Hz, 1H), 7.51 - 7.48 (m, 2H), 7.43 (d, *J* = 8.3 Hz, 1H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6, 145.6, 143.1 (q, $J_{(C-F)}$ = 35.4 Hz), 135.5, 134.3, 131.7, 130.9, 130.7, 129.8, 129.0, 128.8, 127.9, 127.8, 127.5, 126.9, 125.2, 122.2, 121.8, 117.9 (q, $J_{(C-F)}$ = 277.9 Hz).

^{19}F NMR (377 MHz, $CDCl_3$) δ -64.8.

M.p. 164 - 165 °C

HRMS (ESI): [M+H]+ calcd. for $C_{19}H_{12}F_3N_2O^+$, 341.0896, found 341.0905.



3-(Naphthalen-2-yl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4u**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2v** (71.5 mg, 0.5 mmol, 2.5 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %),

PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **4u** as a white solid (62.6 mg, 82%).

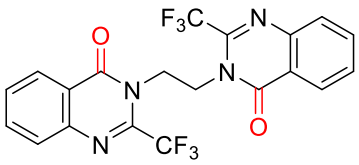
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.36 (d, *J* = 7.9 Hz, 1H), 8.01 (d, *J* = 8.7 Hz, 1H), 7.98 - 7.87 (m, 4H), 7.82 (s, 1H), 7.67 (t, *J* = 7.4 Hz, 1H), 7.64 - 7.54 (m, 2H), 7.38 (d, *J* = 8.6 Hz, 1H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.1, 145.4, 142.5 (q, $J_{(C-F)}$ = 35.7 Hz), 135.4, 133.7, 133.3, 132.4, 129.7, 129.5, 128.9, 128.5, 128.4, 128.1, 127.7, 127.6, 127.1, 126.3, 122.3, 118.1 (q, $J_{(C-F)}$ = 277.4 Hz).

^{19}F NMR (377 MHz, $CDCl_3$) δ -63.8.

M.p. 168 - 169 °C

HRMS (ESI): [M+H]+ calcd. for $C_{19}H_{12}F_3N_2O^+$, 341.0896, found 341.0908.



3,3'-(Ethane-1,2-diyl)bis(2-(trifluoromethyl)quinazolin-4(3*H*)-one) (**4v**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (133.2 mg, 0.4 mmol, 2.0 eq.), amine **2w** (12.0 mg, 0.2 mmol, 1.0 eq.), $Pd(TFA)_2$ (3.4 mg, 0.01 mmol, 5 mol %), PPh_3 (5.2 mg, 0.02 mmol, 10 mol%), Na_2CO_3 (84.8 mg, 0.8 mmol, 4.0 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.2) to give the titled product **4v** as a white solid (62.7 mg, 69%).

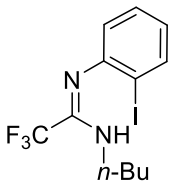
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 (d, *J* = 8.1 Hz, 2H), 7.92 - 7.75 (m, 4H), 7.57 - 7.53 (m, 2H), 4.68 (s, 4H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 162.1, 144.9, 141.7 (q, $J_{(C-F)}$ = 35.8 Hz), 135.2, 129.6, 128.7, 127.1, 121.6, 118.2 (q, $J_{(C-F)}$ = 276.9 Hz), 45.6.

^{19}F NMR (377 MHz, $CDCl_3$) δ -65.4, -65.5.

M.p. 216 - 217 °C

HRMS (ESI): [M+H]+ calcd. for $C_{20}H_{13}F_6N_4O_2^+$, 455.0937, found 455.0941.



(*Z*)-*N*-Butyl-2,2,2-trifluoro-*N'*-(2-iodophenyl)acetimidamide (**5a**)

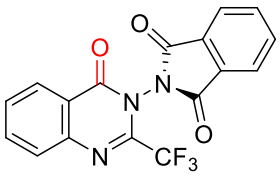
General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (333 mg, 1.0 mmol, 1.0 eq.), amine **2a** (183 mg, 2.5 mmol, 2.5 eq.), Na_2CO_3 (106 mg, 1.0 mmol, 5.0 eq.) and 1,4-dioxane (5 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.3) to give the titled product **5a** as yellow oil. (366.3 mg, 99%).

^{1}H NMR (400 MHz, $(CD_3)_2SO$) δ 8.01 (s, 1H), 7.76 (d, *J* = 6.7 Hz, 1H), 7.26 (t, *J* = 7.0 Hz, 1H), 6.78 (d, *J* = 7.1 Hz, 1H), 6.73 (t, *J* = 7.6 Hz, 1H), 3.31 - 2.73 (m, 2H), 1.71 - 1.39 (m, 2H), 1.39 - 1.11 (m, 2H), 0.97 - 0.71 (m, 3H).

^{13}C NMR (101 MHz, $(CD_3)_2SO$) δ 149.7, 141.8 (q, $J_{(C-F)}$ = 27.0 Hz), 137.9, 128.4, 123.7, 120.4, 117.3 (q, $J_{(C-F)}$ = 35.4 Hz), 92.6, 41.0, 30.4, 19.5, 13.5.

^{19}F NMR (377 MHz, $(CD_3)_2SO$) δ -64.2. -74.1.

HRMS (ESI): [M+H]+ calcd. for $C_{12}H_{15}F_3IN_2^+$, 371.0227, found 371.0235.



2-(4-Oxo-2-(trifluoromethyl)quinazolin-3(4*H*)-yl)isoindoline-1,3-dione (**6**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2x** (38.9 mg, 0.24 mmol, 1.2 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via

flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.2) to give the titled product **6** as a white solid (40.9 mg, 57%).

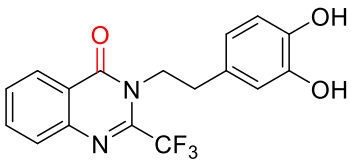
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (d, *J* = 7.8 Hz, 1H), 8.04 - 8.02 (m, 2H), 7.94 (d, *J* = 4.2 Hz, 2H), 7.92 - 7.90 (m, 2H), 7.75 - 7.62 (m, 1H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 163.8, 157.6, 144.8, 142.0 (q, $J_{(C-F)}$ = 37.0 Hz), 136.2, 135.7, 130.2, 130.1, 129.6, 128.0, 125.0, 122.1, 117.3 (q, $J_{(C-F)}$ = 277.4 Hz).

^{19}F NMR (377 MHz, $CDCl_3$) δ -68.4.

M.p. 147 - 149 °C

HRMS (ESI): [M+H]+ calcd. for $C_{17}H_9F_3N_3O_3^+$, 360.0591, found 360.0598.



3-(3,4-Dihydroxyphenethyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**7**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2y** (36.8 mg, 0.24mmol, 1.2 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 5:1, Rf = 0.2) to give the titled product **7** as a white solid (50.4 mg, 72%).

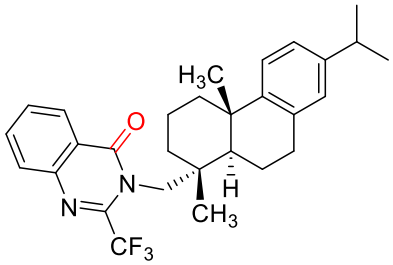
^{1}H NMR (400 MHz, DMSO) δ 8.91 (s, 1H), 8.78 (s, 1H), 8.25 (d, *J* = 7.8 Hz, 1H), 7.95 (t, *J* = 7.5 Hz, 1H), 7.84 (d, *J* = 8.0 Hz, 1H), 7.73 (t, *J* = 7.5 Hz, 1H), 6.75 - 6.58 (m, 2H), 6.50 (d, *J* = 7.8 Hz, 1H), 4.11 (t, *J* = 8.0 Hz, 2H), 2.79 (t, *J* = 10.0 Hz, 2H).

^{13}C NMR (101 MHz, DMSO) δ 160.6, 145.4, 144.5, 144.1, 141.5 (q, $J_{(C-F)}$ = 35.0 Hz), 135.2, 129.6, 128.4, 128.1, 126.5, 121.6, 119.2, 118.2 (q, $J_{(C-F)}$ = 277.5 Hz), 115.8, 46.7, 33.4.

^{19}F NMR (377 MHz, DMSO) δ -64.9.

M.p. 179- 180 °C

HRMS (ESI): [M+H]+ calcd. for $C_{17}H_{14}F_3N_2O_3^+$, 351.0951, found 351.0954.



3-(((1R,4aS,10aR)-7-Isopropyl-1,4a-dimethyl-1,2,3,4,4a,9,10,10a-octahydrophenanthren-1-yl)methyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**8**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (66.6 mg, 0.2 mmol, 1.0 eq.), amine **2z** (68.5 mg, 0.24 mmol, 1.2 eq.), $Pd(TFA)_2$ (1.7 mg, 0.005 mmol, 2.5 mol %), PPh_3 (2.6 mg, 0.01 mmol, 5 mol%), Na_2CO_3 (42.4 mg, 0.4 mmol, 2 eq.), TFBen (210.0 mg, 1 mmol, 5.0 eq.) and 1,4-dioxane (2 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 20:1, Rf = 0.2) to give the titled product **8** as a white solid (55.0 mg, 57%).

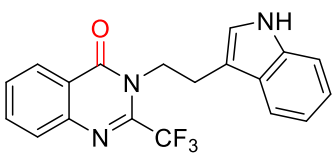
^{1}H NMR (400 MHz, $CDCl_3$) δ 8.28 (d, *J* = 7.9 Hz, 1H), 7.87 - 7.77 (m, 2H), 7.62 - 7.58 (m, 1H), 7.15 (d, *J* = 8.2 Hz, 1H), 7.00 (d, J = 8.1 Hz, 1H), 6.94 (s, 1H), 3.03 - 3.00 (m, 2H), 2.94 - 2.75 (m, 1H), 2.25 (d, *J* = 12.9 Hz, 1H), 2.04 - 2.00 (m, 1H), 1.93 - 1.87 (m, 1H), 1.76 - 1.63 (m, 2H), 1.65 - 1.53 (m, 1H), 1.45 - 1.33 (m, 1H), 1.30 - 1.26 (m, 6H), 1.23 (d, *J* = 6.9 Hz, 6H), 1.09 (s, 3H), 0.90 - 0.86 (m, 1H).

^{13}C NMR (101 MHz, $CDCl_3$) δ 163.1, 147.3, 145.8, 144.8, 143.4 (q, $J_{(C-F)}$ = 34.7 Hz), 134.9, 134.7, 129.4, 128.3, 127.5, 127.0, 124.1, 124.0, 122.0, 118.4 (q, $J_{(C-F)}$ = 277.9 Hz), 77.2, 55.1, 48.1, 40.1, 38.1, 36.0, 33.6, 30.4, 29.8, 25.9, 24.1, 22.8, 19.9, 18.6.

^{19}F NMR (377 MHz, $CDCl_3$) δ -62.3.

M.p. 221 - 222 °C

HRMS (ESI): [M+H]+ calcd. for $C_{29}H_{34}F_3N_2O^+$, 483.2618, found 483.2622.



3-(2-(1*H*-Indol-3-yl)ethyl)-2-(trifluoromethyl)quinazolin-4(3*H*)-one (**4w**)

General Procedure was followed with (2-iodophenyl)trifluoroacetimide chloride **1a** (333.0 mg, 1.0 mmol, 1.0 eq.), amine **2aa** (192.5 mg, 1.2 mmol, 1.2 eq.), $Pd(TFA)_2$ (8.5 mg, 0.025 mmol, 2.5 mol %), PPh_3 (13 mg, 0.05 mmol, 5 mol%), Na_2CO_3 (212 mg, 2.0 mmol, 2 eq.), TFBen (420.0 mg, 2.0 mmol, 2.0 eq.) and 1,4-dioxane (5 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 10:1, Rf = 0.2) to give the titled product **4w** as a white solid (296.3 mg, 83%).

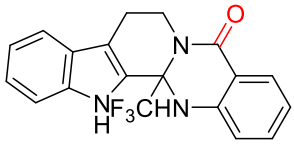
^{1}H NMR (400 MHz, DMSO) δ 10.98 (s, 1H), 8.35 - 8.22 (m, 1H), 7.96 - 7.91 (m, 1H), 7.84 (t, *J* = 6.9 Hz, 1H), 7.78 - 7.66 (m, 2H), 7.39 (d, *J* = 8.0 Hz, 1H), 7.26 (s, 1H), 7.10 (t, *J* = 7.5 Hz, 1H), 7.03 (t, *J* = 7.4 Hz, 1H), 4.26 (t, *J* = 8.0 Hz, 2H), 3.12 (t, *J* = 8.0 Hz, 2H).

^{13}C NMR (101 MHz, DMSO) δ 160.8, 144.5, 141.6 (q, $J_{(C-F)}$ = 35.0 Hz), 136.3, 135.1, 129.5, 128.1, 127.0, 126.5, 123.1, 121.7, 121.1, 118.6, 118.2 (q, $J_{(C-F)}$ = 277.0 Hz), 118.0, 111.6, 110.1, 45.8, 24.1.

^{19}F NMR (377 MHz, DMSO) δ -64.8.

M.p. 179- 180 °C

HRMS (ESI): [M+H]+ calcd. for $C_{19}H_{15}F_3N_3O^+$, 358.1162, found 358.1167.



13b-(Trifluoromethyl)-8,13,13b,14-tetrahydroindolo[2',3':3,4]pyrido[2,1-*b*]quinazolin-5(7*H*)-one (**9**)

General Procedure was followed with **4w** (357.0 mg, 1 mmol, 1.0 eq.), HOAc (3 mL) and HCl (0.5 mL). Upon completion the mixture was concentrated and purified via flash column chromatography (petroleum ether / ethyl acetate = 5:1, Rf = 0.2) to give the titled product **9** as a white solid (346.3 mg, 97%).

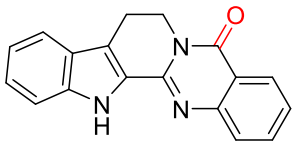
^{1}H NMR (400 MHz, DMSO) δ 10.97 (s, 1H), 7.78 (d, *J* = 7.1 Hz, 1H), 7.75 (s, 1H), 7.59 - 7.54 (m, 2H), 7.39 (t, *J* = 7.7 Hz, 1H), 7.24 (t, J = 7.5 Hz, 1H), 7.10 (t, *J* = 7.4 Hz, 1H), 6.91 - 6.83 (m, 2H), 5.16 - 5.11 (m, 1H), 3.26 (t, *J* = 12.5 Hz, 1H), 2.96 (d, *J* = 19.3 Hz, 1H), 2.88 - 2.71 (m, 1H).

^{13}C NMR (101 MHz, DMSO) δ 161.4, 143.8, 136.9, 133.9, 127.7, 125.5 (q, $J_{(C-F)}$ = 300.1 Hz), 124.9, 124.7, 123.1, 119.5, 119.1, 119.0, 114.8, 114.7, 112.2, 112.1, 37.1, 19.8.

^{19}F NMR (377 MHz, DMSO) δ -75.9.

M.p. 265 - 266 °C

HRMS (ESI): [M+H]+ calcd. for $C_{19}H_{15}F_3N_3O^+$, 358.1162, found 358.1169.



8,13-Dihydroindolo[2',3':3,4]pyrido[2,1-b]quinazolin-5(7*H*)-one (**10**)

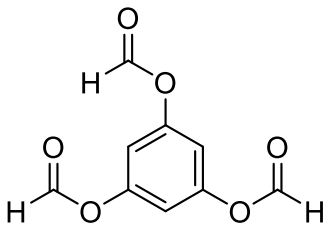
General Procedure was followed with **9** (357.0 mg, 1.0 mmol, 1.0 eq.), KOH (200.0 mg), EtOH (5.0 mL) and H_2O (1.5 mL). Upon completion the mixture was cooled and the crystals were collected, washed, and dried to give the titled product **10** as a white solid (275.5 mg, 96%).

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.91 (s, 1H), 8.33 (d, *J* = 7.8 Hz, 1H), 7.71 - 7.65 (m, 1H), 7.65 – 7.59 (m, 2H), 7.47 - 7.37 (m, 1H), 7.28 - 7.26 (m, 2H), 7.18 - 7.14 (m, 1H), 4.59 (t, *J* = 6.9 Hz, 2H), 3.23 (t, *J* = 6.9 Hz, 2H).

^{13}C NMR (101 MHz, DMSO) δ 161.1, 147.8, 145.7, 139.1, 134.8, 127.6, 127.0, 126.9, 126.4, 125.4, 125.2, 121.2, 120.4, 120.2, 118.3, 113.0, 41.3, 19.4.

M.p. 255 - 256 °C

HRMS (ESI): [M+H]+ calcd. for $C_{18}H_{14}N_3O^+$ 288.1131,, found 288.1144.



Benzene-1,3,5-triyl triformate (**TFBen**)

General Procedure was followed with Formic acid (8.4 mL, 222.8 mmol, 5.0 equiv.), acetic anhydride (16.8 mL, 178.2 mmol, 4.0 equiv.), 1,3,5-trihydroxybenzene (5.62 g, 44.6 mmol, 1.0 equiv.) and NaOAc (1.83 g, 22.3 mmol, 0.5 equiv.). The mixture was stirred for 4 h in a water bath and then diluted with toluene (100 mL), washed with H_2O (50 mL) twice. Keep the organic phase in fridge (2-8 °C) ovemight. Then filtered and dried in vacuo to afford the desired product benzene-1,3,5-triyl triformate (TFBen) (5.1 g, 55%) as a white solid.

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.24 (s, 3H), 6.97 (s, 3H).

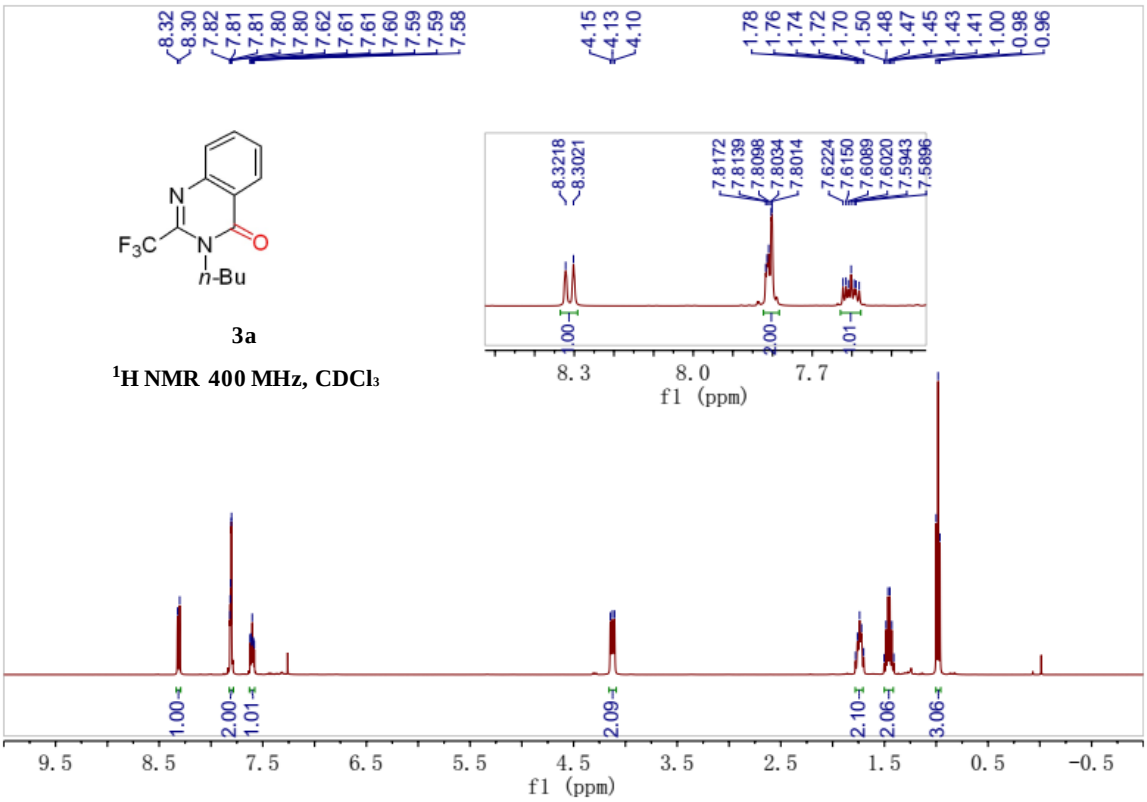
^{13}C NMR (101 MHz, $CDCl_3$) δ 158.1, 150.3, 112.6.

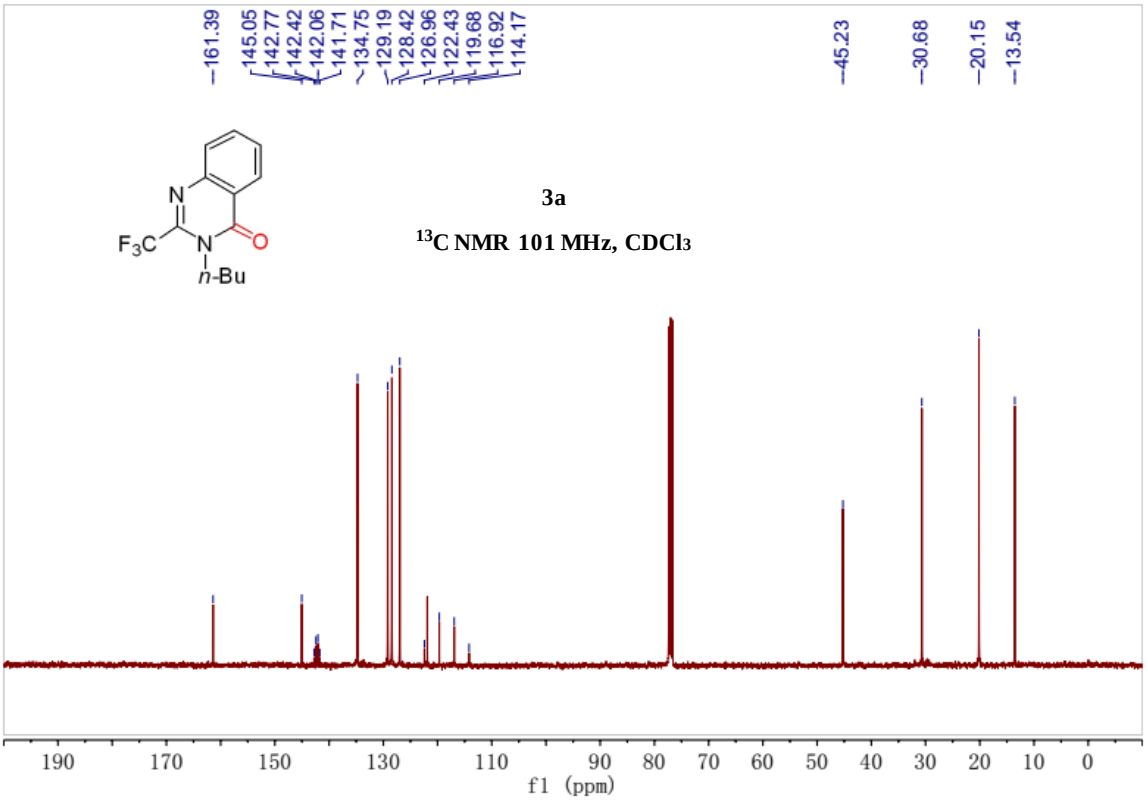
5 References

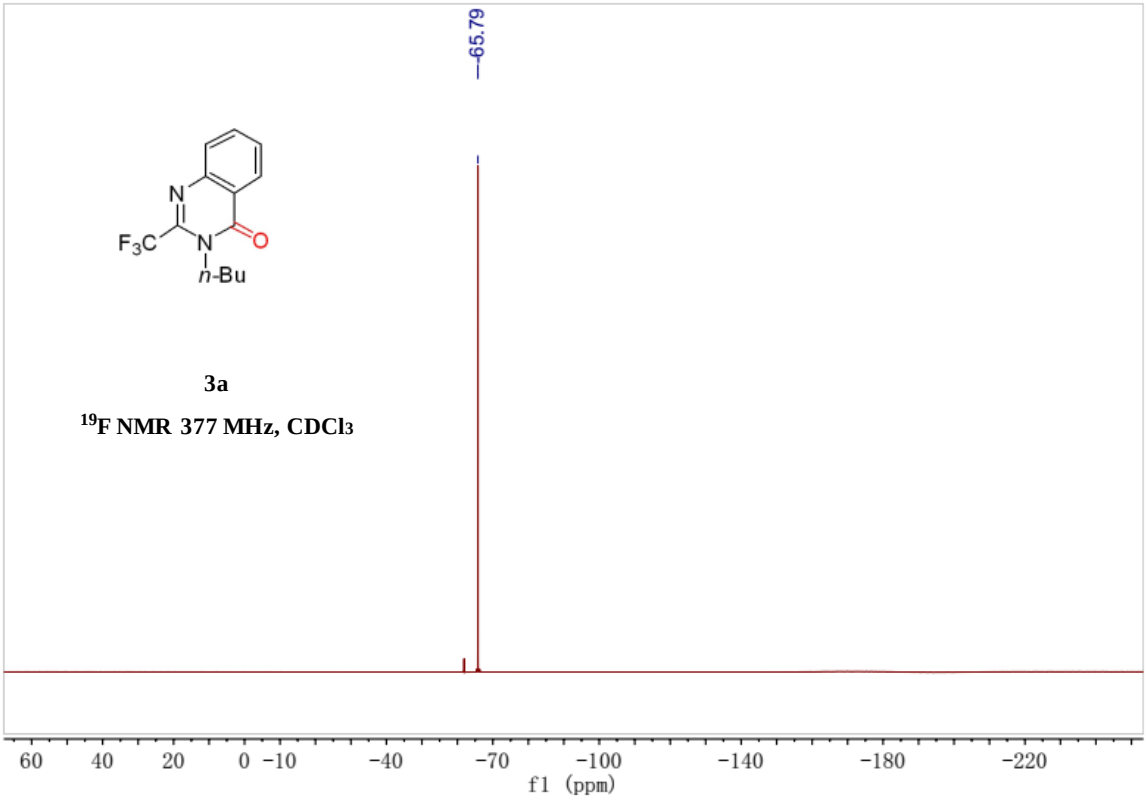
(1) K. Tamura, H. Mizukami, K. Maeda, H. Watanabe and K. Uneyama, One-pot synthesis of trifluoroacetimidoyl halides. *J. Org. Chem.*, 1993, **58**, 32.

(2) (a) L. Jiang, X. Qi and X.-F. Wu, Benzene-1,3,5-triyl triformate (TFBen): a convenient, efficient, and non-reacting CO source in carbonylation reactions. *Tetrahedron Lett.* 2016, **57**, 3368; (b) L. Jiang, R. Li, C. Zhou, X. Qi, J.-B. Peng and X.-F. Wu, A general and practical Lewis acids-catalyzed aryl formates synthesis. *Mol. Catal.*, 2017, **433**, 8.

6 Copy of ^{1}H, ^{13}C and ^{19}F NMR Spectra of Products

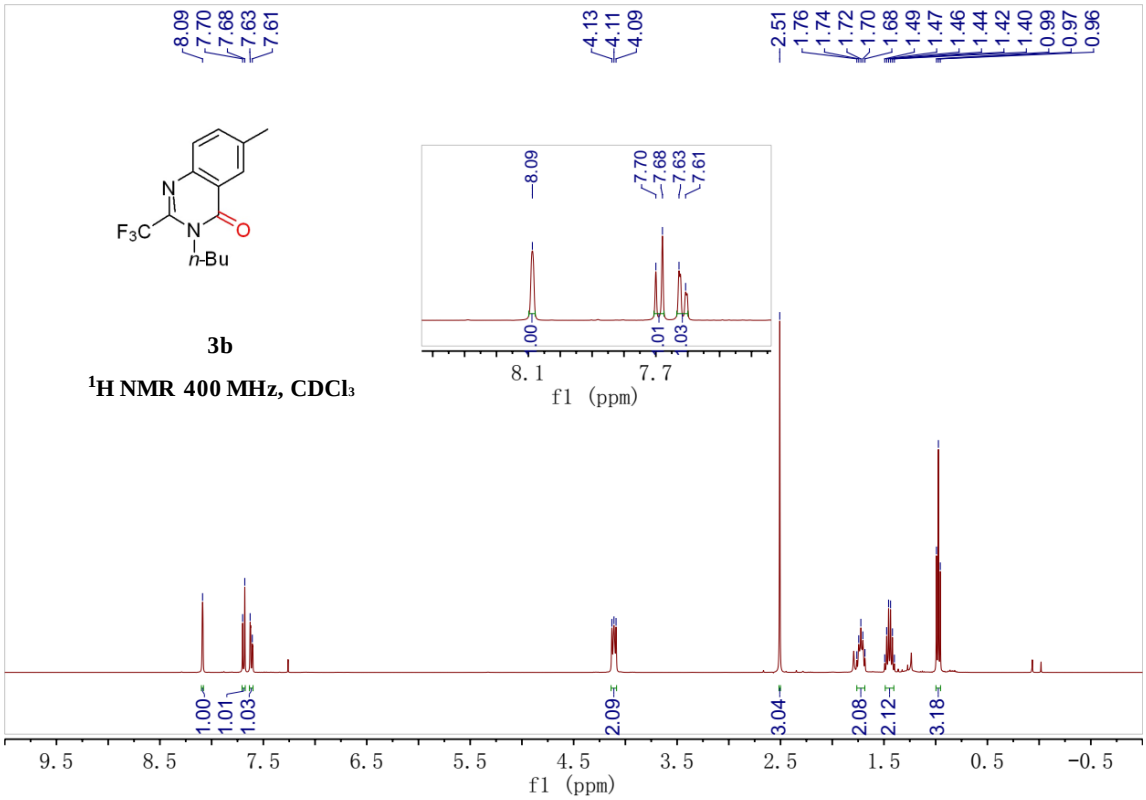






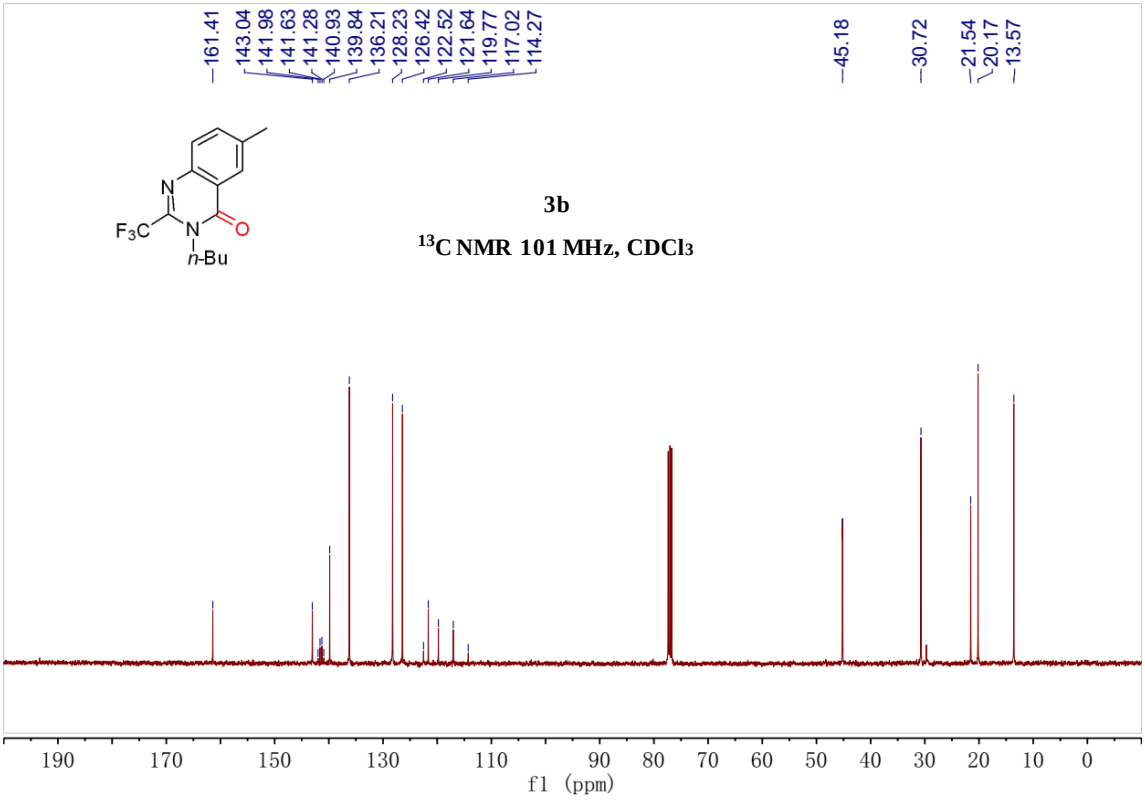
3a

^{19}F NMR 377 MHz, CDCl$_3$



3b

^{1}H NMR 400 MHz, CDCl$_3$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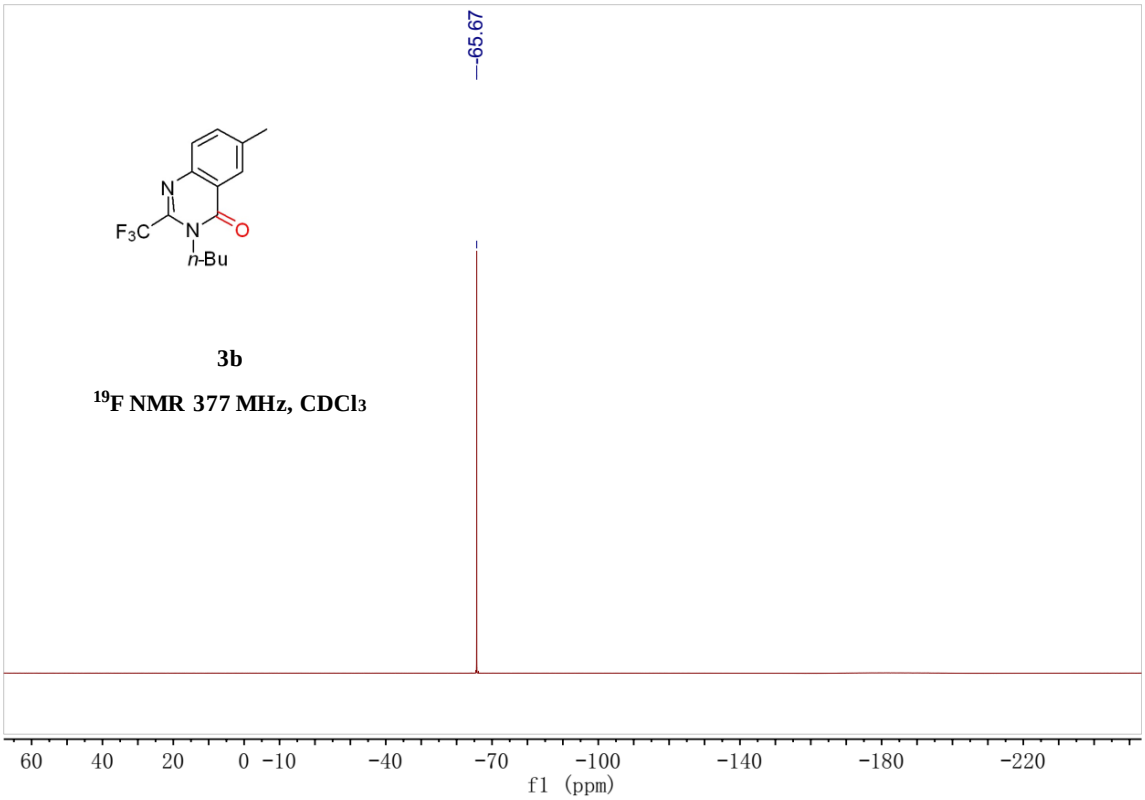
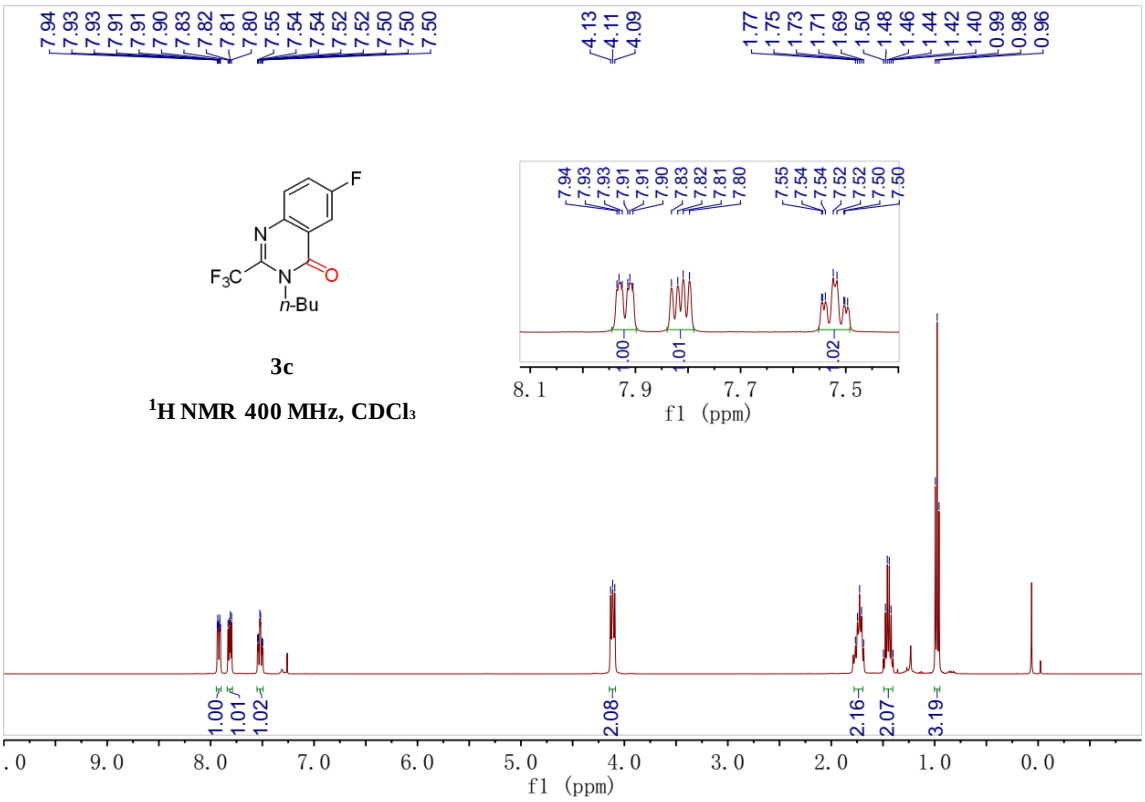
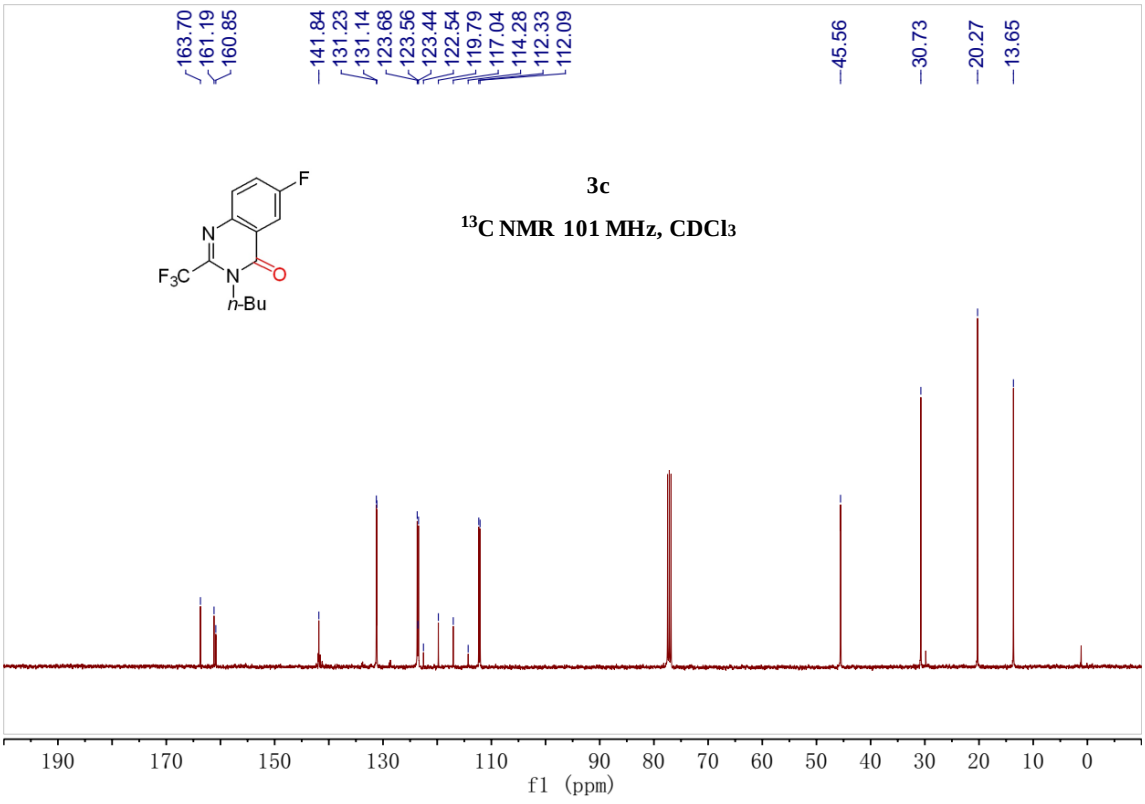
143.04
141.98
141.63
141.28
140.93
139.84
136.21
128.23
126.42
122.52
121.64
119.77
117.02
114.27
45.18
30.72
21.54
20.17
13.57
N
F3C
N
O
n-Bu
3b
13C NMR 101 MHz, CDCl3
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


65.67
N
F3C
N
O
n-Bu
3b
19F NMR 377 MHz, CDCl3
60
40
20
0
-10
-40
-70
-100
-140
-180
-220
f1 (ppm)



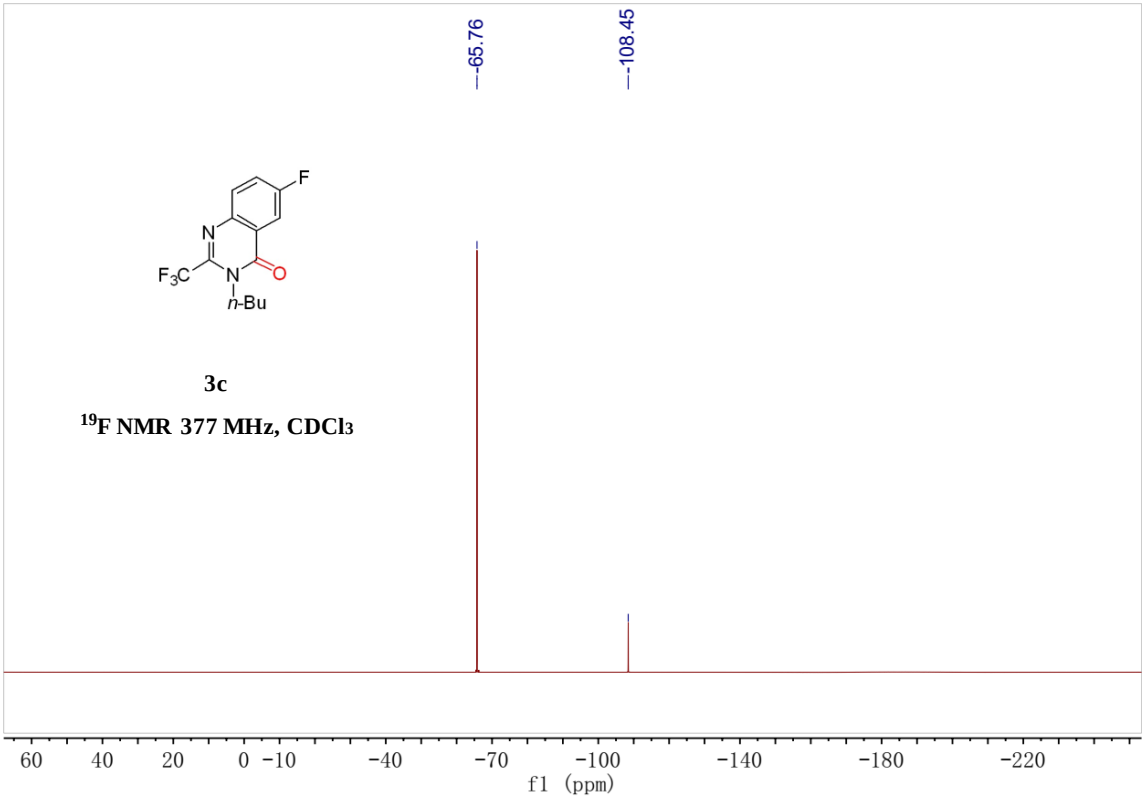
3c

^{1}H NMR 400 MHz, CDCl$_3$



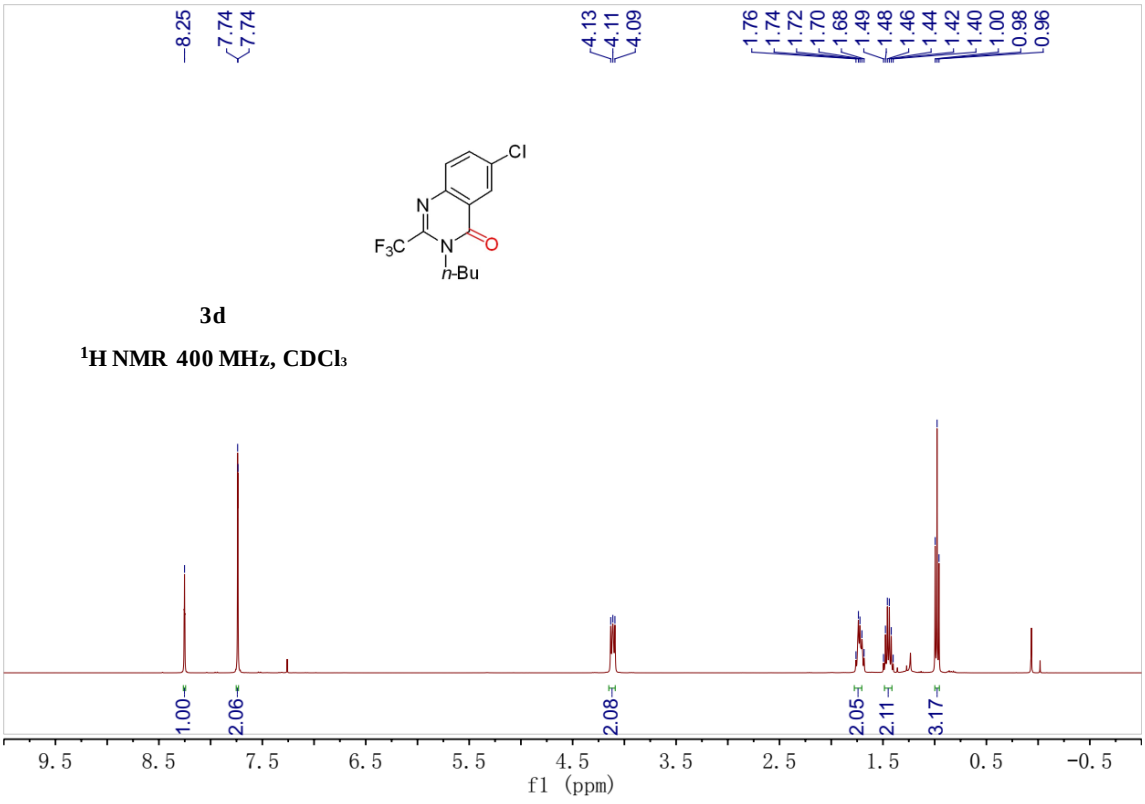
3c

^{13}C NMR 101 MHz, CDCl$_3$



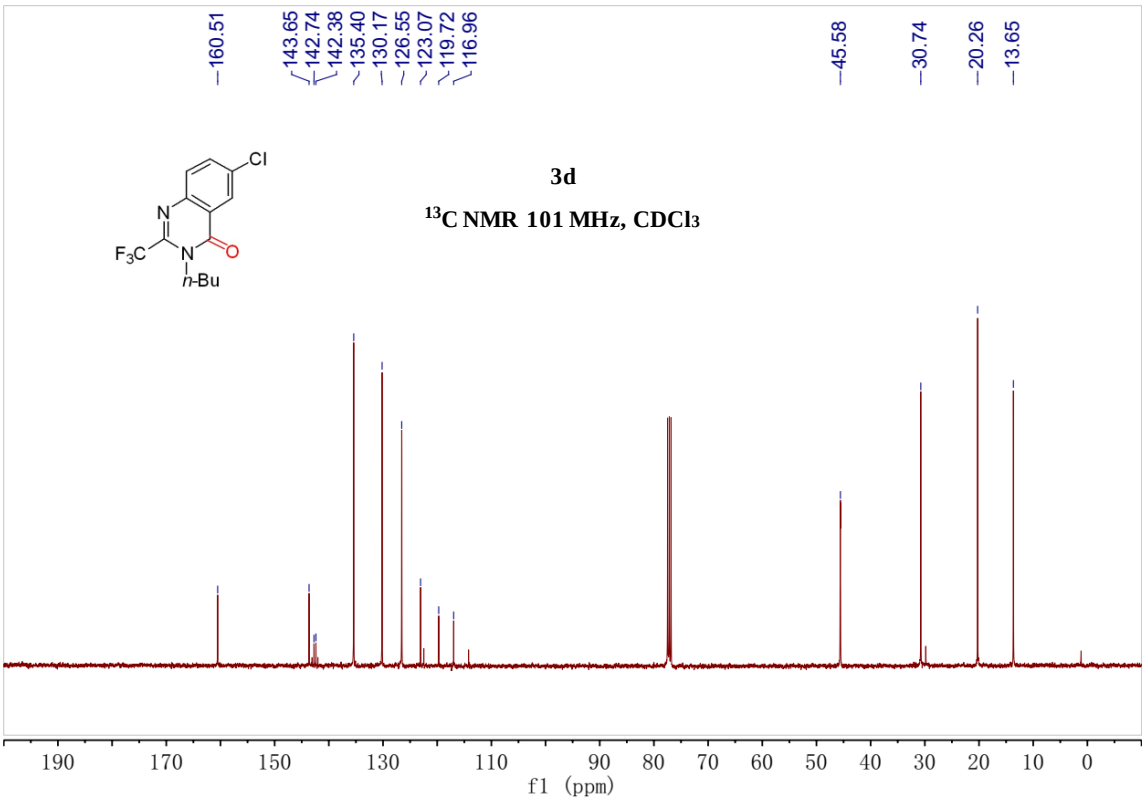
3c

^{19}F NMR 377 MHz, $CDCl_3$



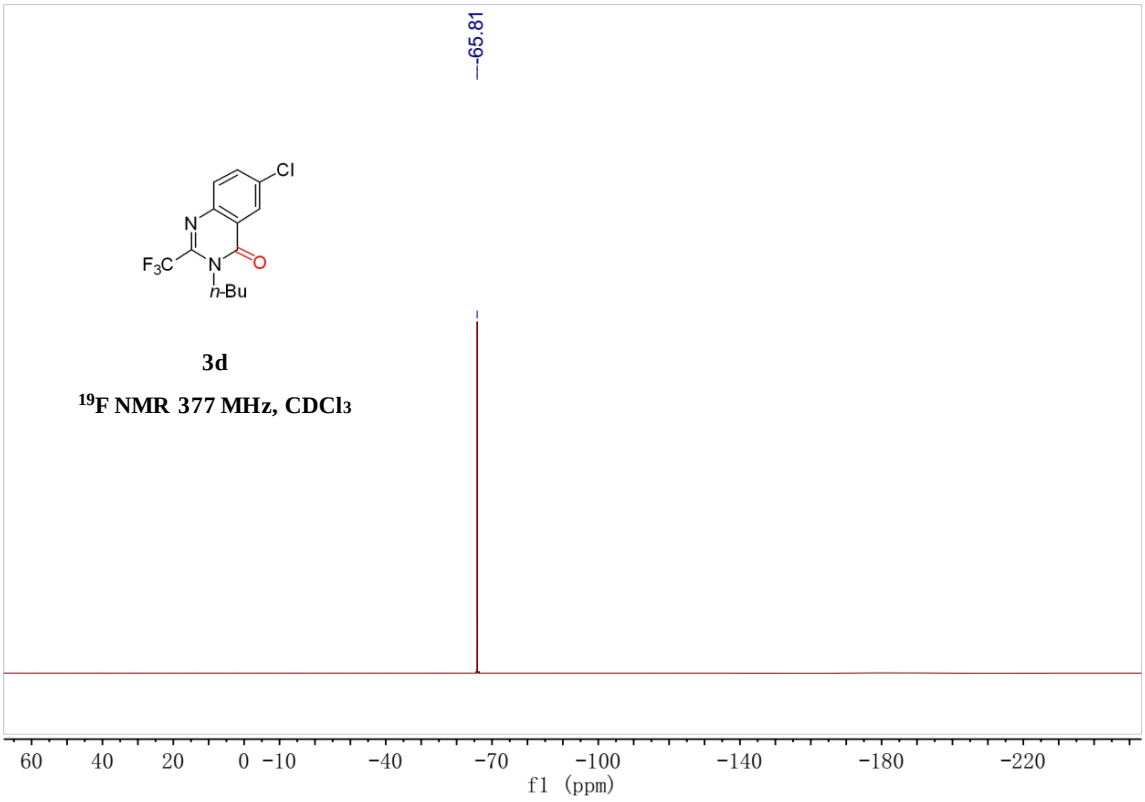
3d

^{1}H NMR 400 MHz, $CDCl_3$



3d

^{13}C NMR 101 MHz, $CDCl_3$



3d

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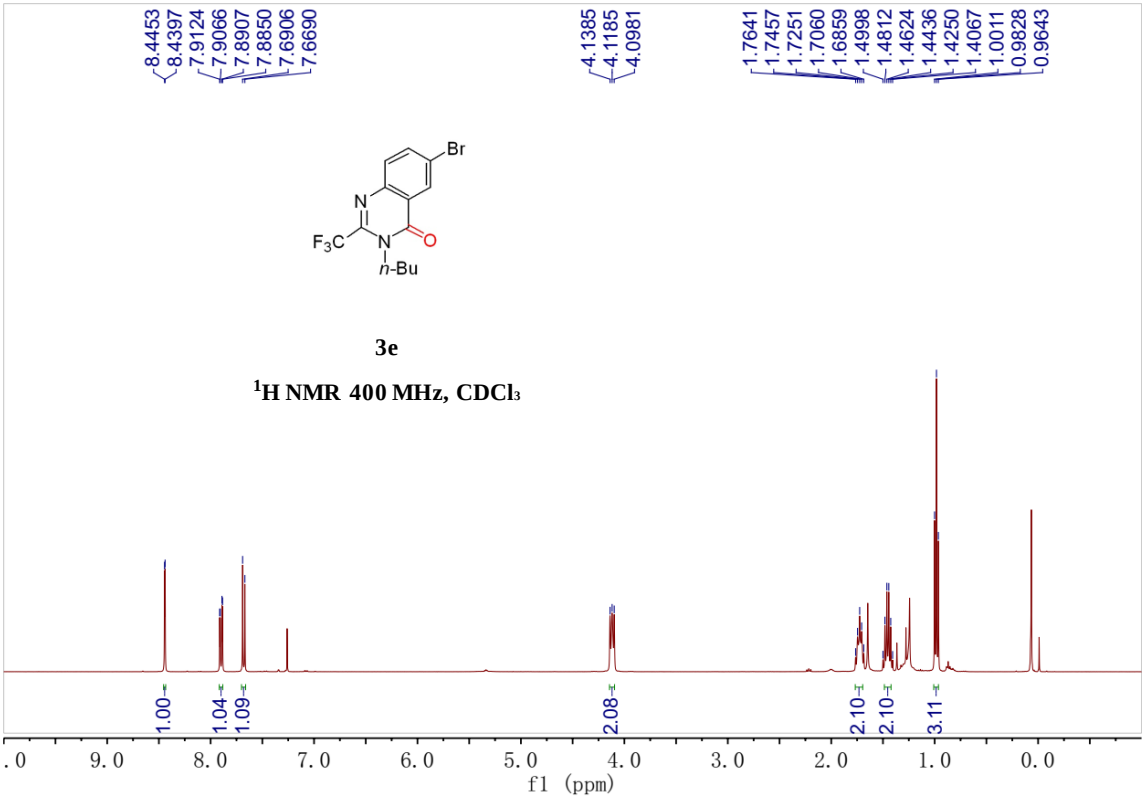

3e

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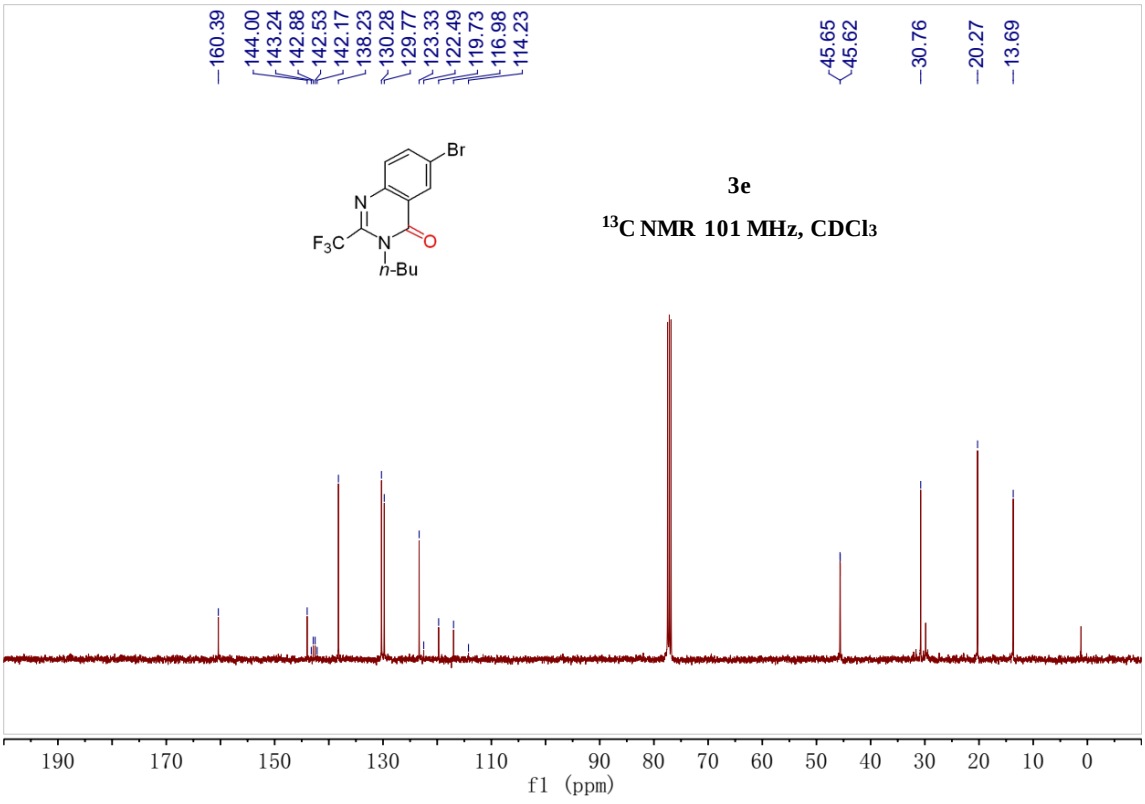

3e

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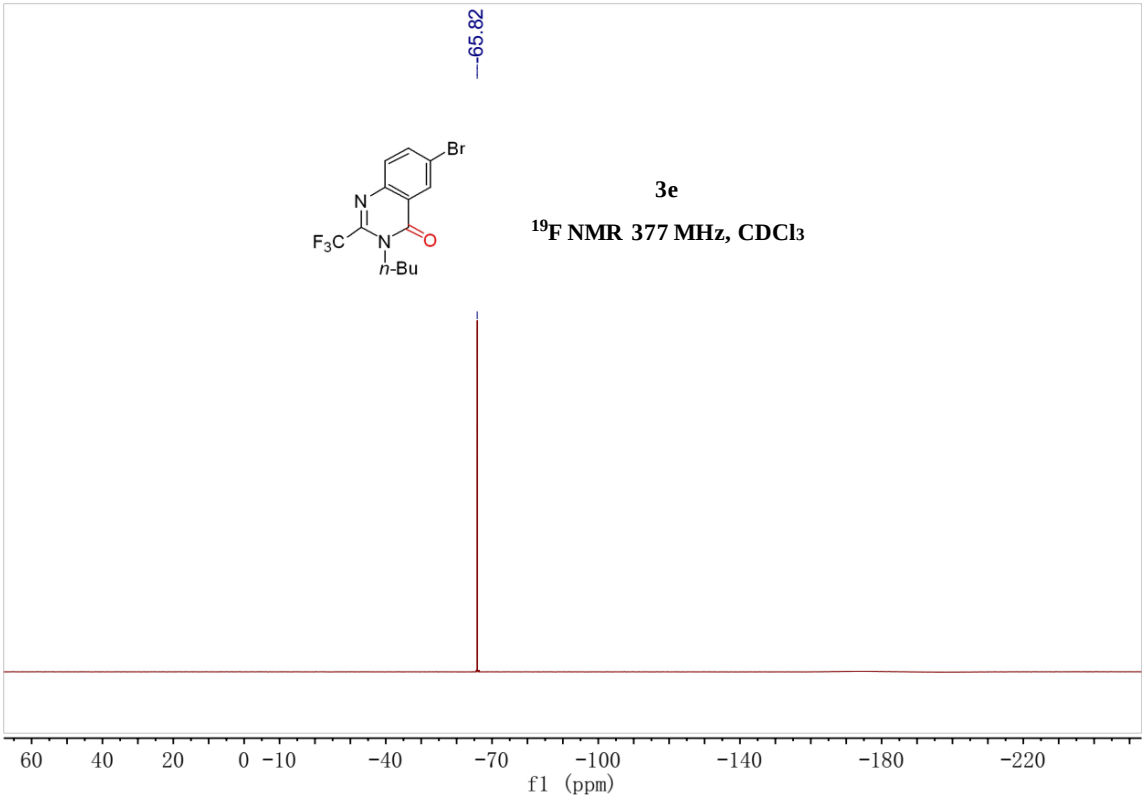
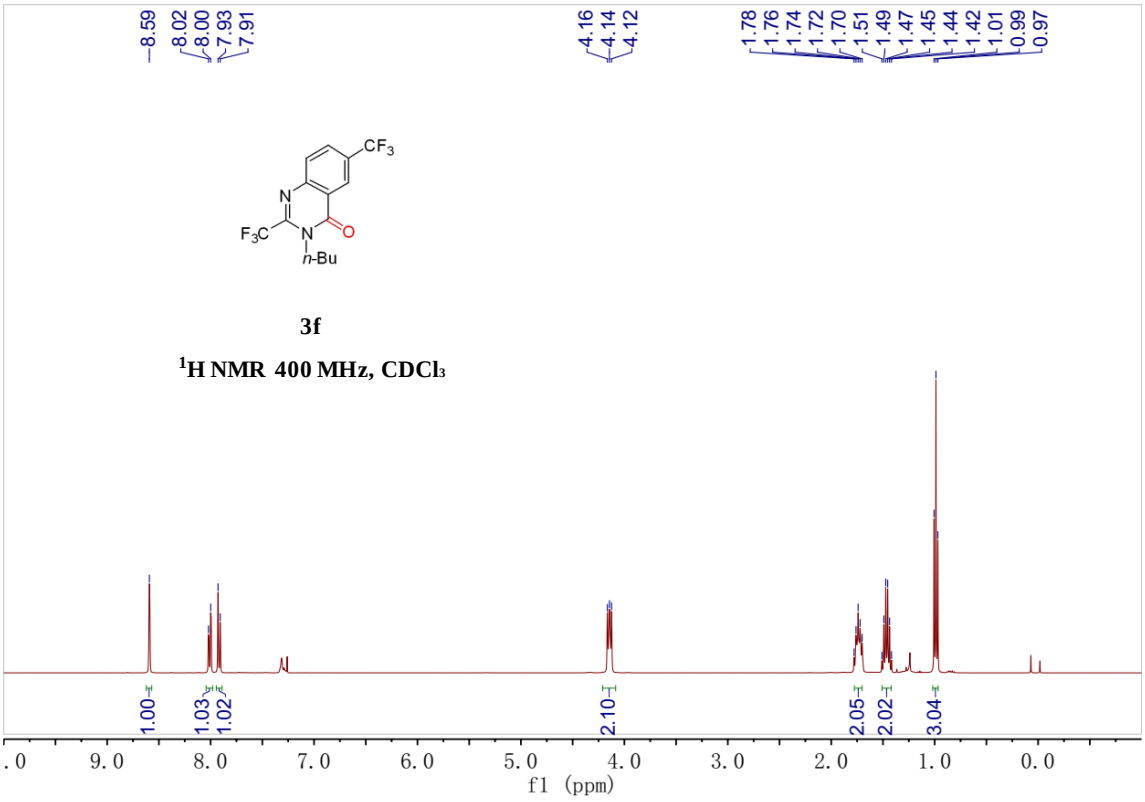


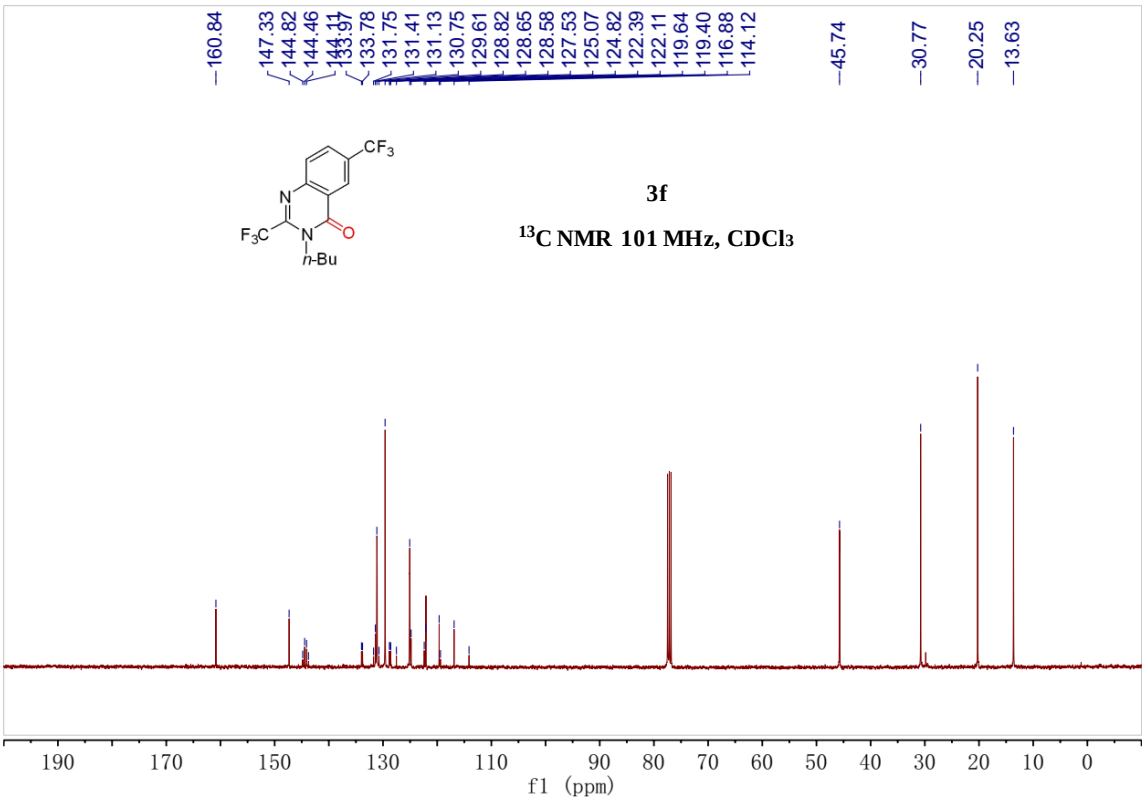
3e

^{19}F NMR 377 MHz, CDCl$_3$



3f

^{1}H NMR 400 MHz, CDCl$_3$



3f

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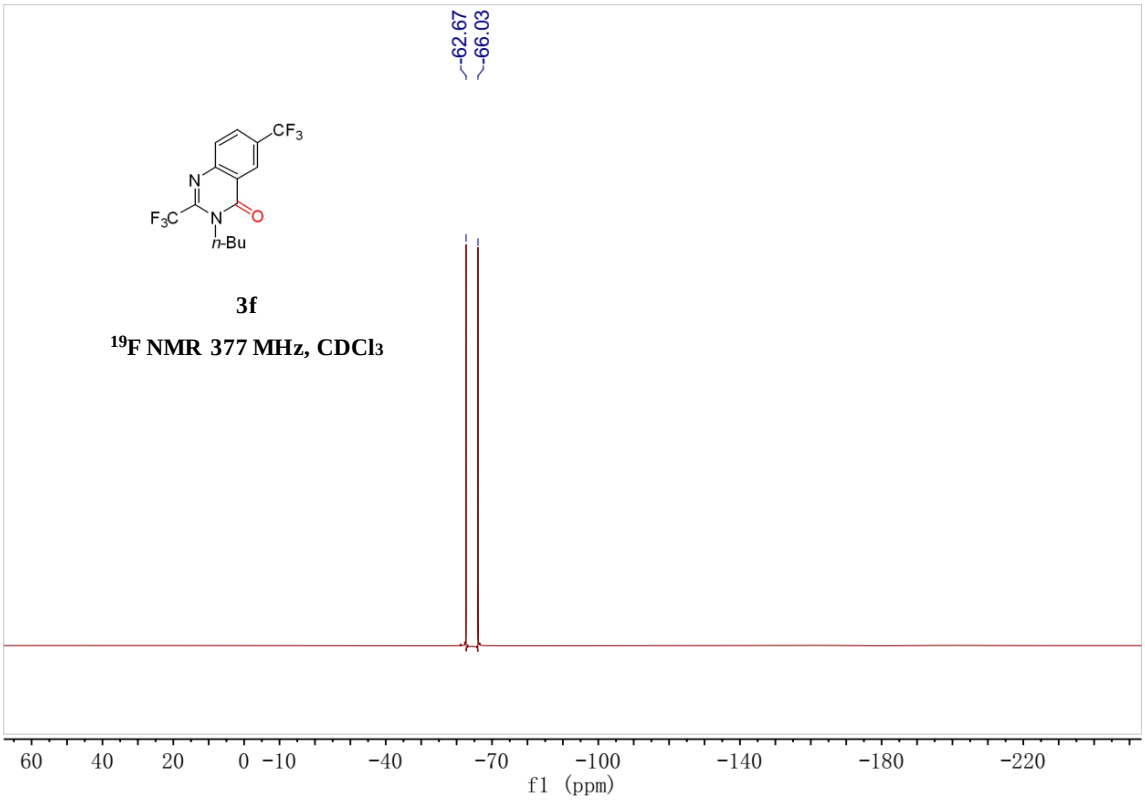

3f

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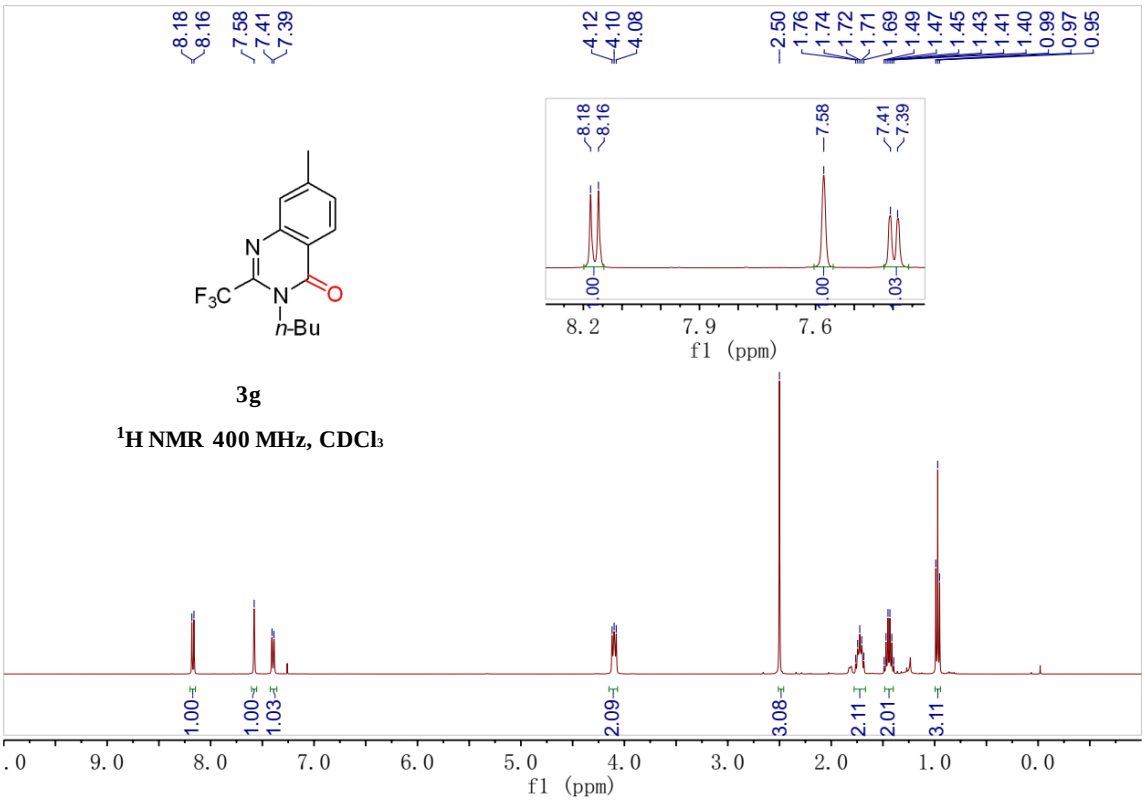

3g

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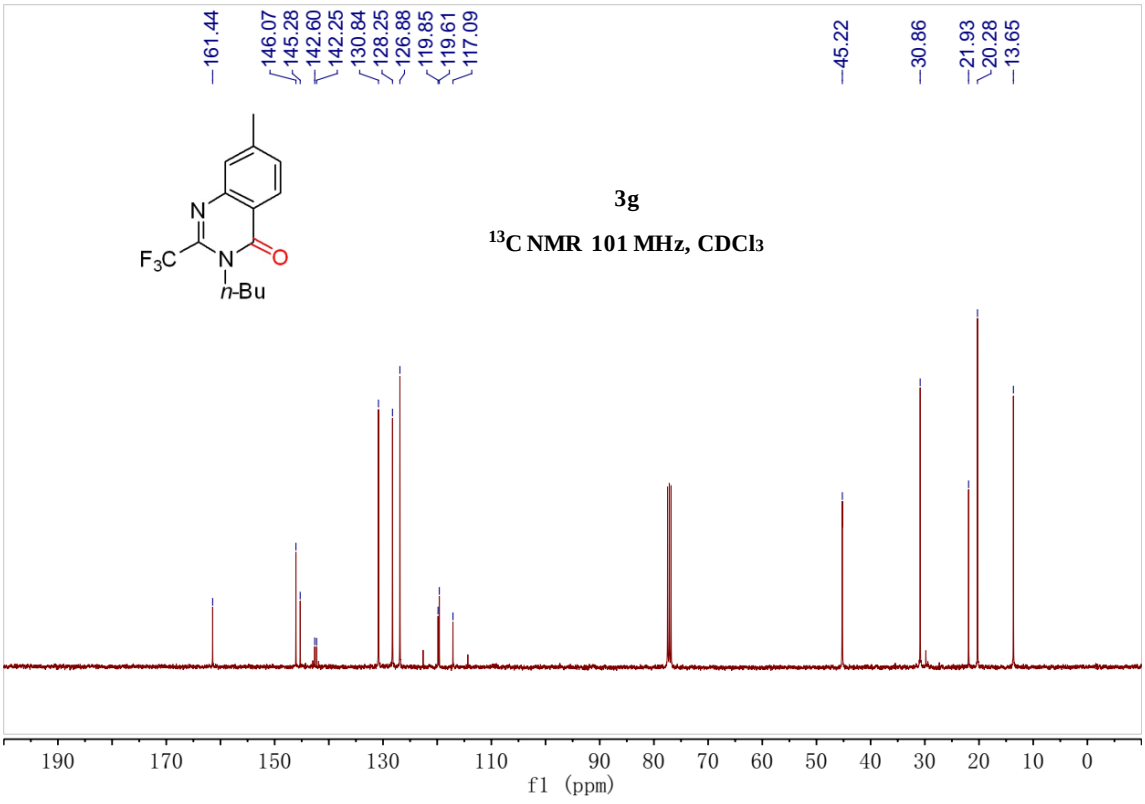

3g

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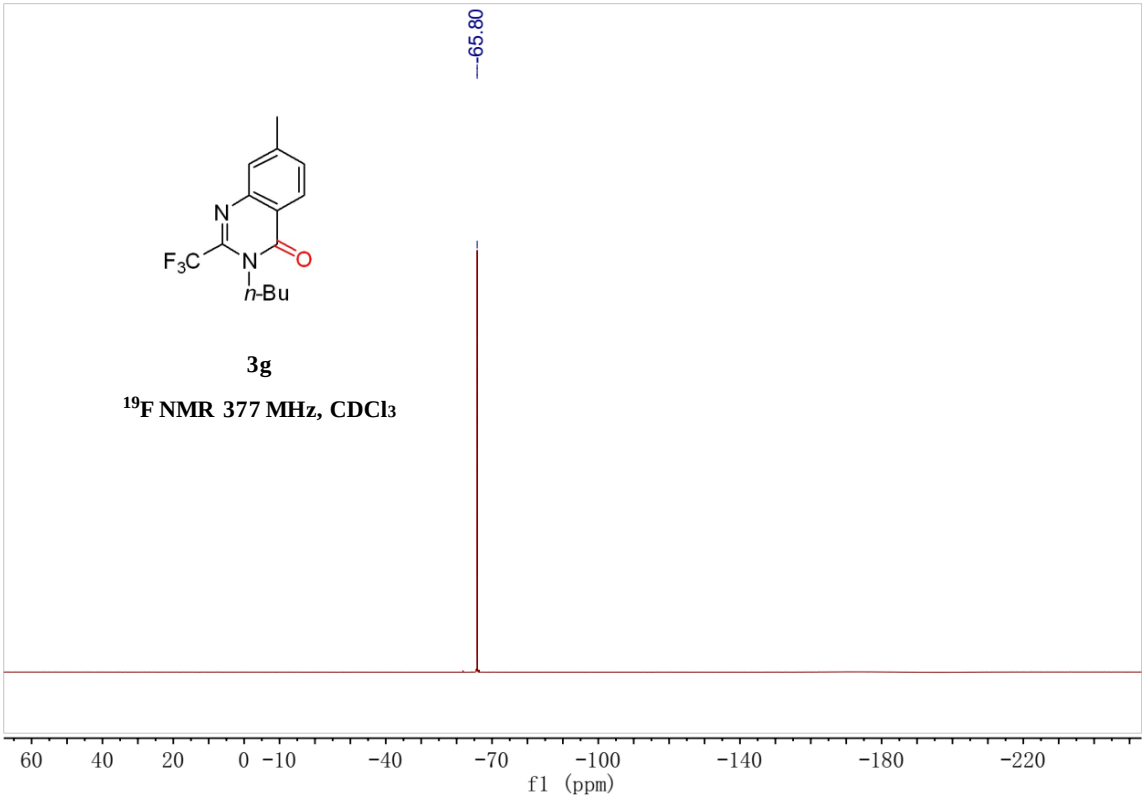

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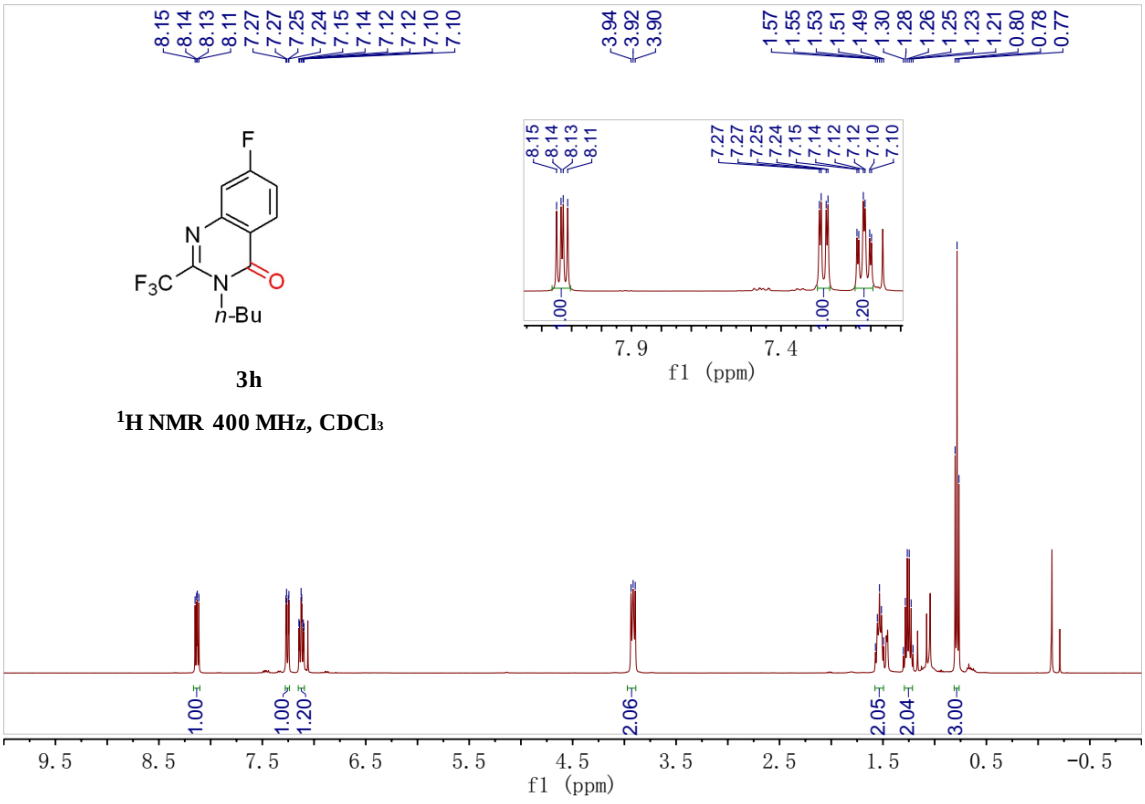

3h

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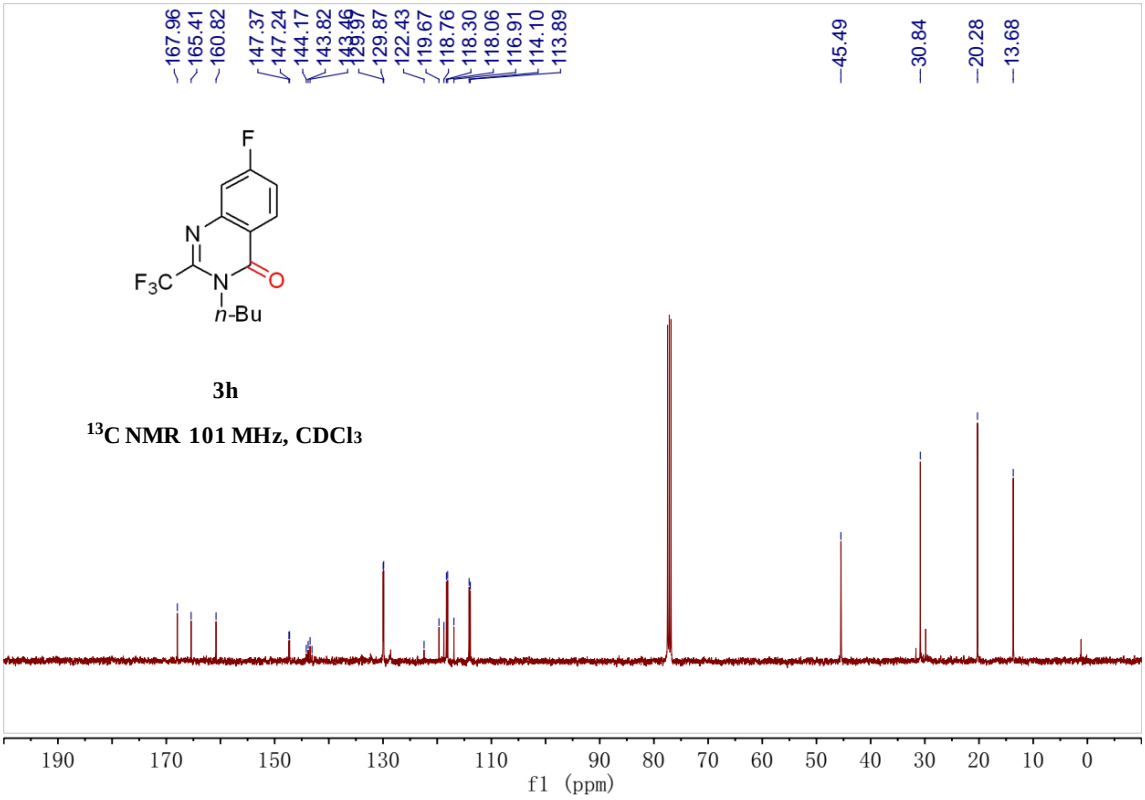

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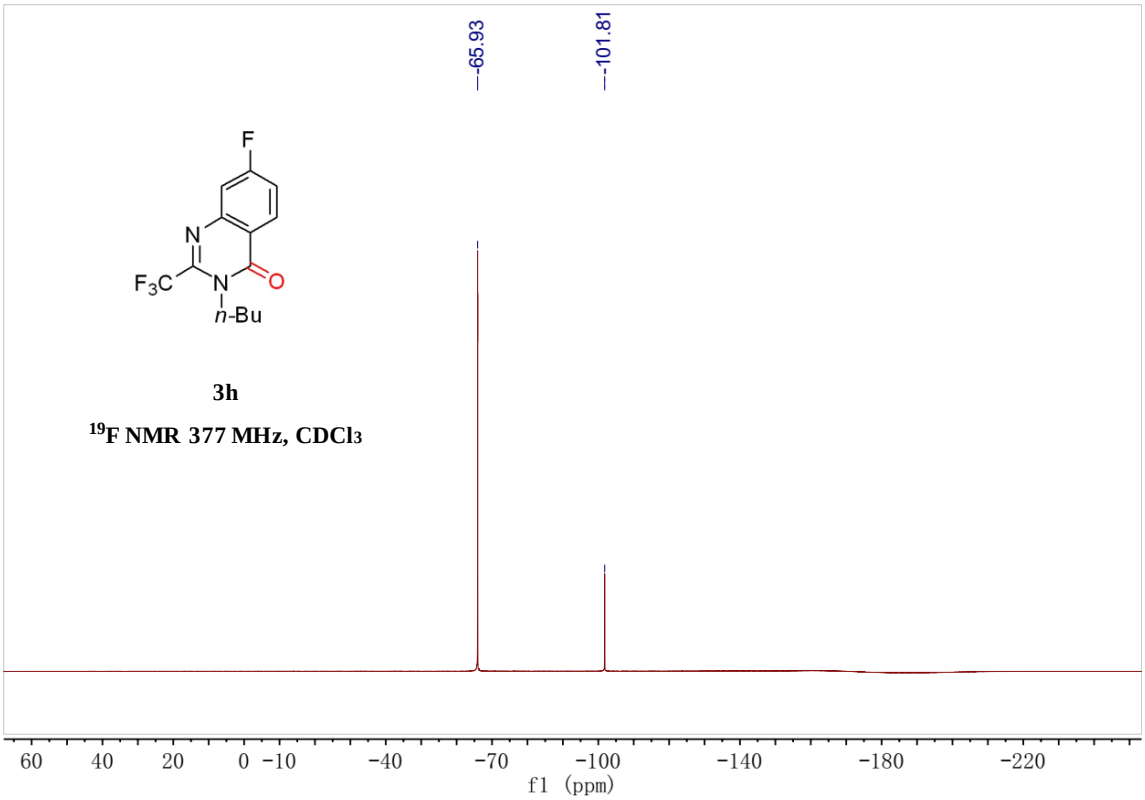

3h

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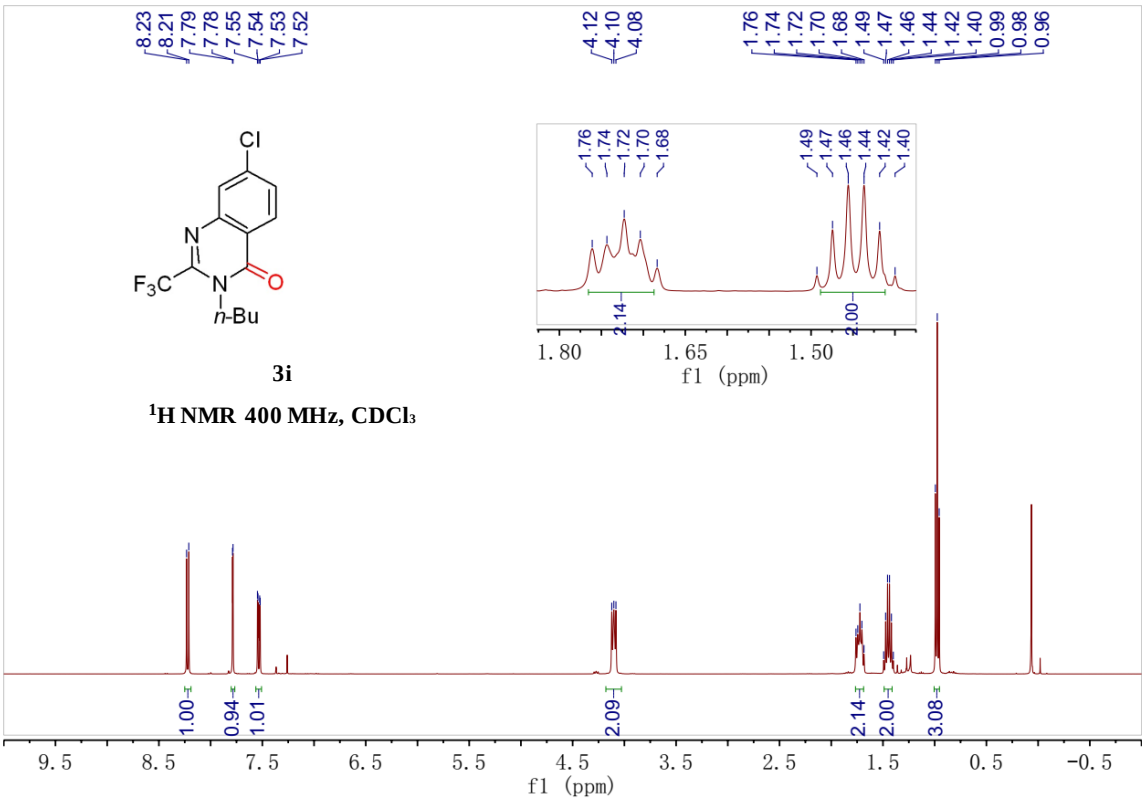
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1.72
1.70
1.68
1.49
1.47
1.46
1.44
1.42
1.40
0.99
0.98
0.96
Cl
N
F3C
N
O
n-Bu
3i
1H NMR 400 MHz, CDCl3
2.14
2.00
1.80
1.65
1.50
f1 (ppm)
1.00
0.94
1.01
2.09
2.14
2.00
3.08
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8.5
7.5
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4.5
3.5
2.5
1.5
0.5
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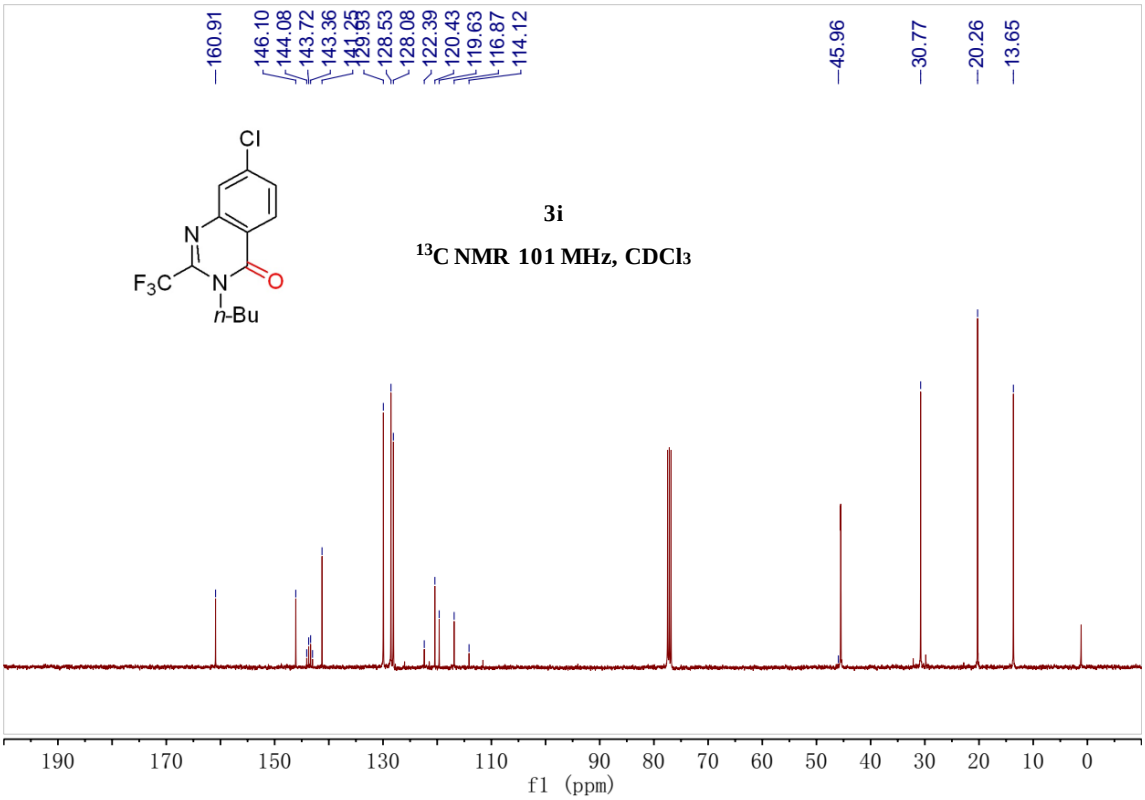
f1 (ppm)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30.77
20.26
13.65
Cl
N
F3C
N
O
n-Bu
3i
13C NMR 101 MHz, CDCl3
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50
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30
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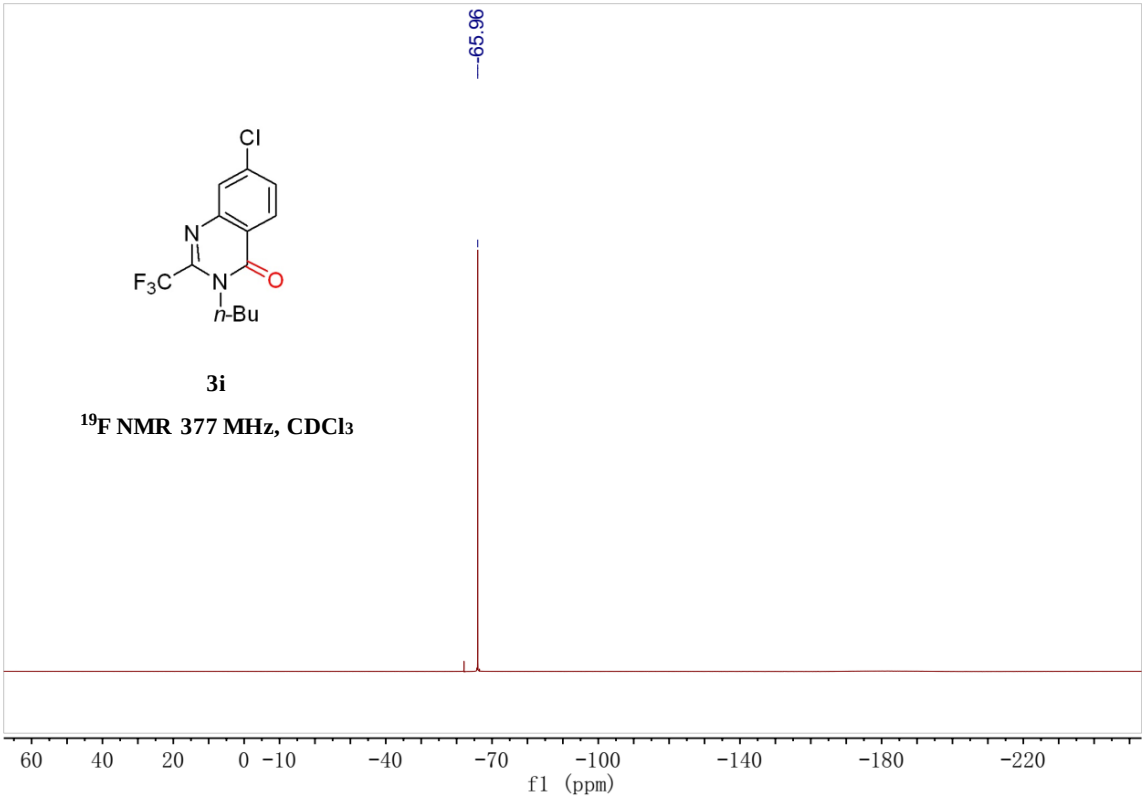
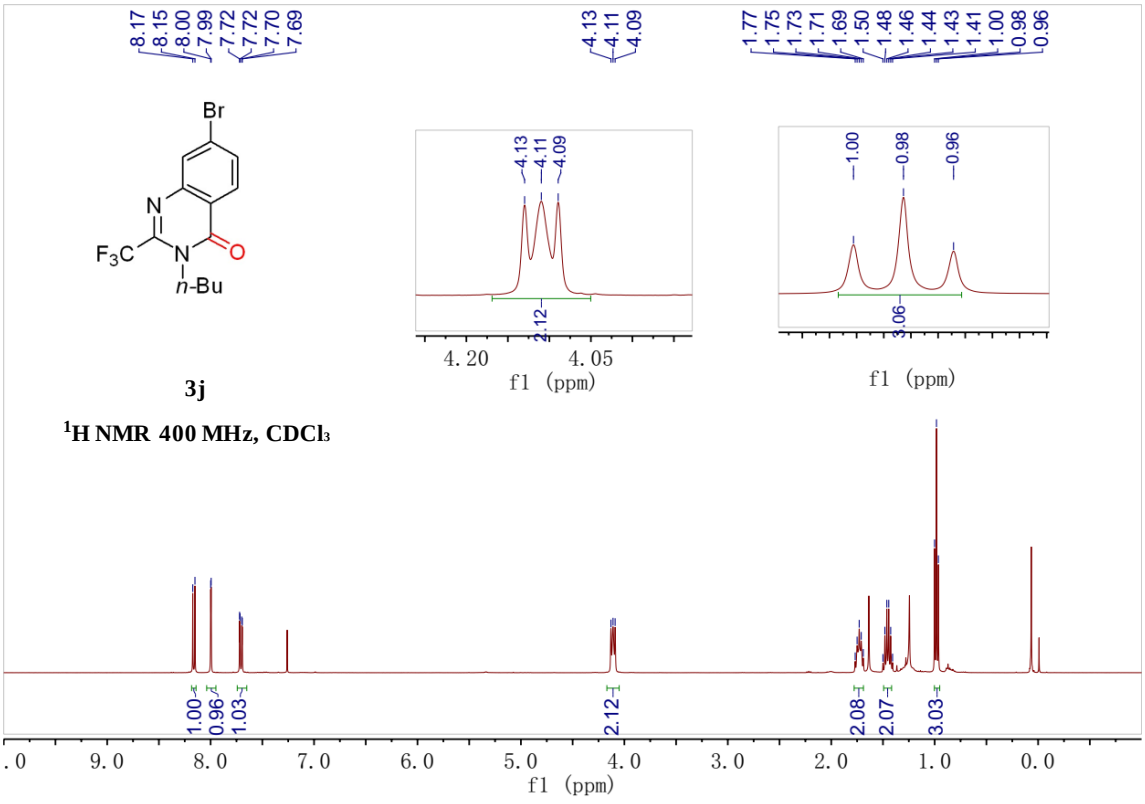
f1 (ppm)



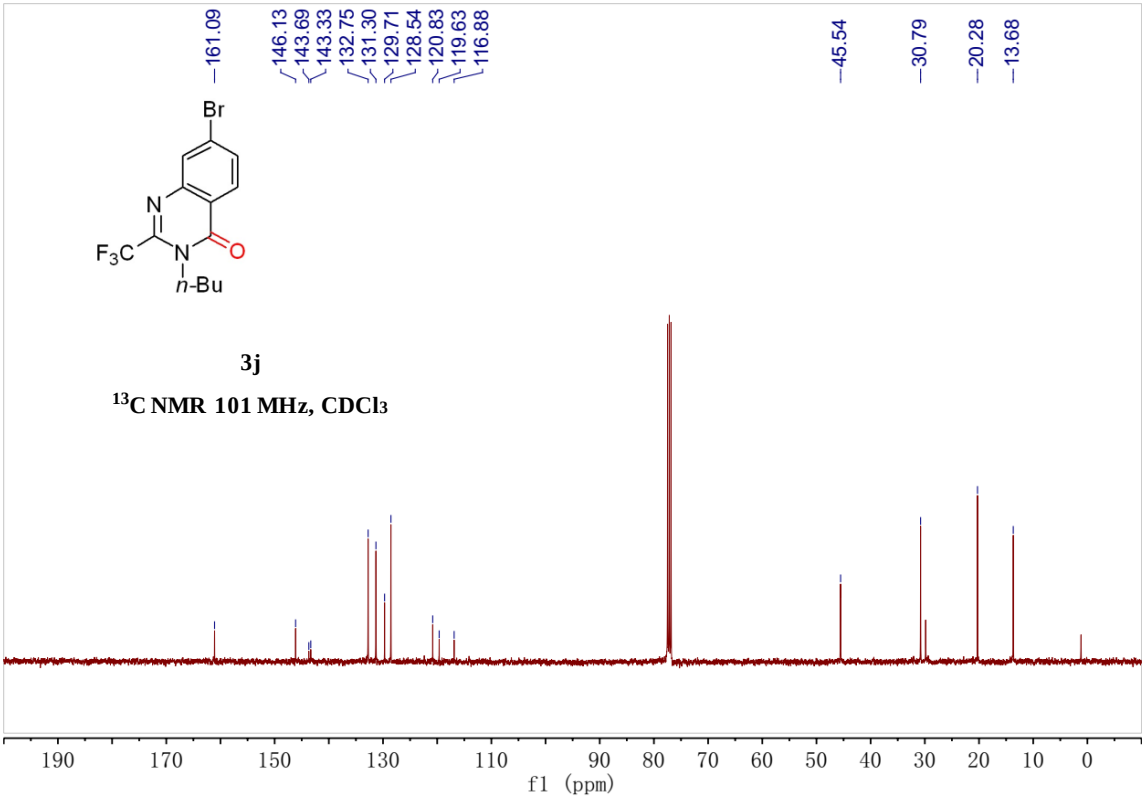
3i

^{19}F NMR 377 MHz, CDCl$_3$



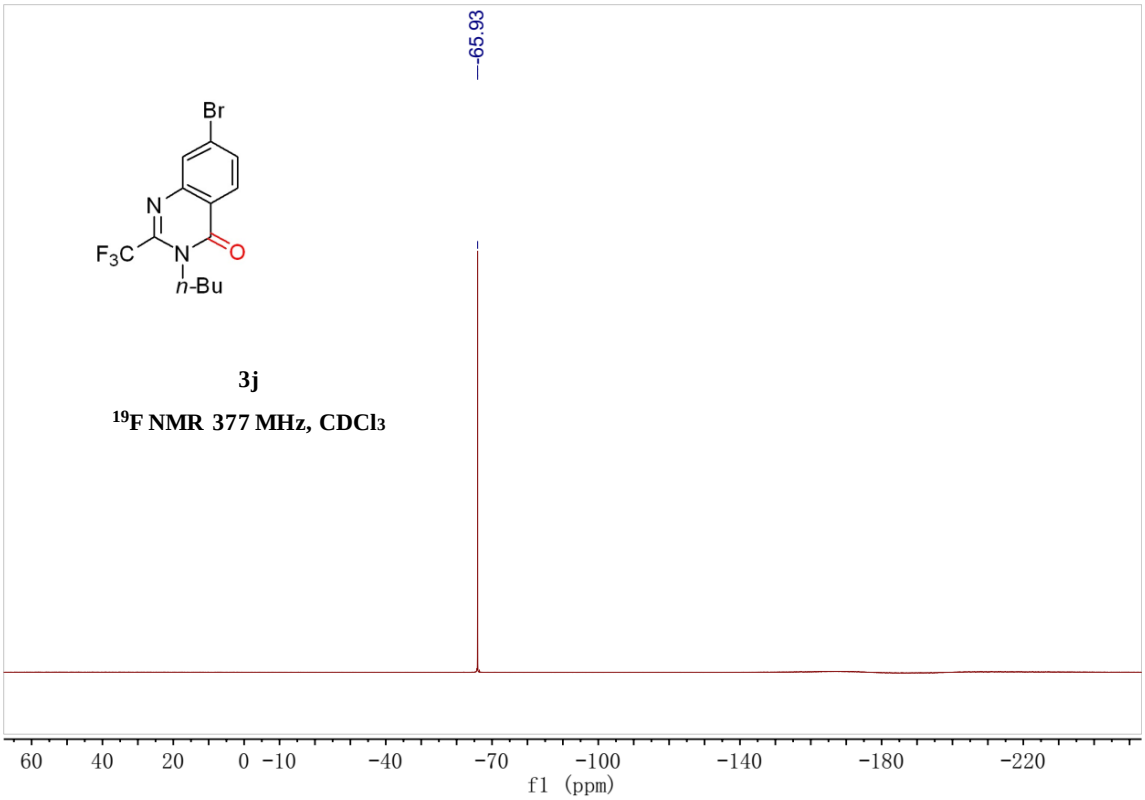
3j

^{1}H NMR 400 MHz, CDCl$_3$



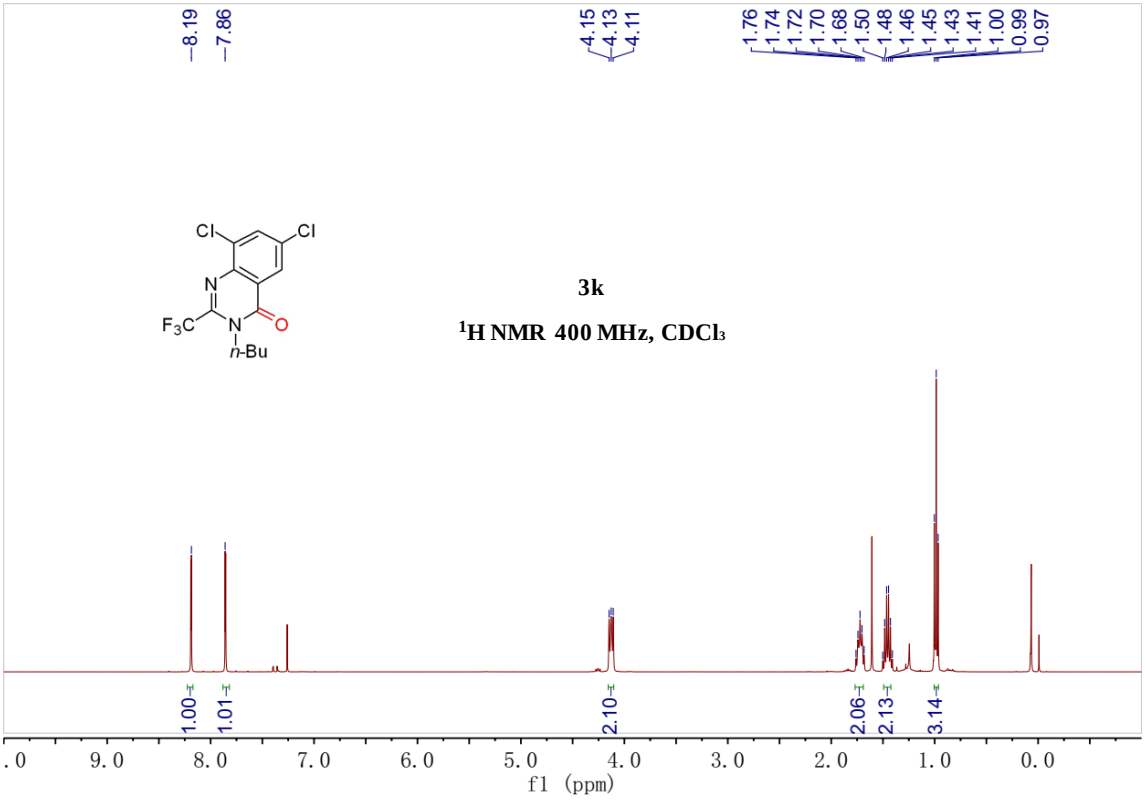
3j

^{13}C NMR 101 MHz, $CDCl_3$



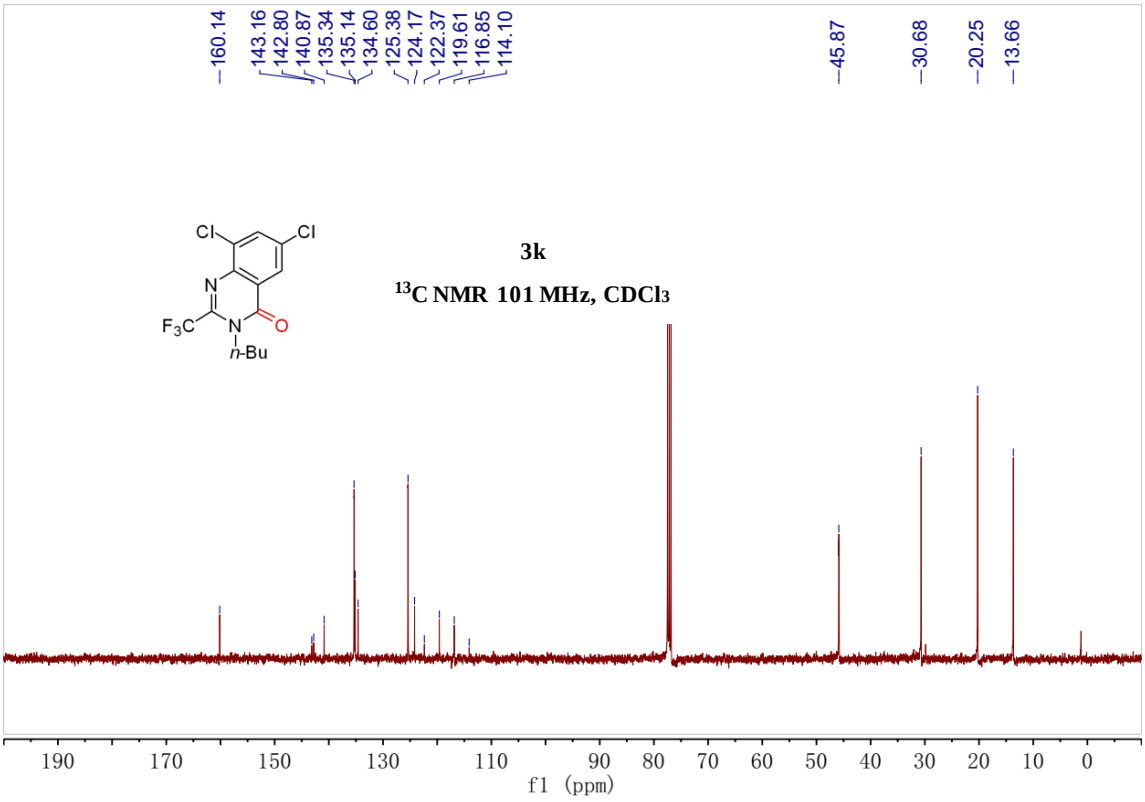
3j

^{19}F NMR 377 MHz, $CDCl_3$



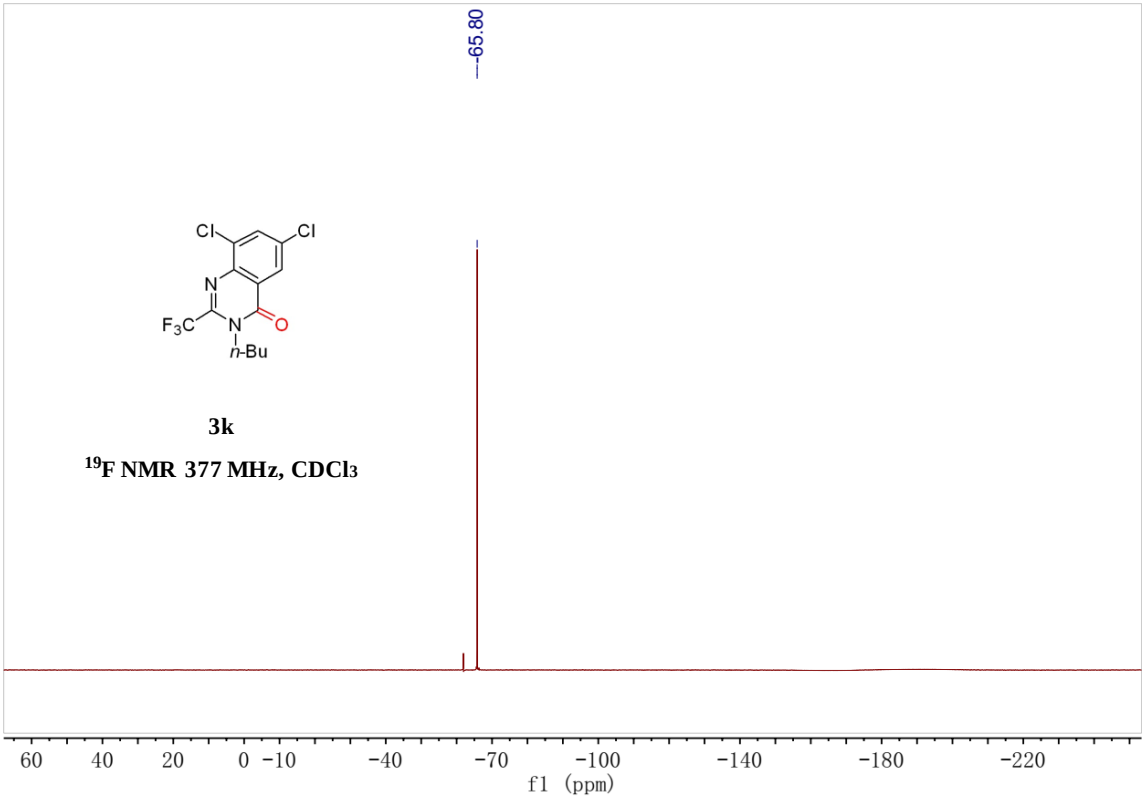
3k

^{1}H NMR 400 MHz, $CDCl_3$



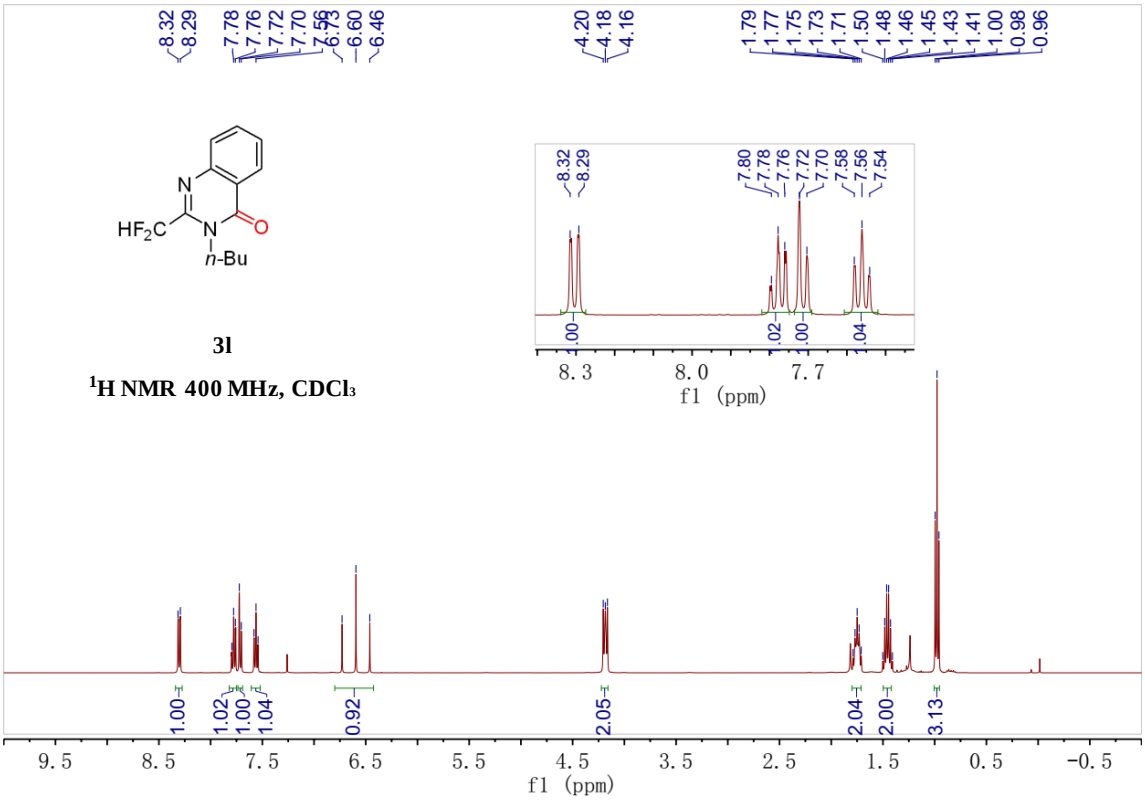
3k

^{13}C NMR 101 MHz, $CDCl_3$



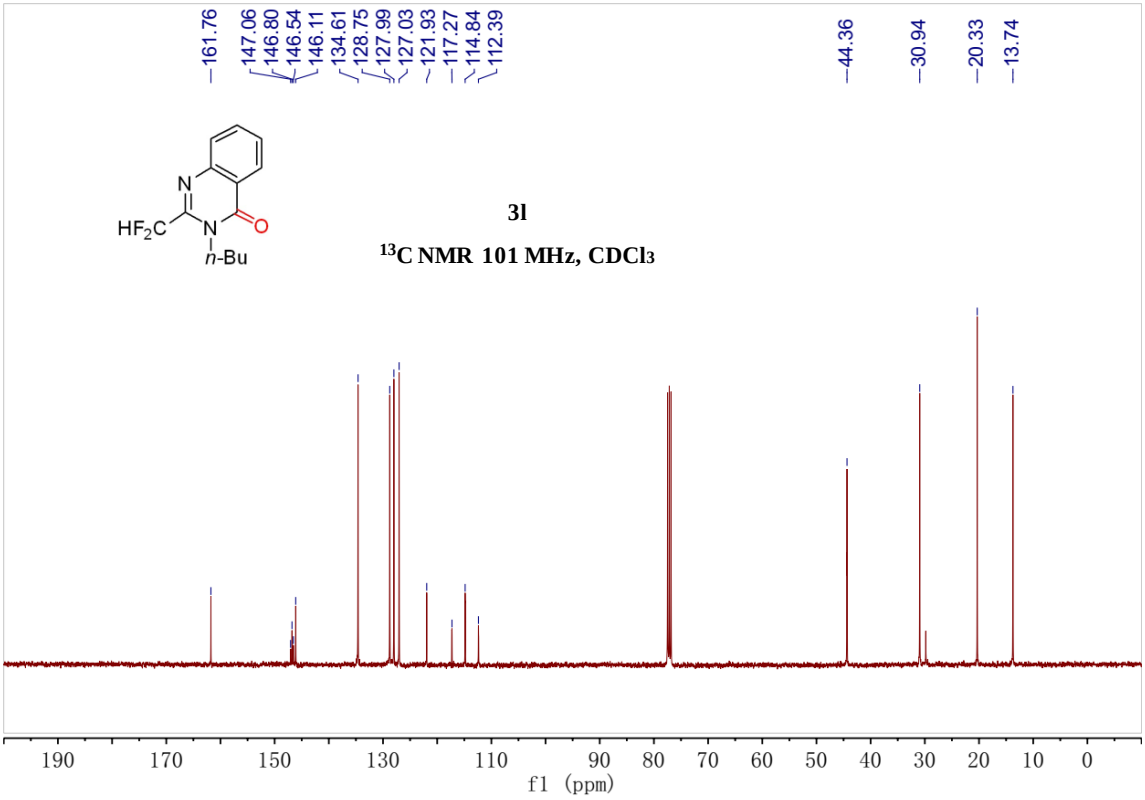
3k

^{19}F NMR 377 MHz, CDCl$_3$



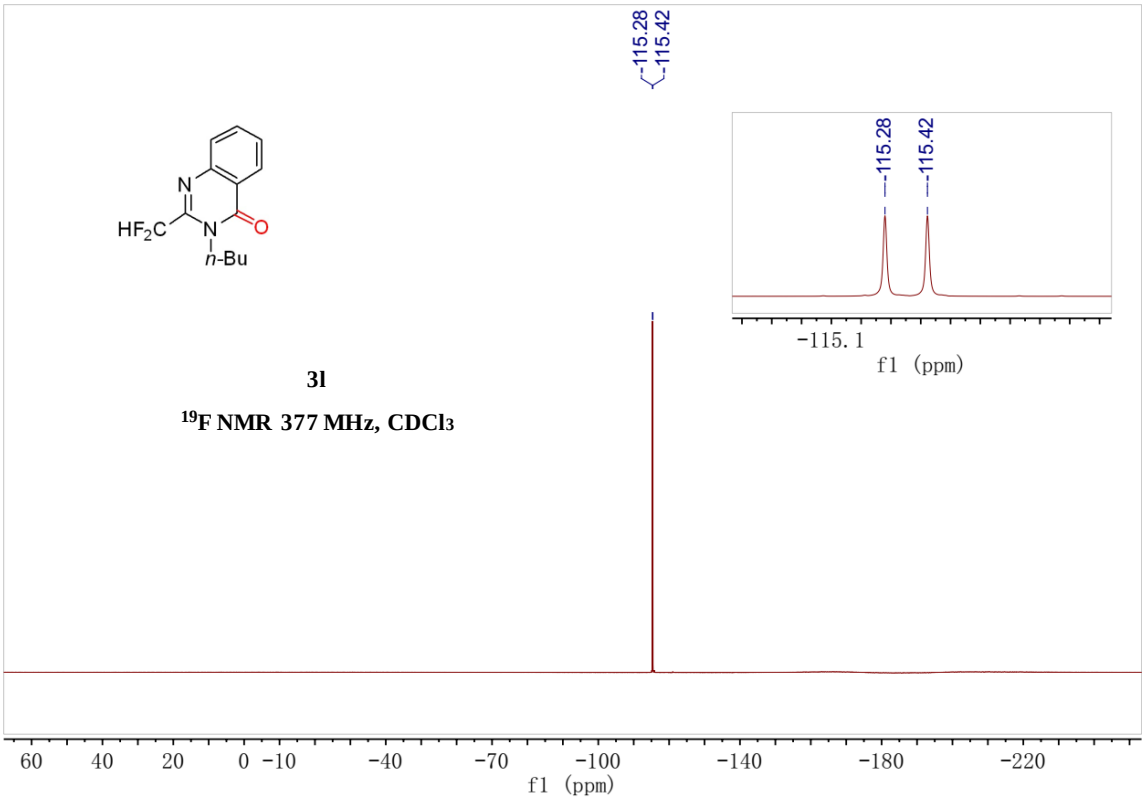
3l

^{1}H NMR 400 MHz, CDCl$_3$



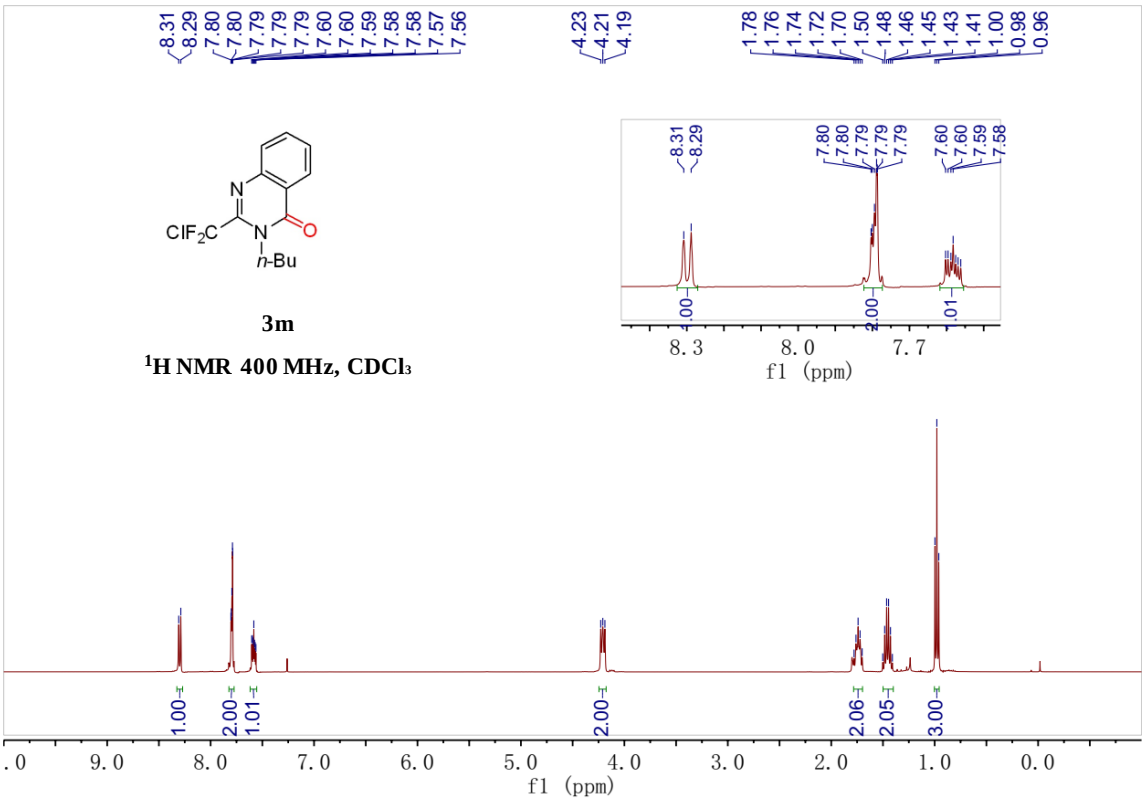
3l

^{13}C NMR 101 MHz, $CDCl_3$



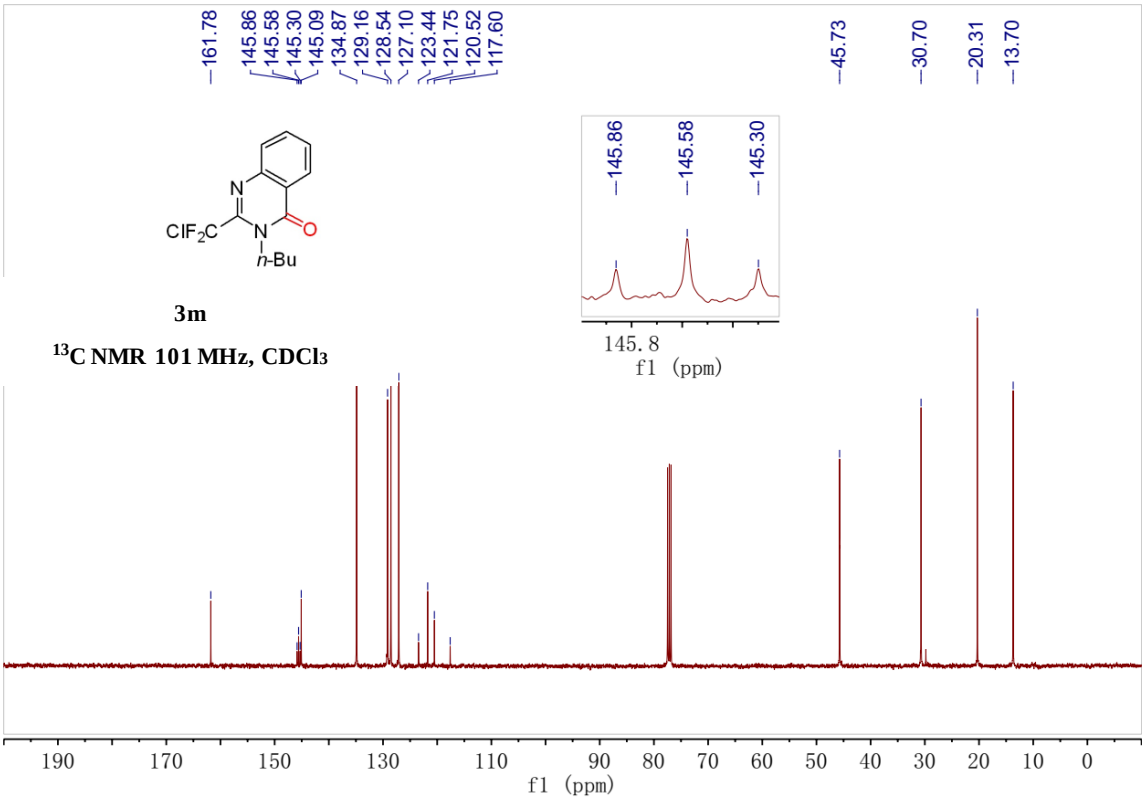
3l

^{19}F NMR 377 MHz, $CDCl_3$



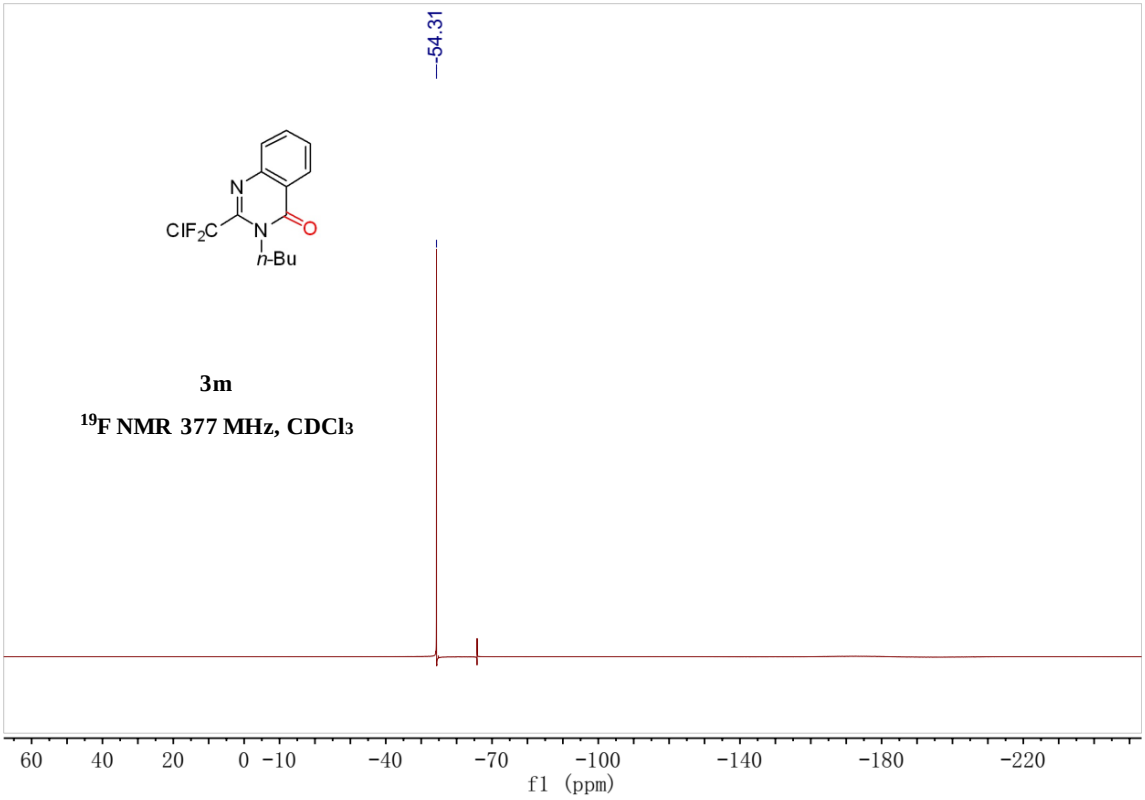
3m

^{1}H NMR 400 MHz, CDCl$_3$



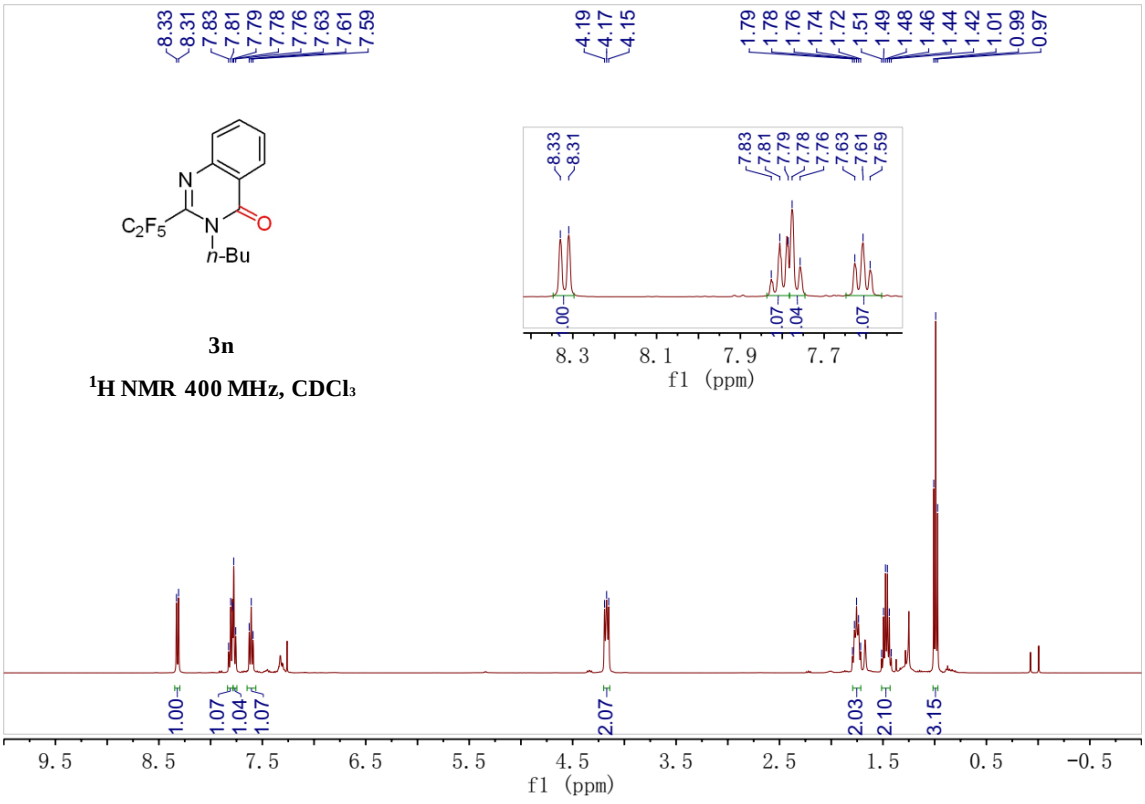
3m

^{13}C NMR 101 MHz, CDCl$_3$



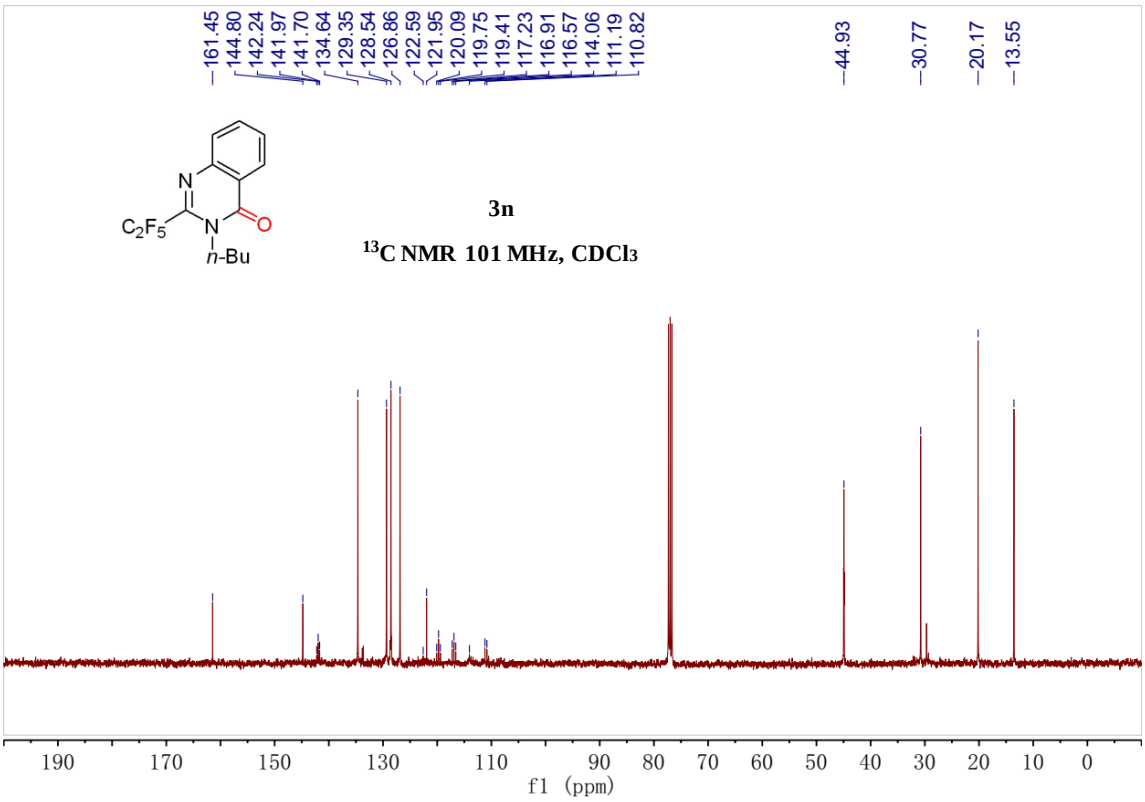
3m

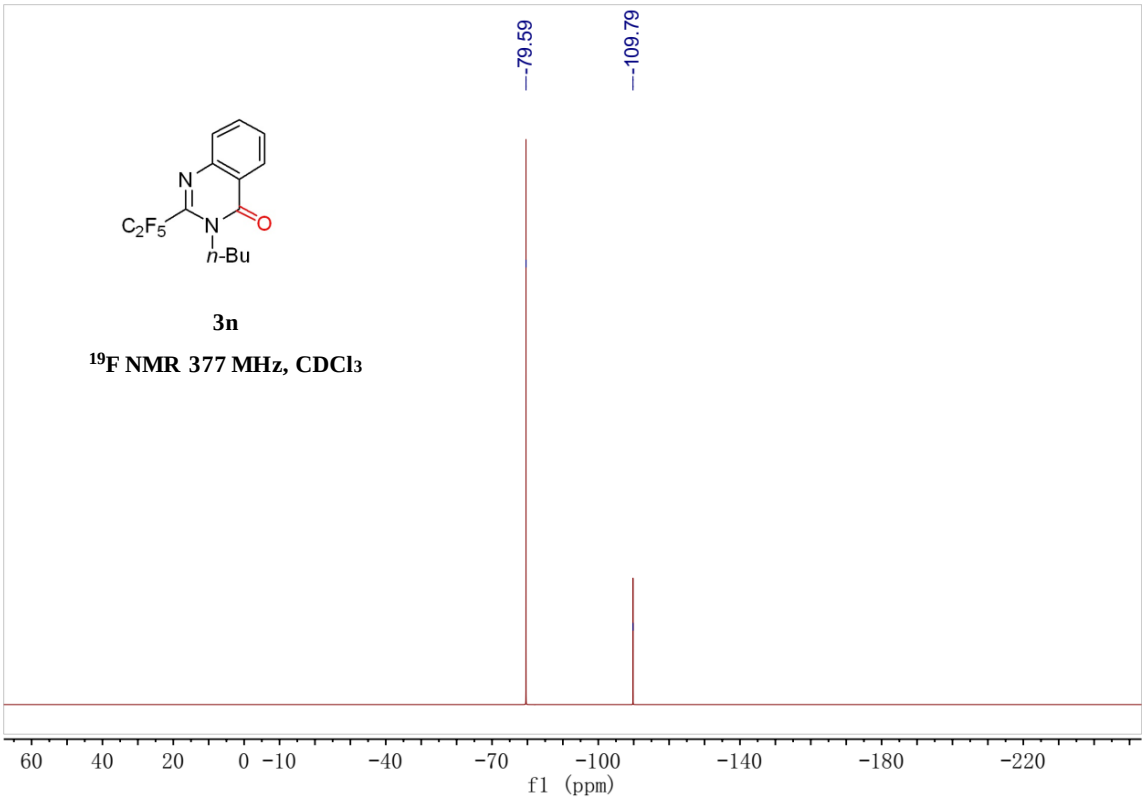
^{19}F NMR 377 MHz, CDCl$_3$

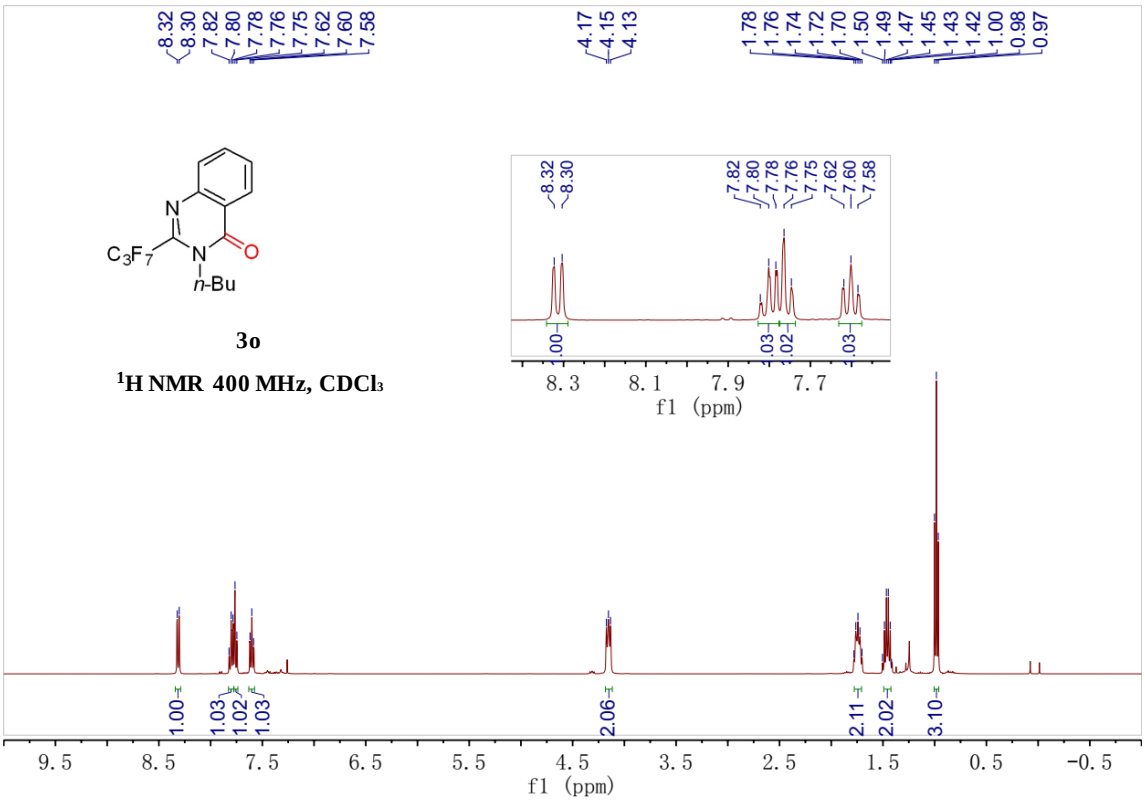


3n

^{1}H NMR 400 MHz, CDCl$_3$

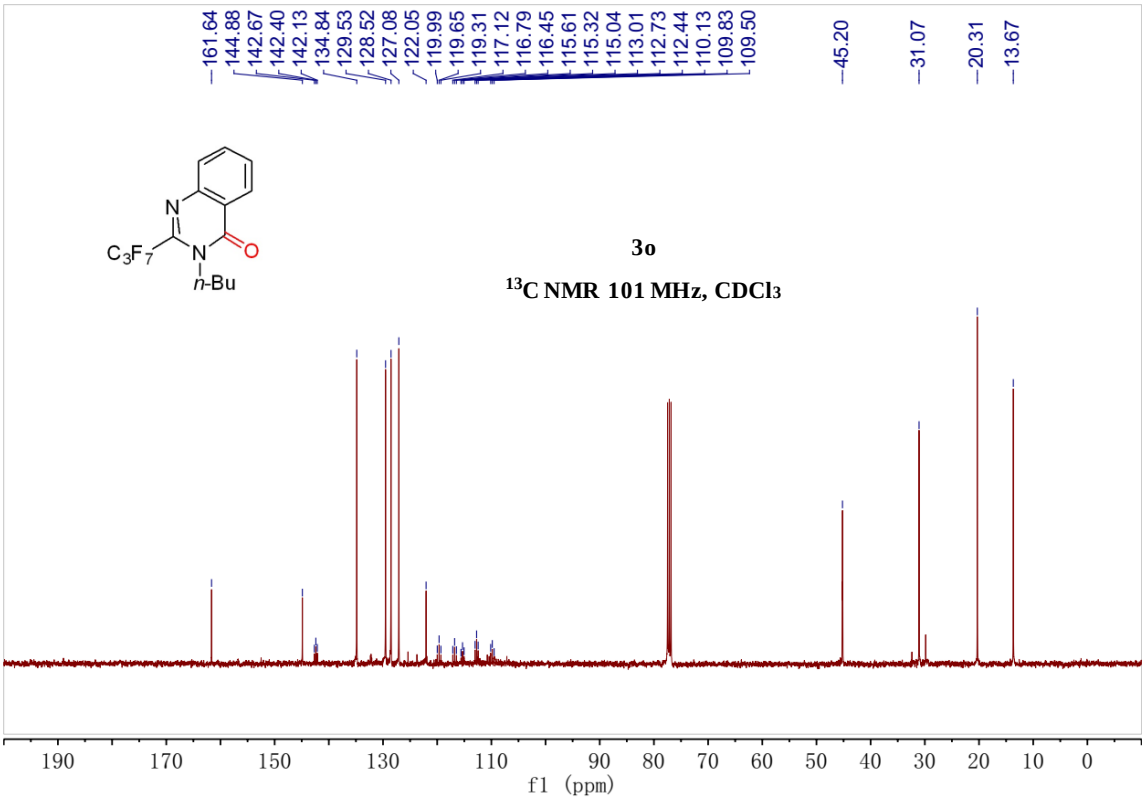

161.45
144.80
142.24
141.97
141.70
134.64
129.35
128.54
126.86
122.59
121.95
120.09
119.75
119.41
117.23
116.91
116.57
114.06
111.19
110.82
44.93
30.77
20.17
13.55
N
C2F5
N
O
n-Bu
3n
13C NMR 101 MHz, CDCl3
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


-79.59
-109.79
N
C2F5
N
O
n-Bu
3n
19F NMR 377 MHz, CDCl3
60
40
20
0
-10
-40
-70
-100
-140
-180
-220
f1 (ppm)



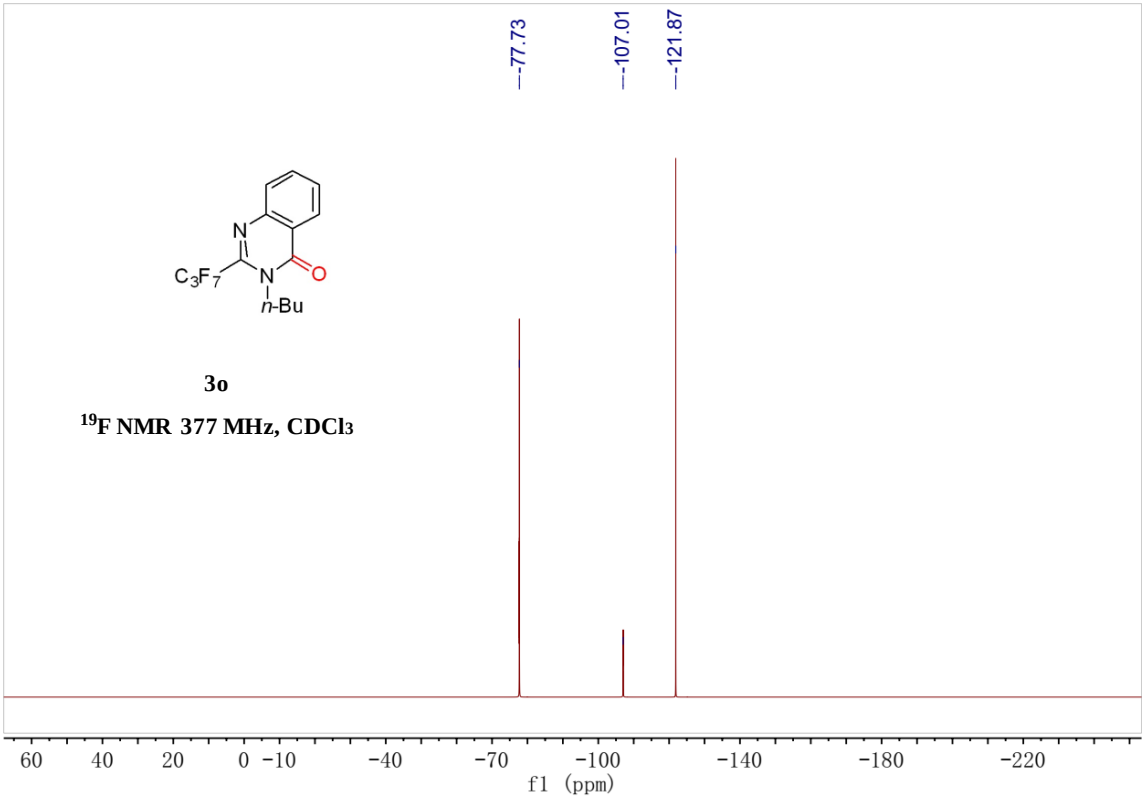
3o

^{1}H NMR 400 MHz, $CDCl_3$



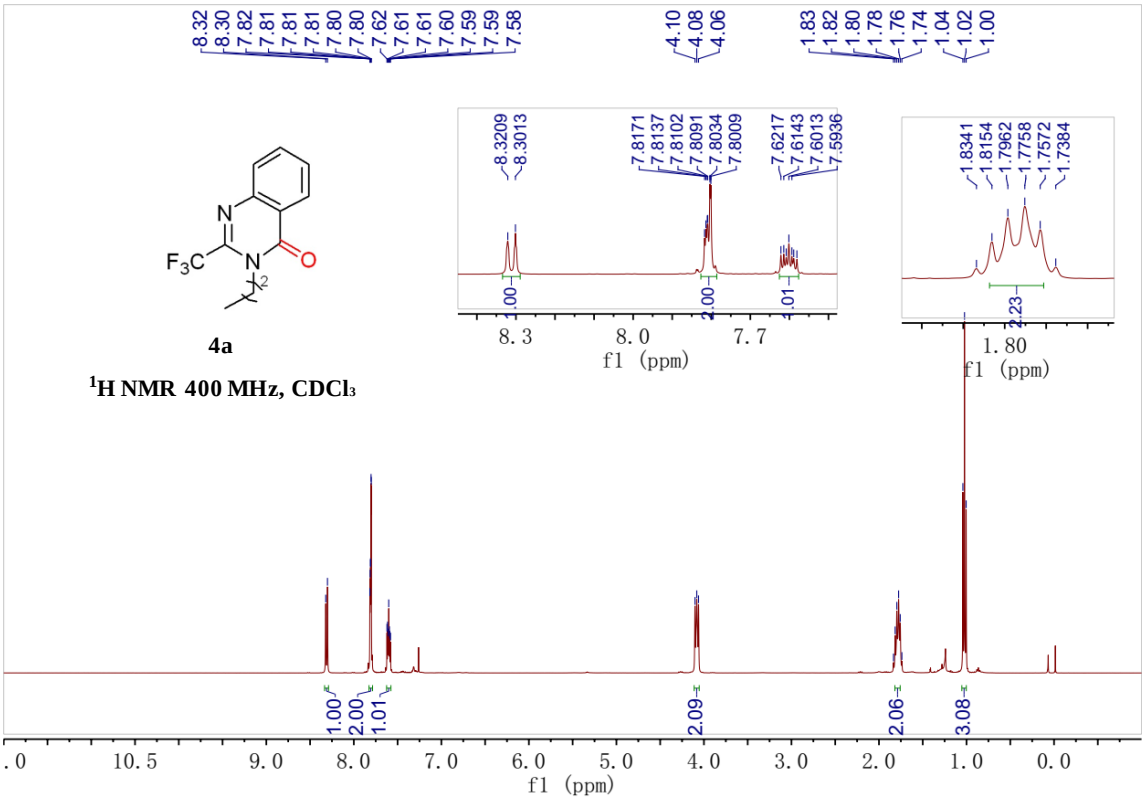
3o

^{13}C NMR 101 MHz, $CDCl_3$



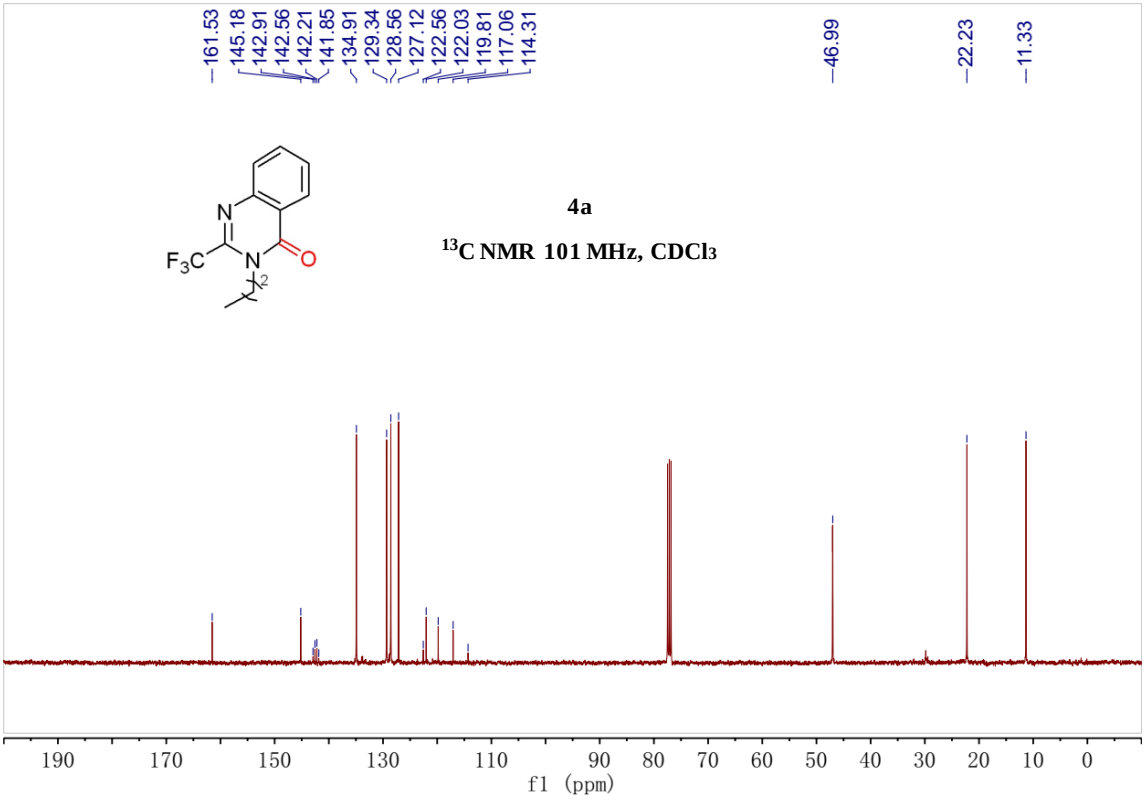
3o

^{19}F NMR 377 MHz, CDCl$_3$



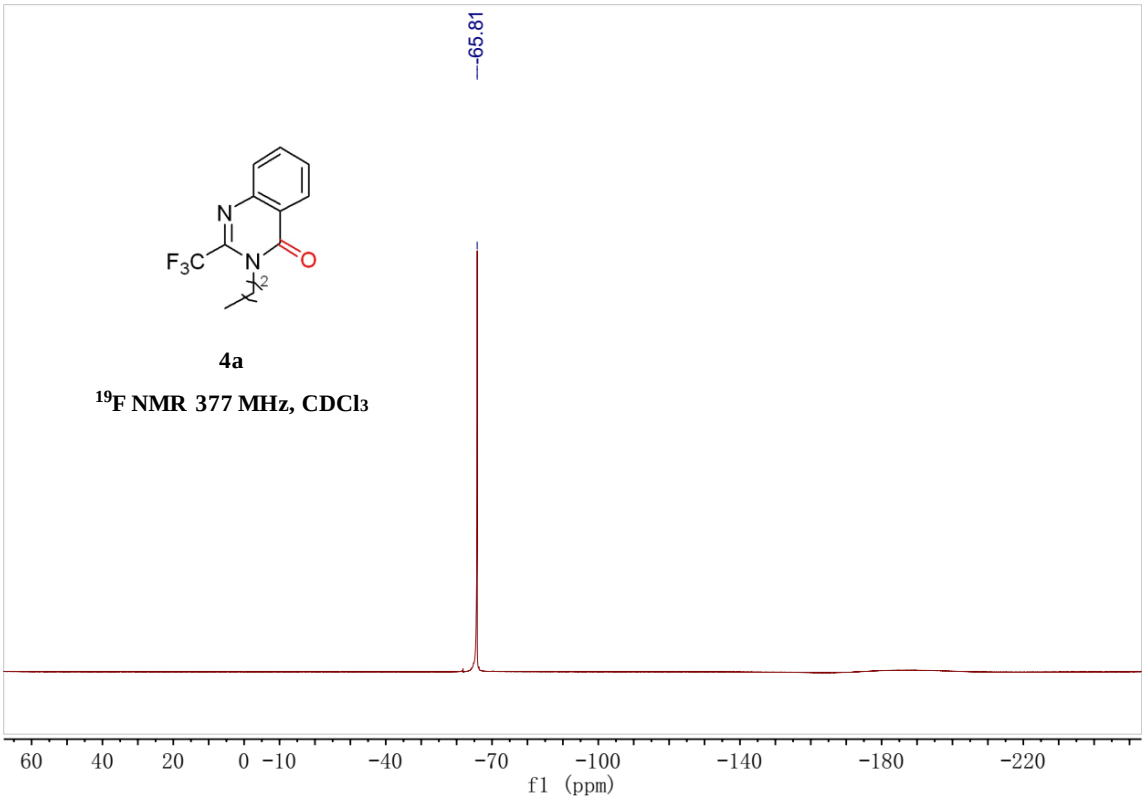
4a

^{1}H NMR 400 MHz, CDCl$_3$



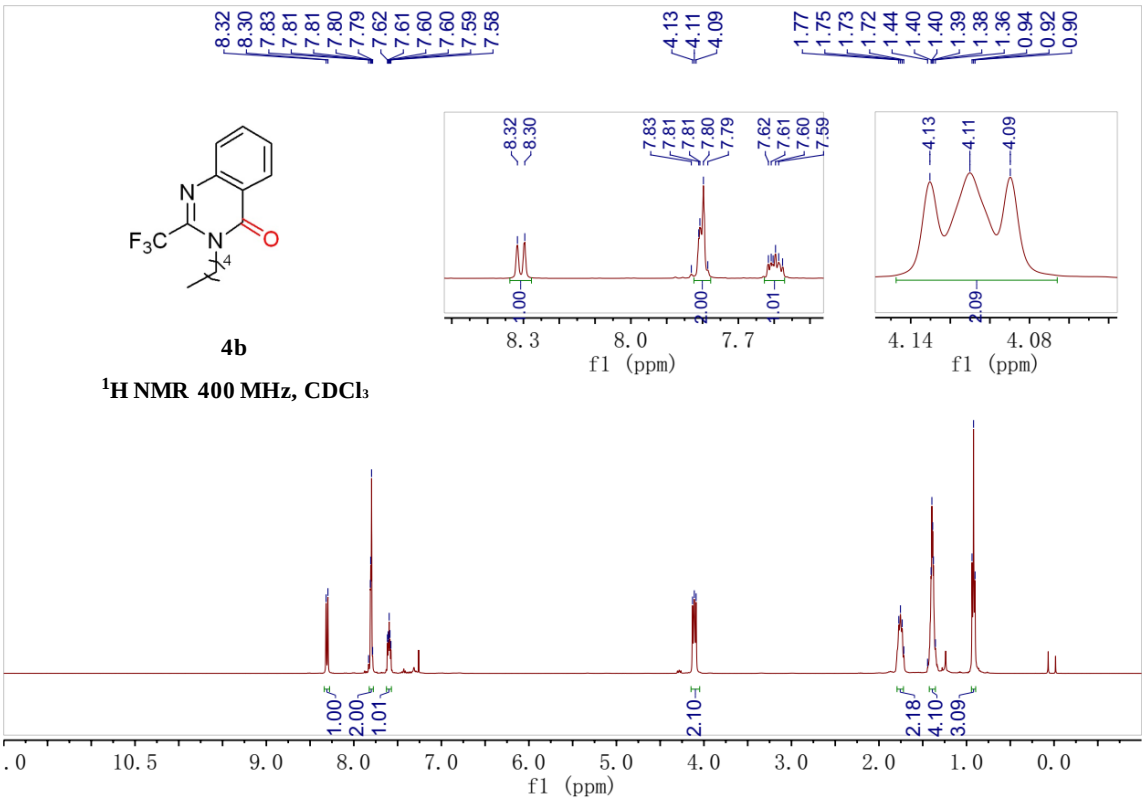
4a

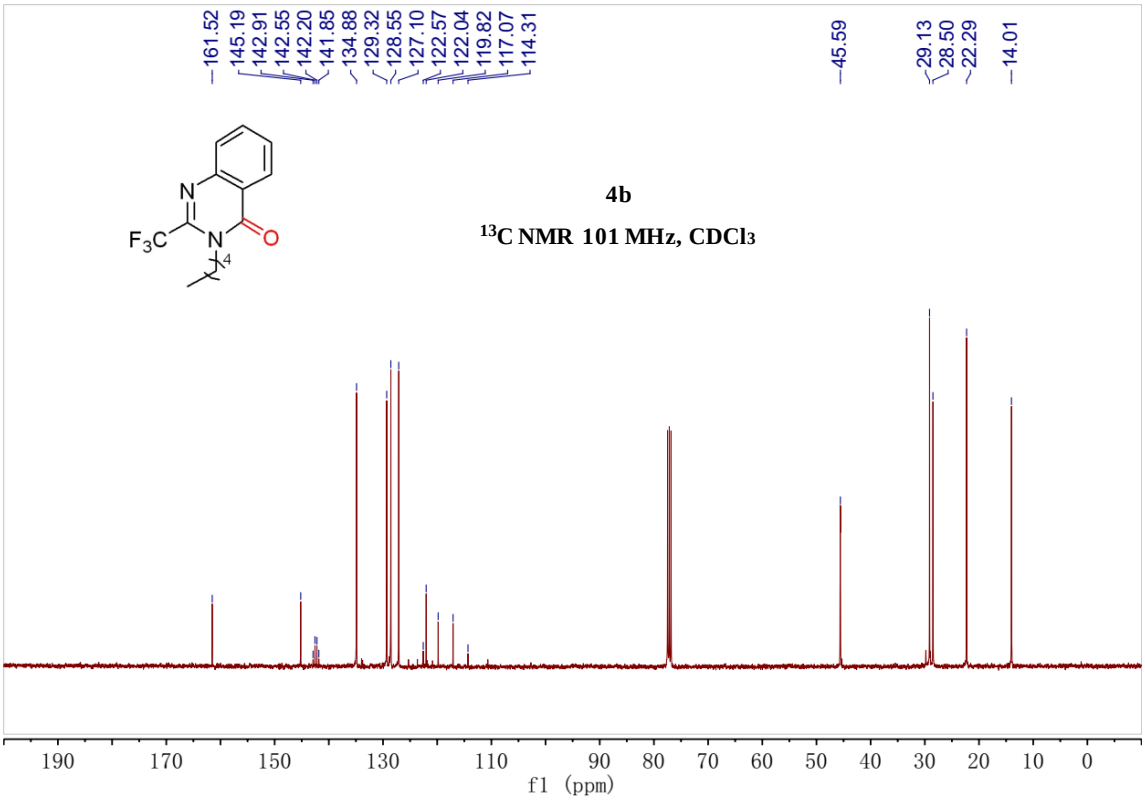
^{13}C NMR 101 MHz, CDCl$_3$

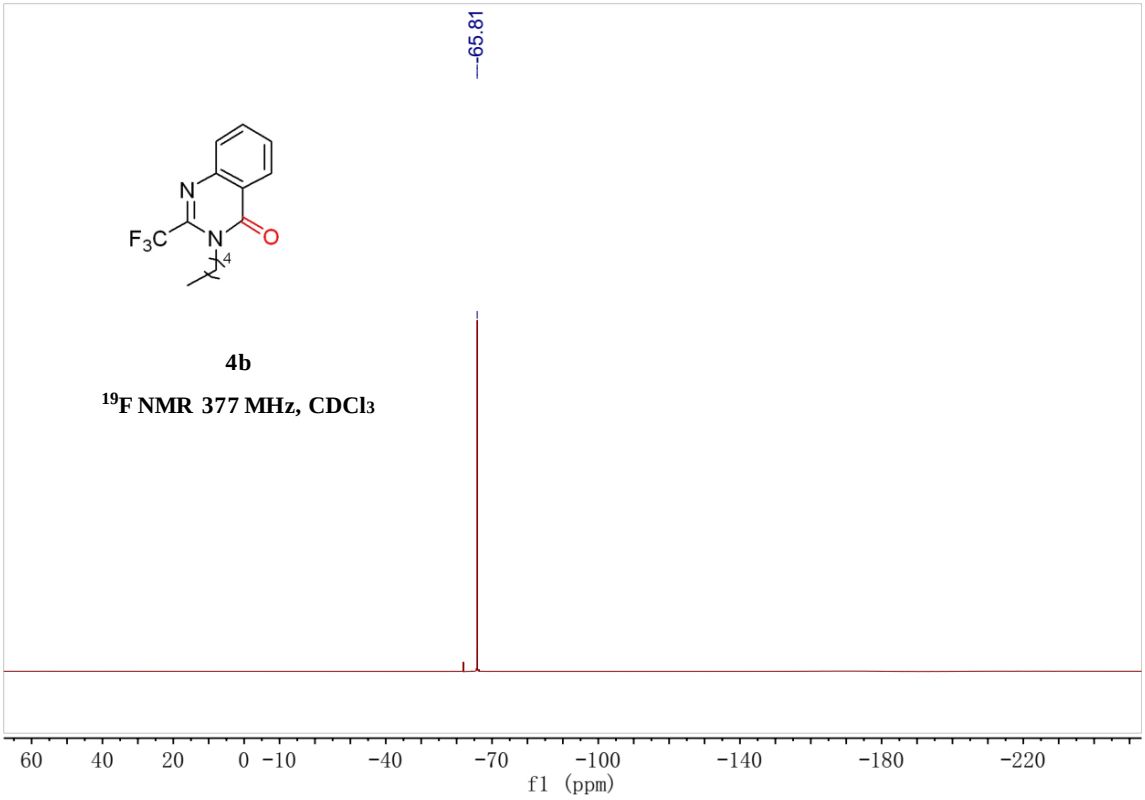


4a

^{19}F NMR 377 MHz, CDCl$_3$

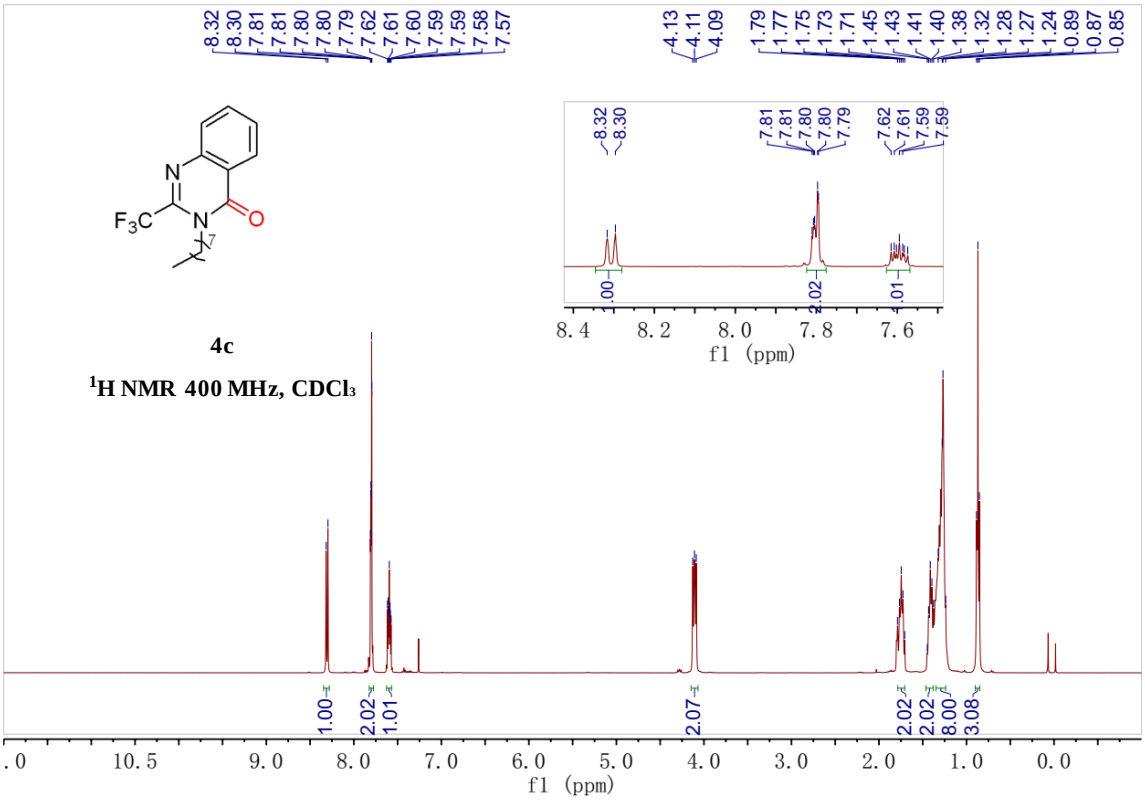

8.32
8.30
7.83
7.81
7.81
7.80
7.79
7.62
7.61
7.60
7.60
7.59
7.58
4.13
4.11
4.09
1.77
1.75
1.73
1.72
1.44
1.40
1.40
1.39
1.38
1.36
0.94
0.92
0.90
F3C
N
O
4
4b
1H NMR 400 MHz, CDCl3
f1 (ppm)
f1 (ppm)
f1 (ppm)


161.52
145.19
142.91
142.55
142.20
141.85
134.88
129.32
128.55
127.10
122.57
122.04
119.82
117.07
114.31
45.59
29.13
28.50
22.29
14.01
F3C
N
O
4
4b
13C NMR 101 MHz, CDCl3
f1 (ppm)



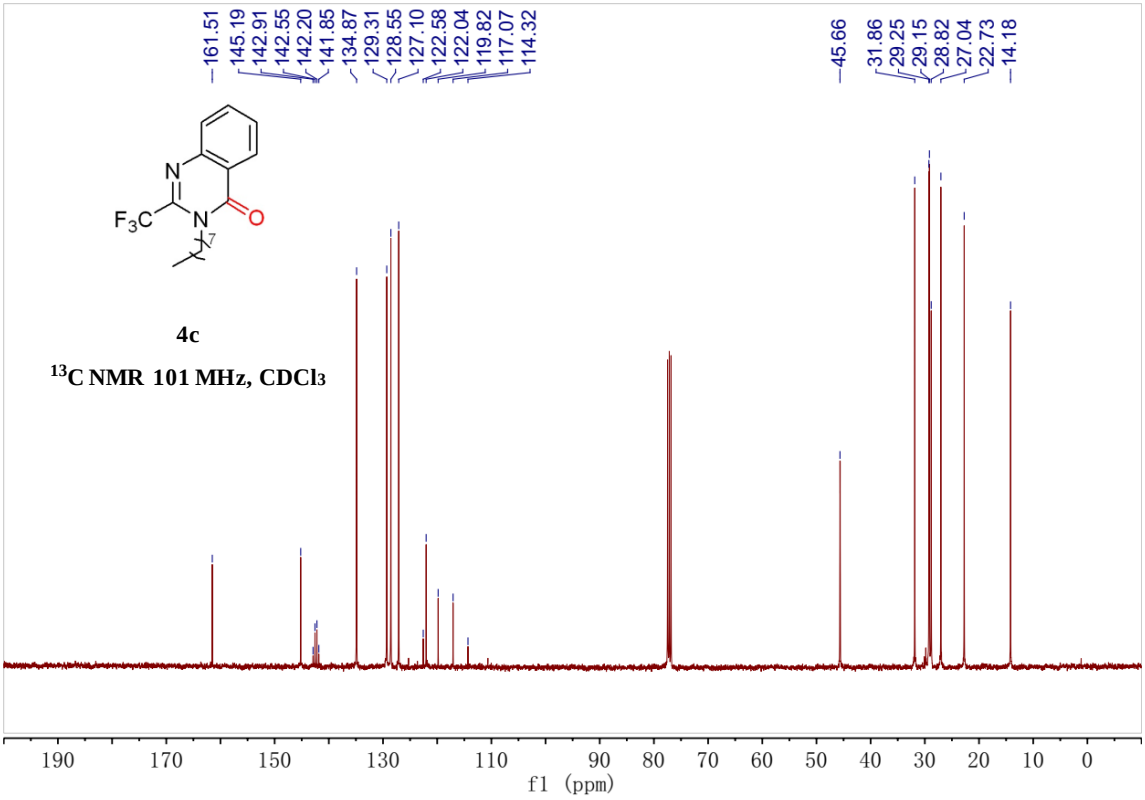
4b

^{19}F NMR 377 MHz, CDCl$_3$



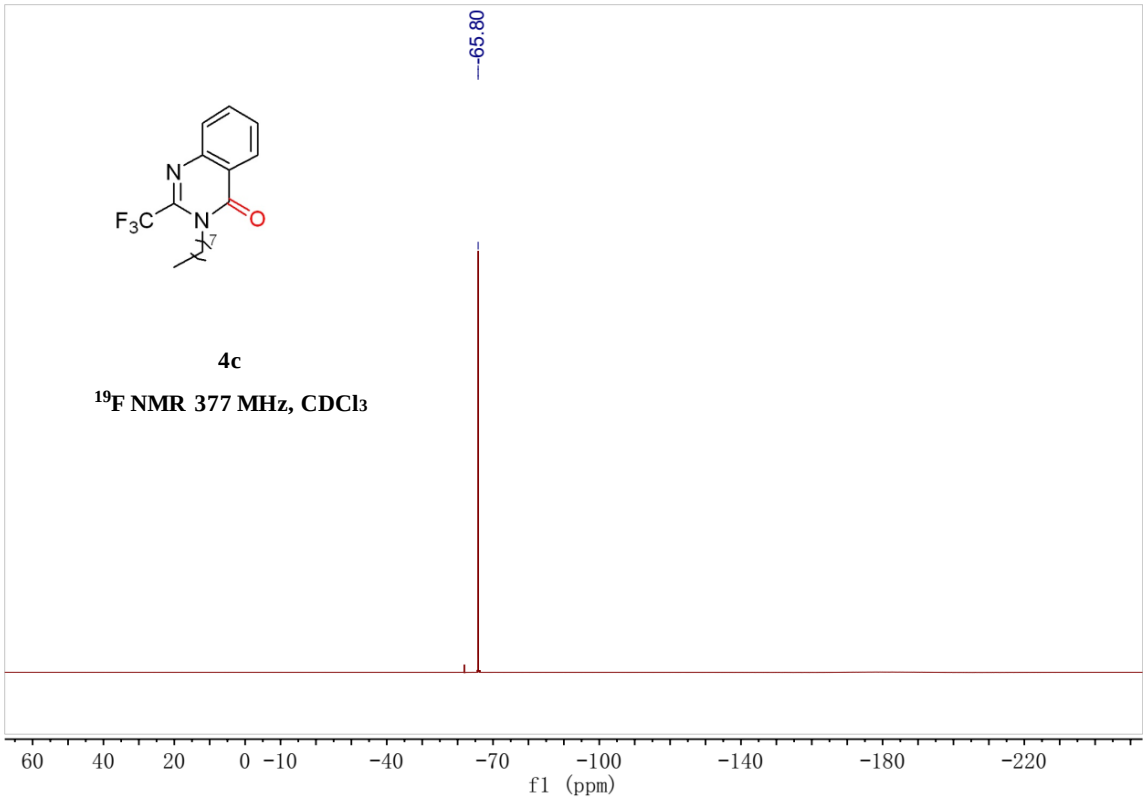
4c

^{1}H NMR 400 MHz, CDCl$_3$



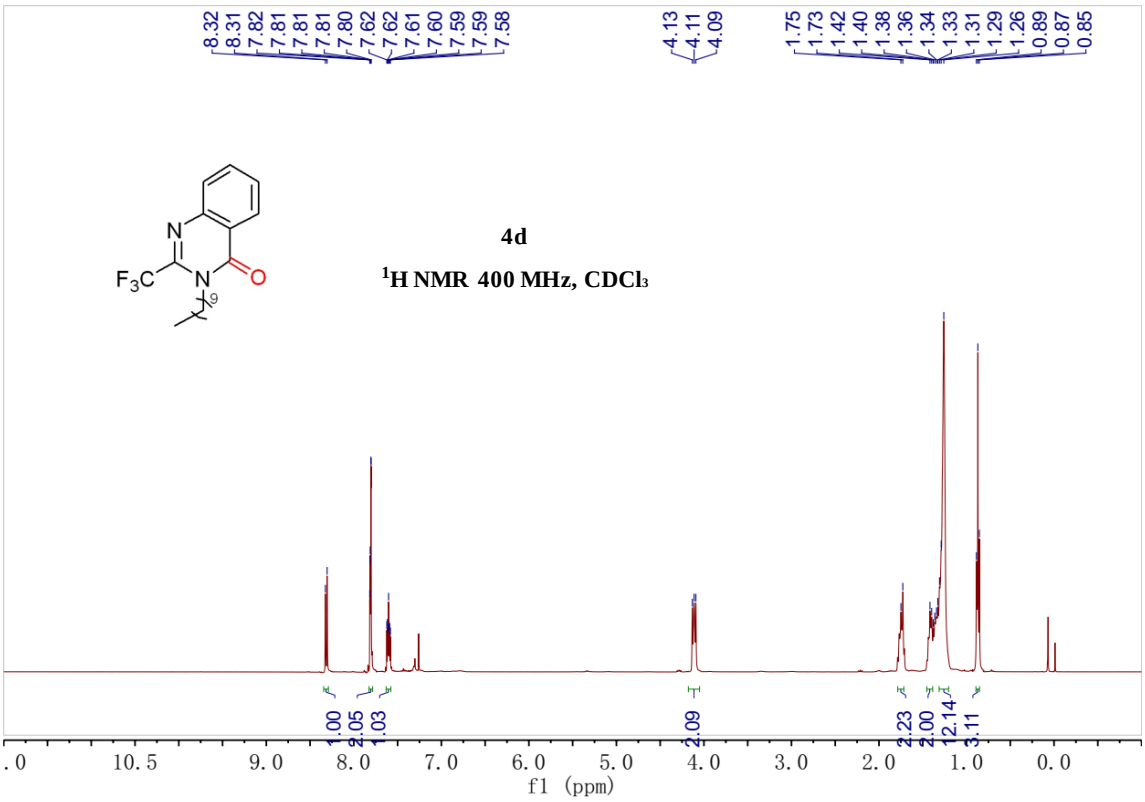
4c

^{13}C NMR 101 MHz, CDCl$_3$



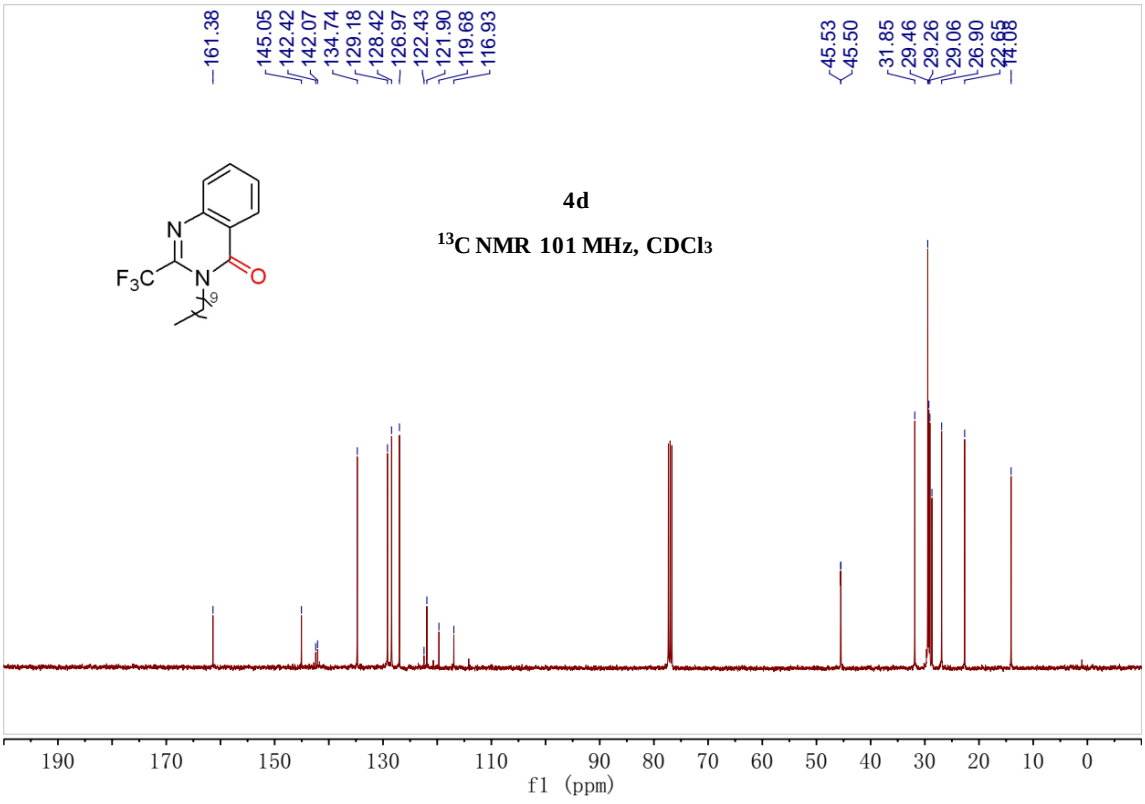
4c

^{19}F NMR 377 MHz, CDCl$_3$



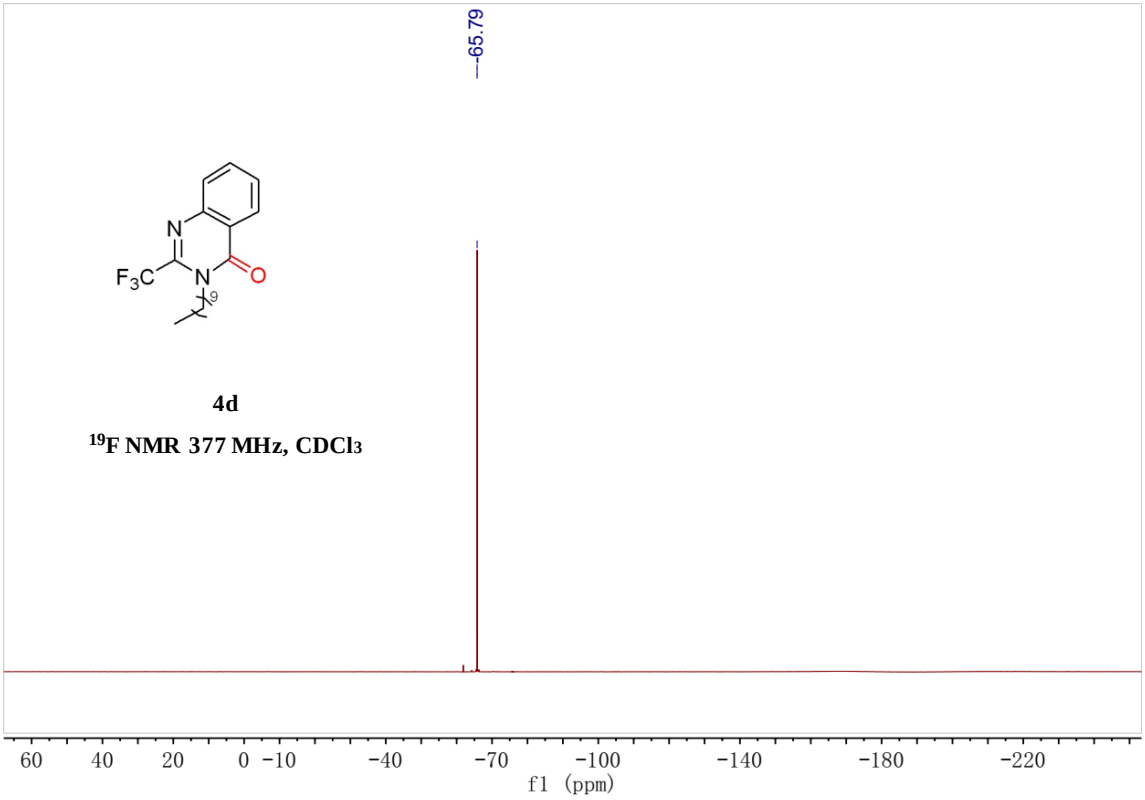
4d

^{1}H NMR 400 MHz, CDCl$_3$



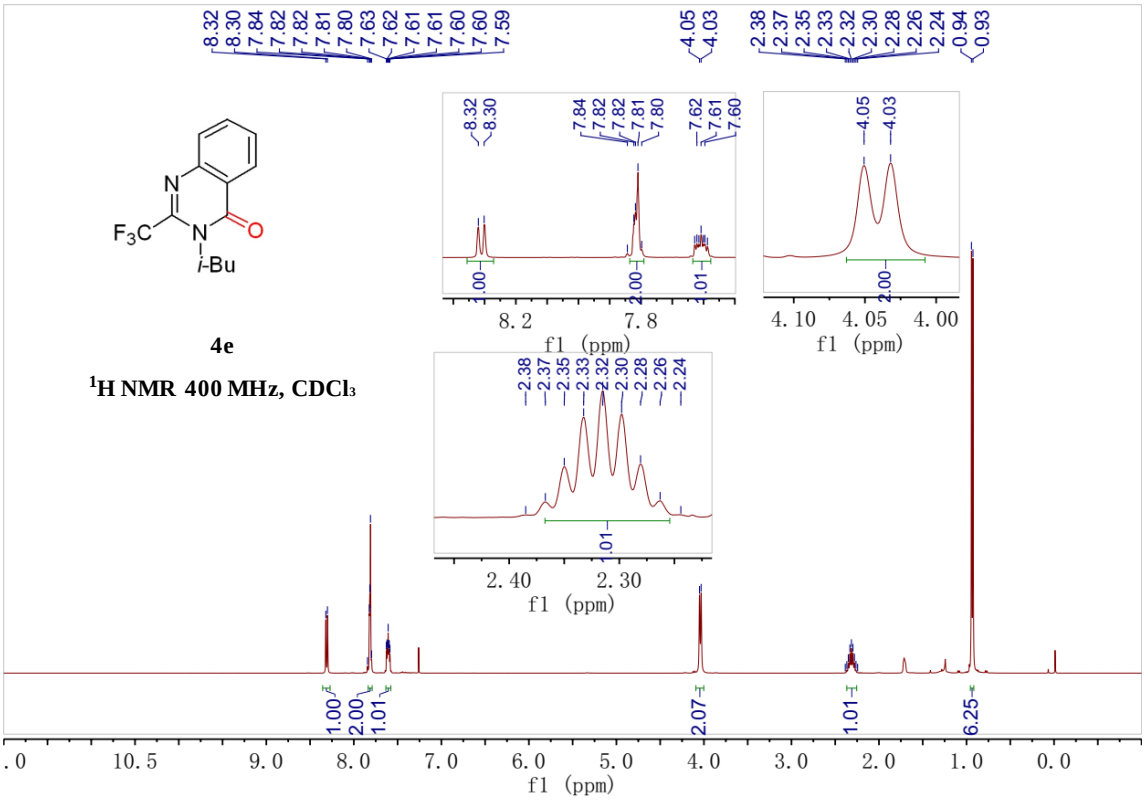
4d

^{13}C NMR 101 MHz, CDCl$_3$



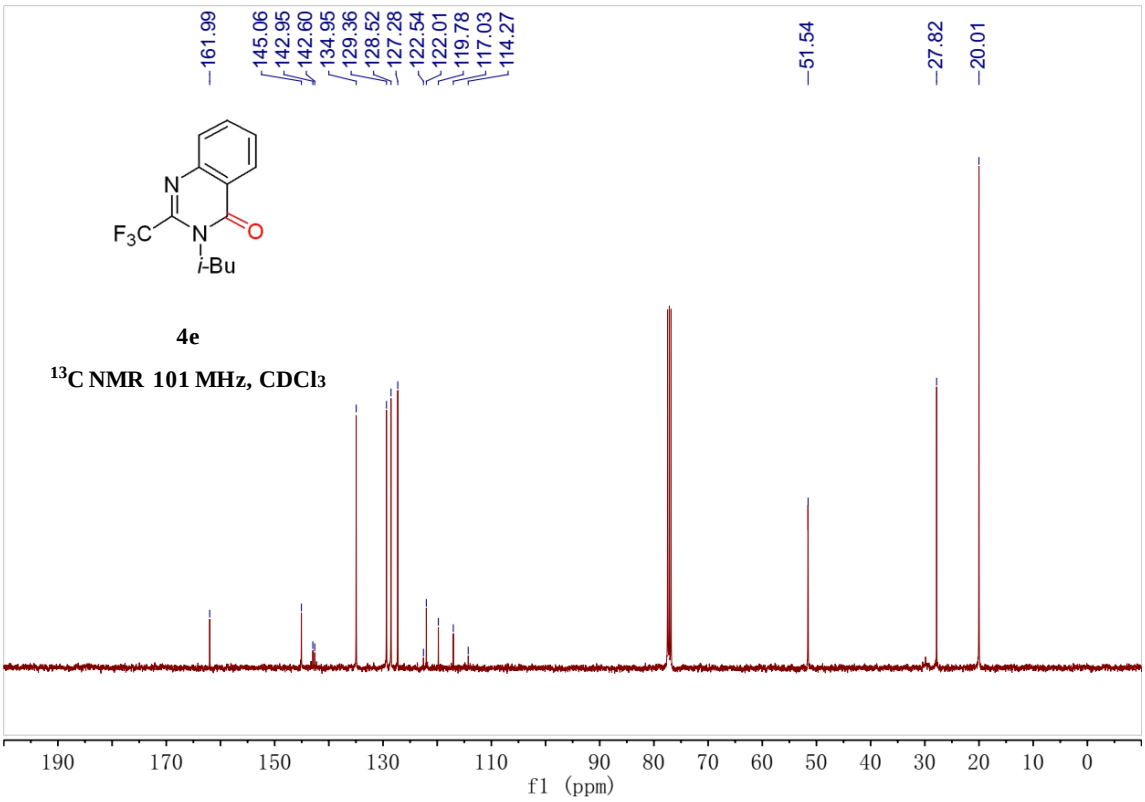
4d

^{19}F NMR 377 MHz, CDCl$_3$



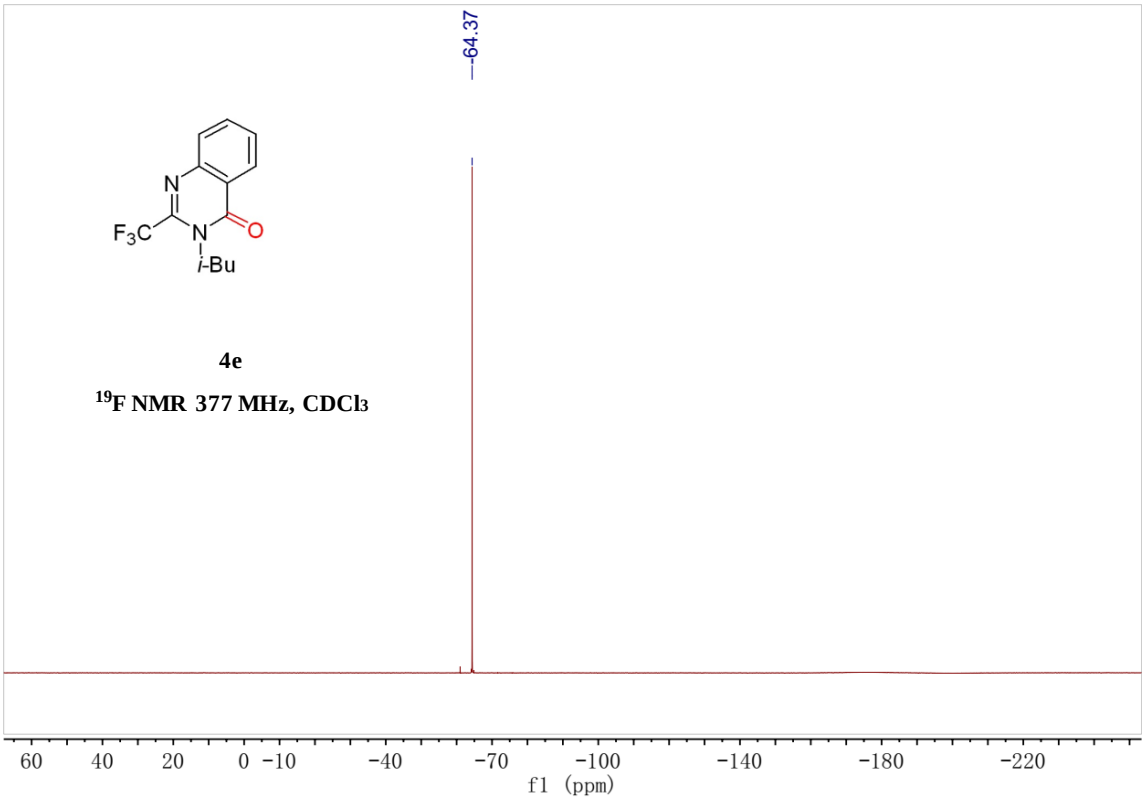
4e

^{1}H NMR 400 MHz, CDCl$_3$



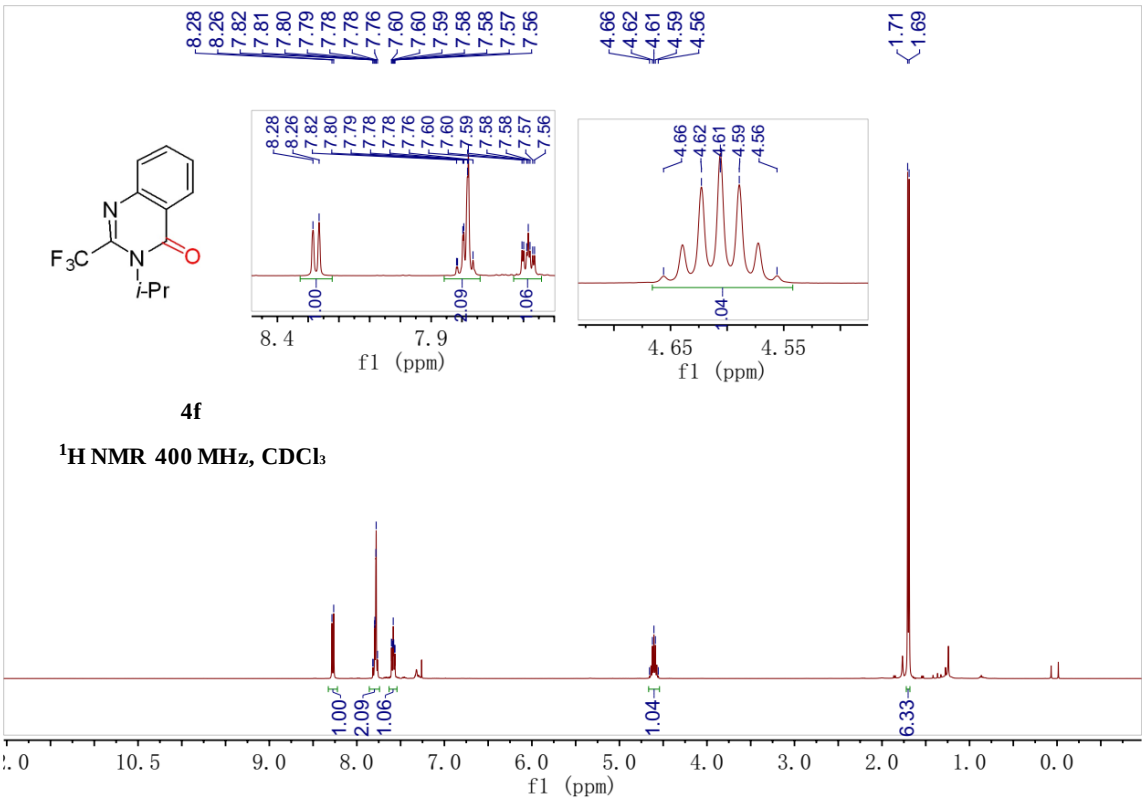
4e

^{13}C NMR 101 MHz, CDCl$_3$



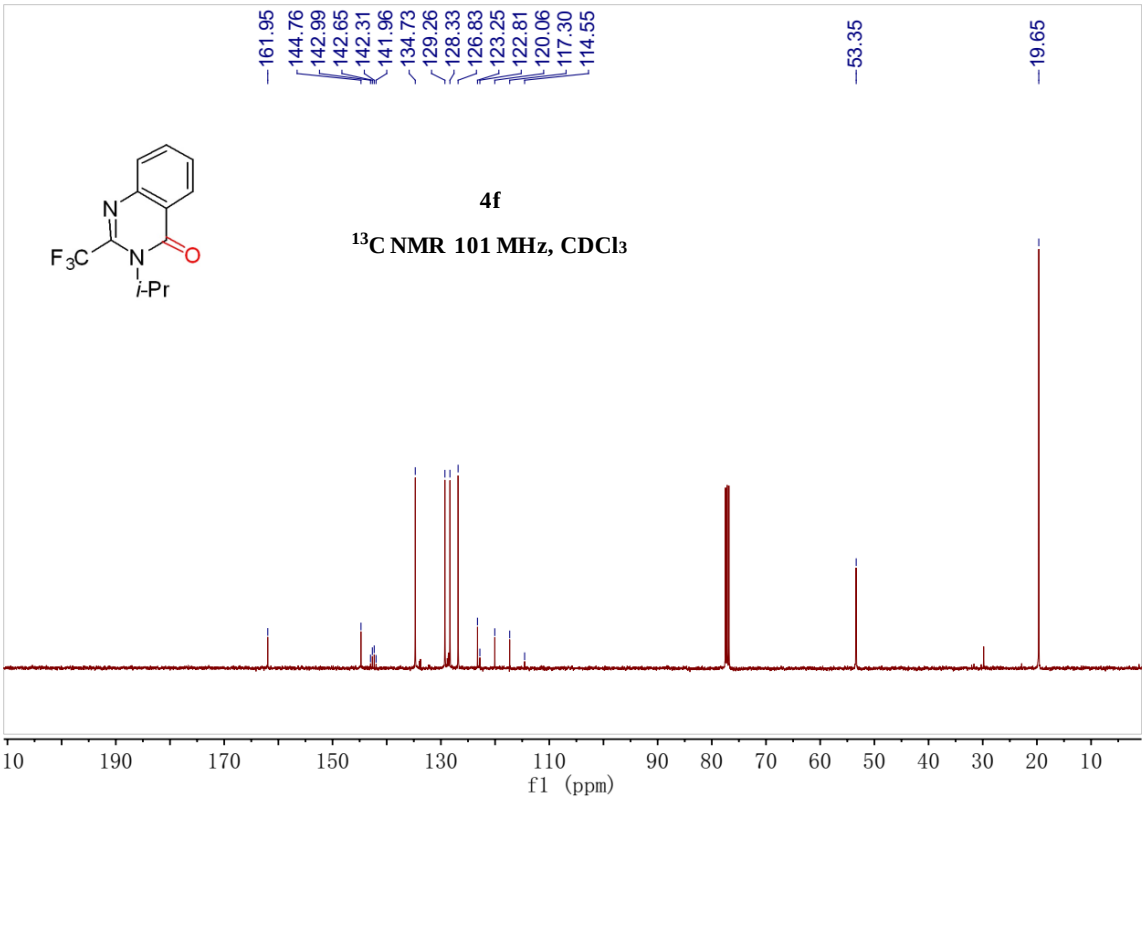
4e

^{19}F NMR 377 MHz, CDCl$_3$



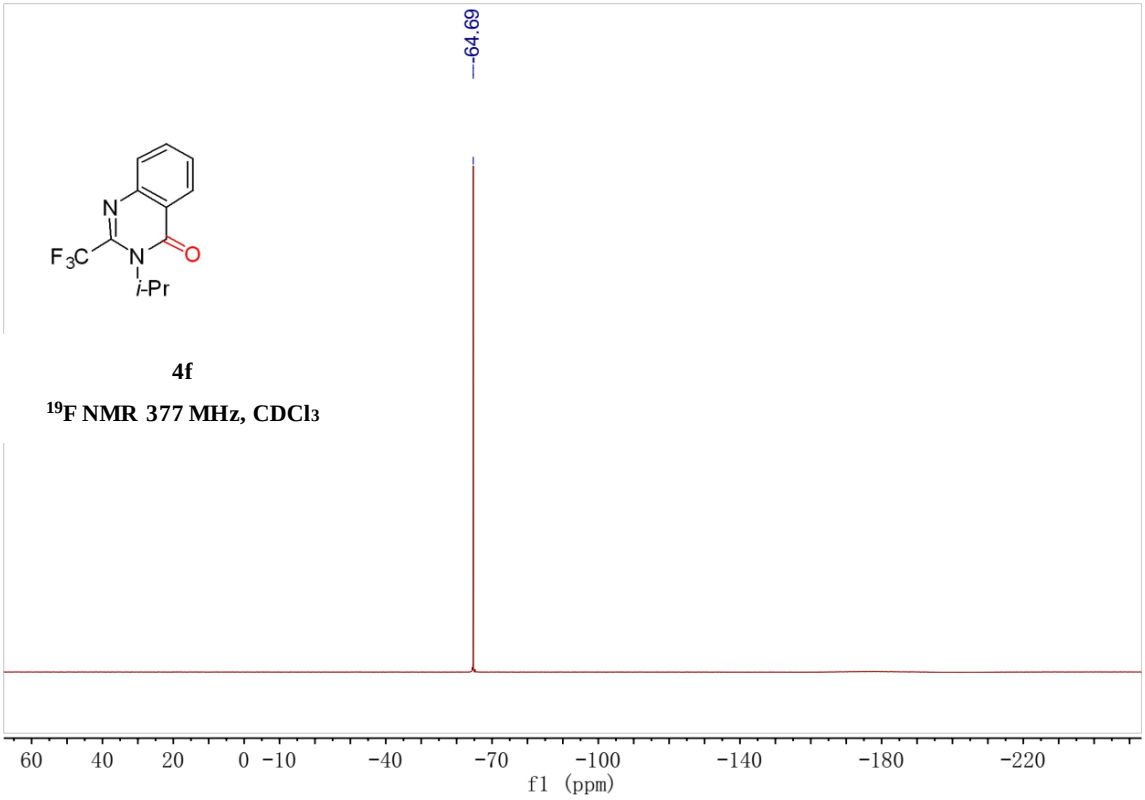
4f

^{1}H NMR 400 MHz, $CDCl_3$



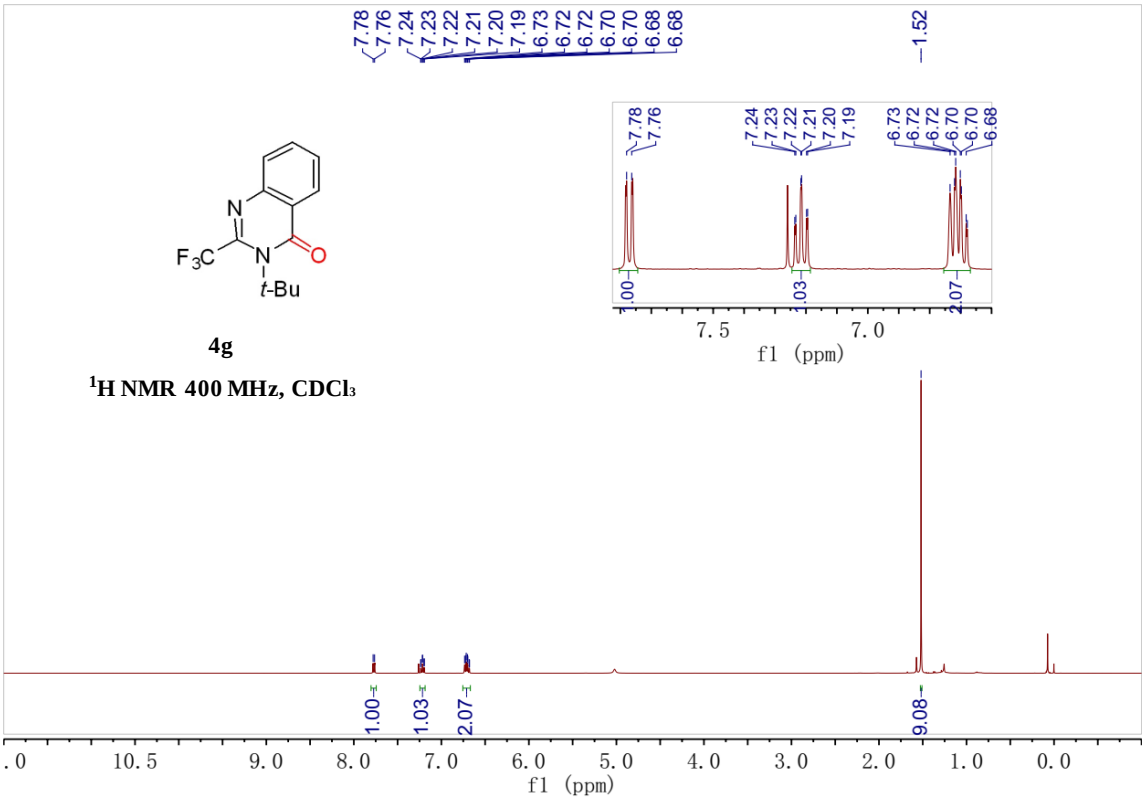
4f

^{13}C NMR 101 MHz, $CDCl_3$



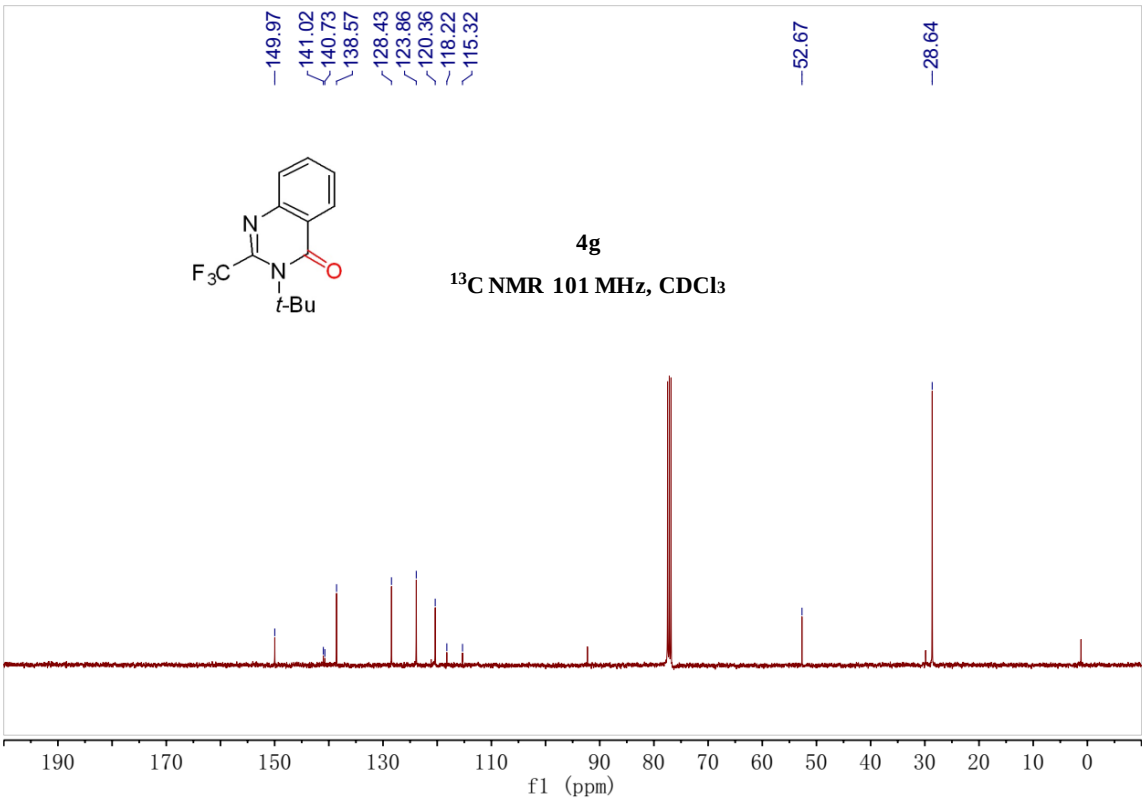
4f

^{19}F NMR 377 MHz, CDCl$_3$



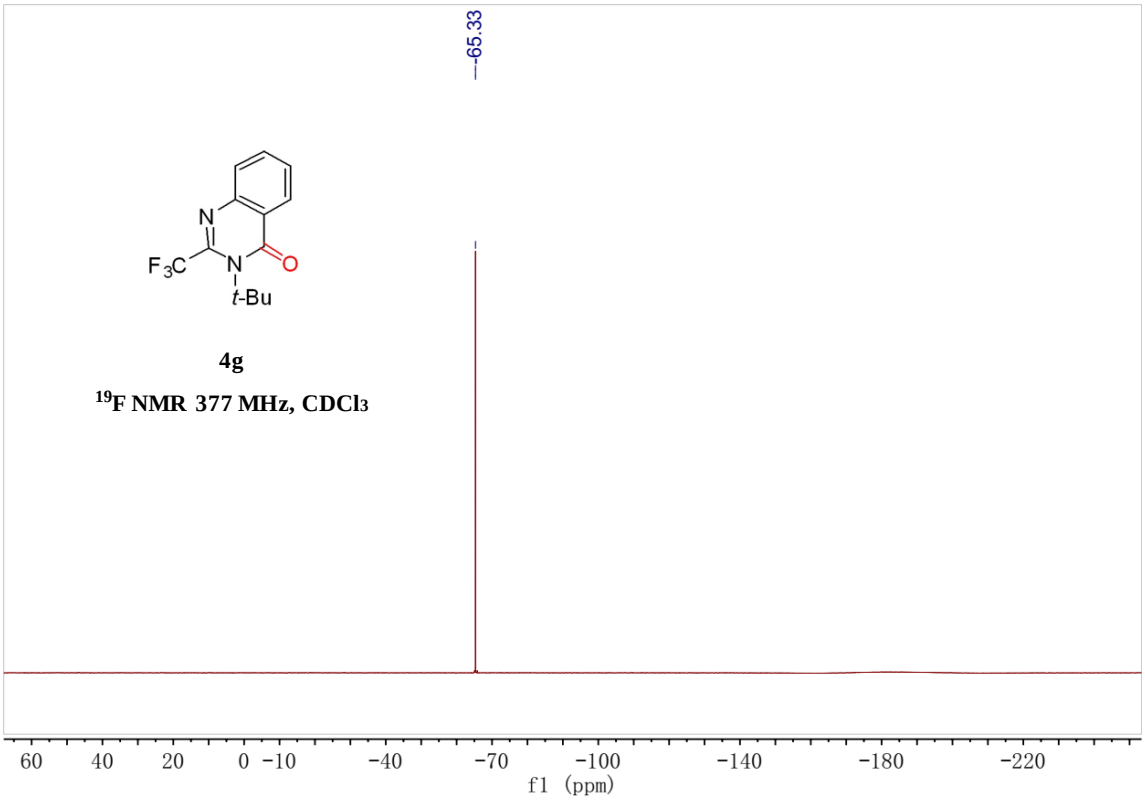
4g

^{1}H NMR 400 MHz, CDCl$_3$



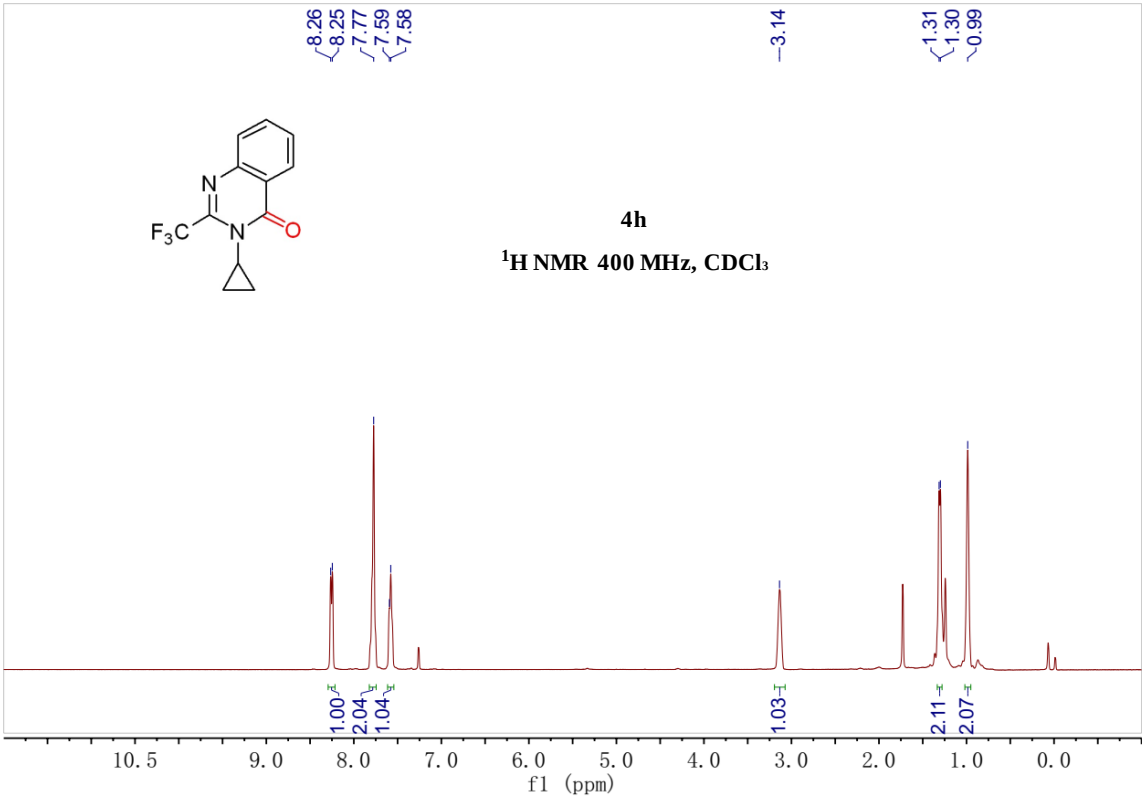
4g

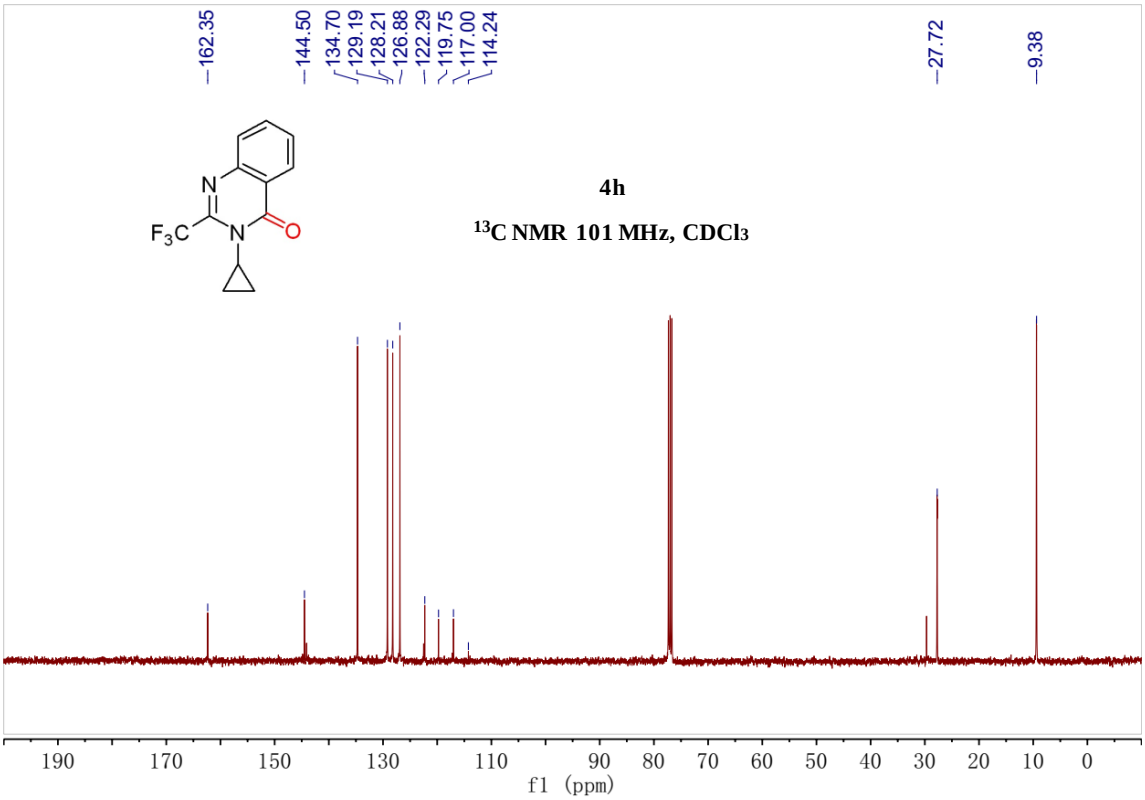
^{13}C NMR 101 MHz, CDCl$_3$

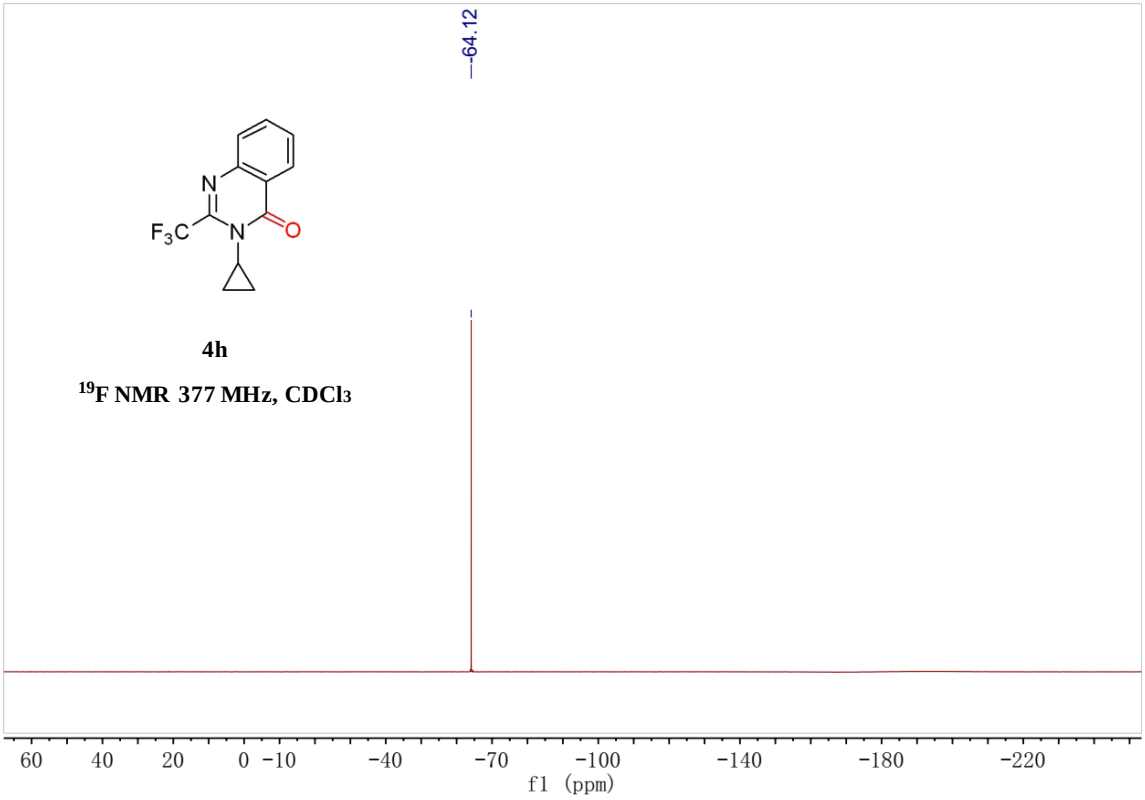


4g

^{19}F NMR 377 MHz, CDCl$_3$

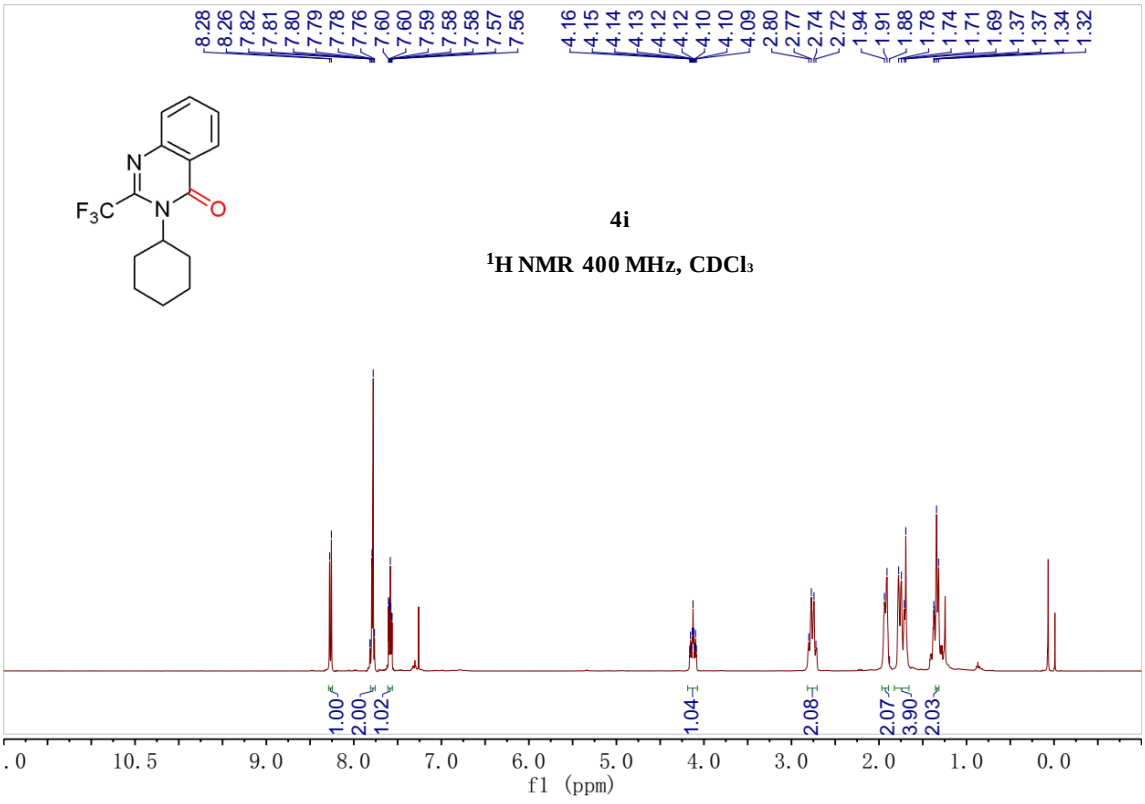

8.26
8.25
7.77
7.59
7.58
3.14
1.31
1.30
0.99
4h
1H NMR 400 MHz, CDCl3
1.00
2.04
1.04
1.03
2.11
2.07
10.5
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
f1 (ppm)


162.35
144.50
134.70
129.19
128.21
126.88
122.29
119.75
117.00
114.24
27.72
9.38
4h
13C NMR 101 MHz, CDCl3
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)



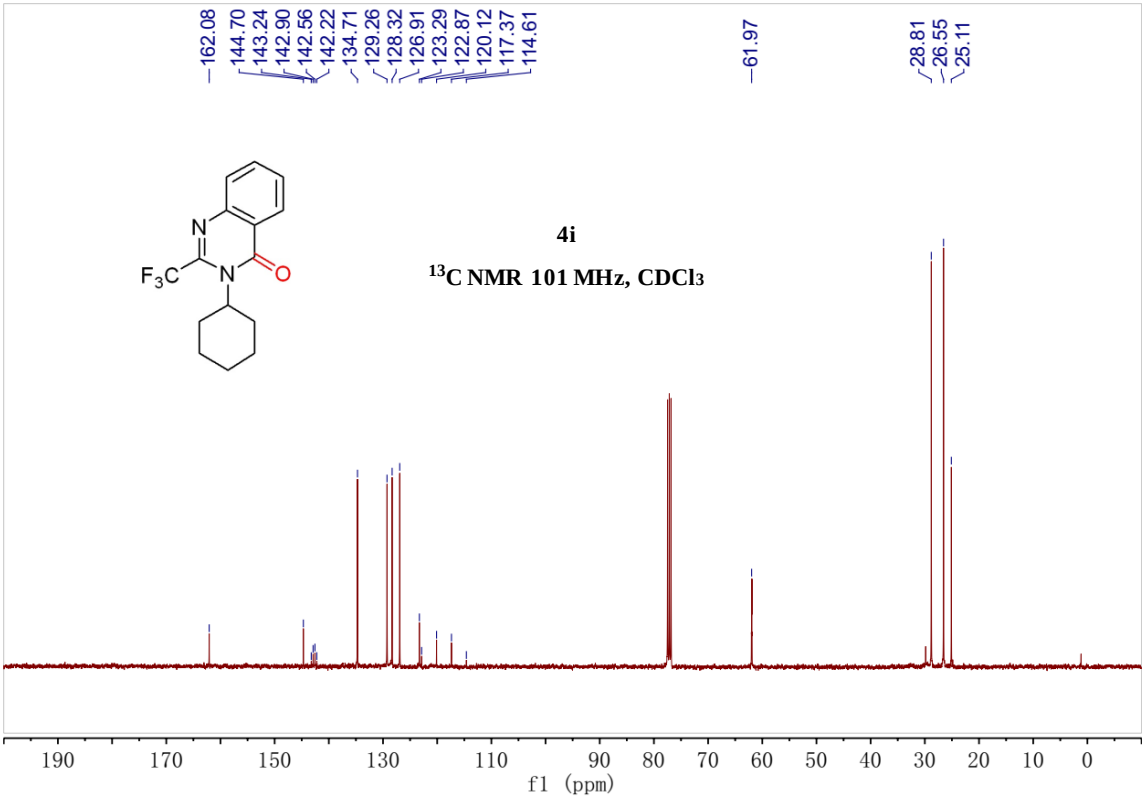
4h

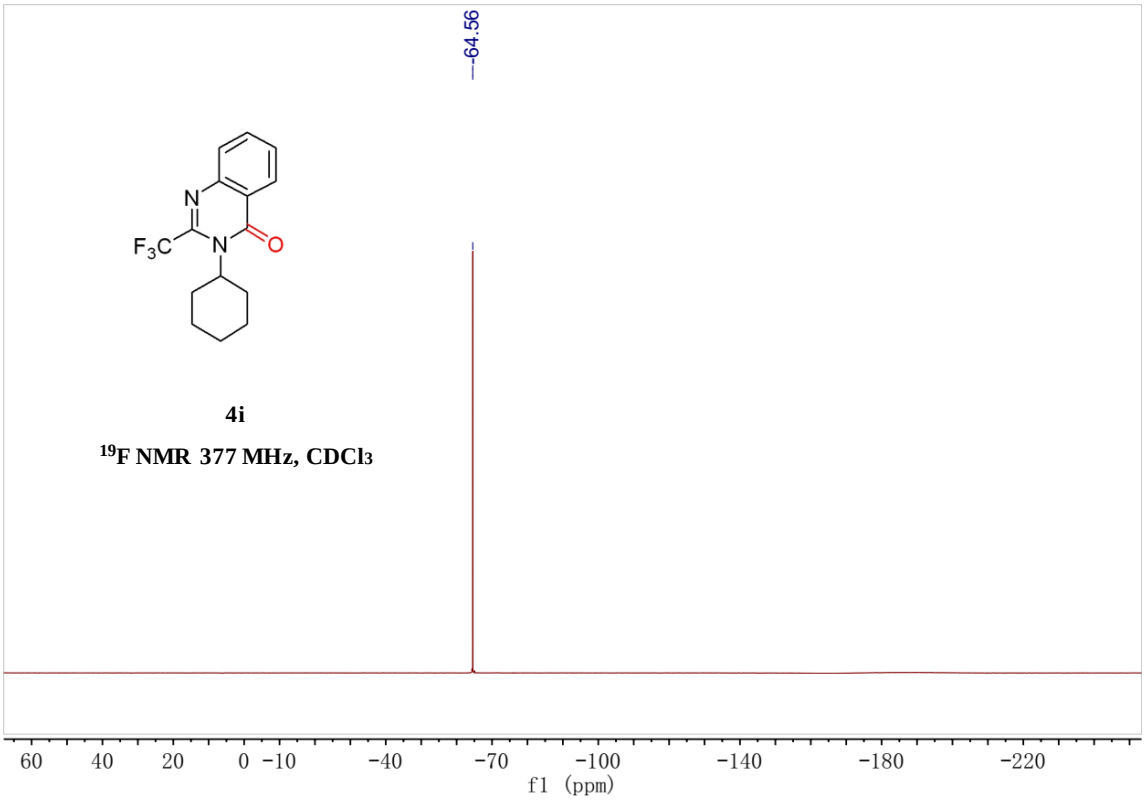
^{19}F NMR 377 MHz, CDCl$_3$

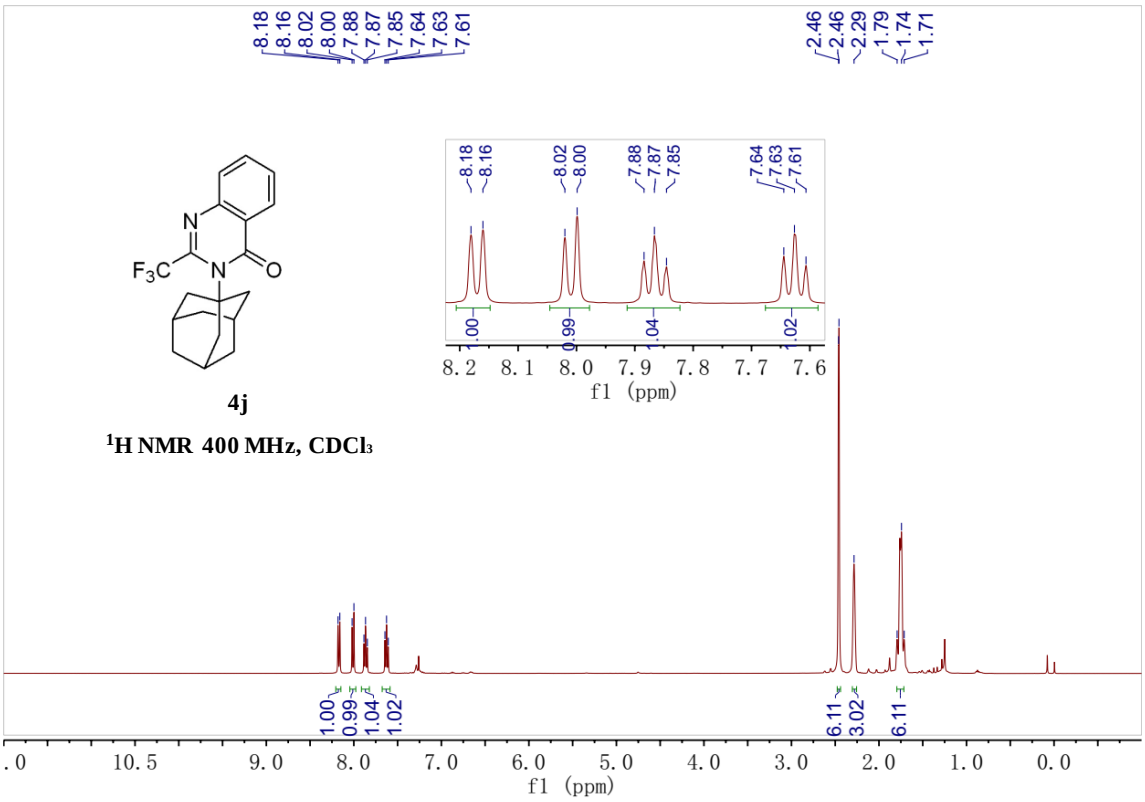


4i

^{1}H NMR 400 MHz, CDCl$_3$

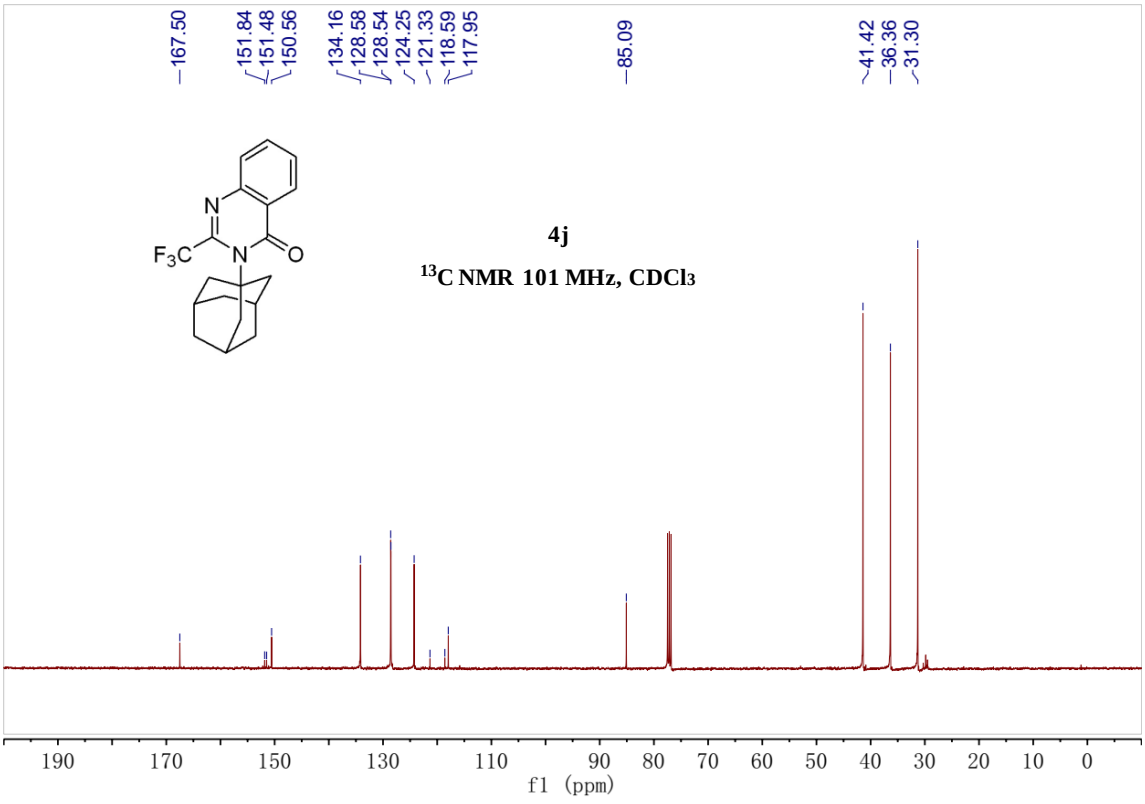

162.08
144.70
143.24
142.90
142.56
142.22
134.71
129.26
128.32
126.91
123.29
122.87
120.12
117.37
114.61
61.97
28.81
26.55
25.11
N
F3C
N
O
4i
13C NMR 101 MHz, CDCl3
190
170
150
130
110
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


64.56
N
F3C
N
O
4i
19F NMR 377 MHz, CDCl3
60
40
20
0
-10
-40
-70
-100
-140
-180
-220
f1 (ppm)



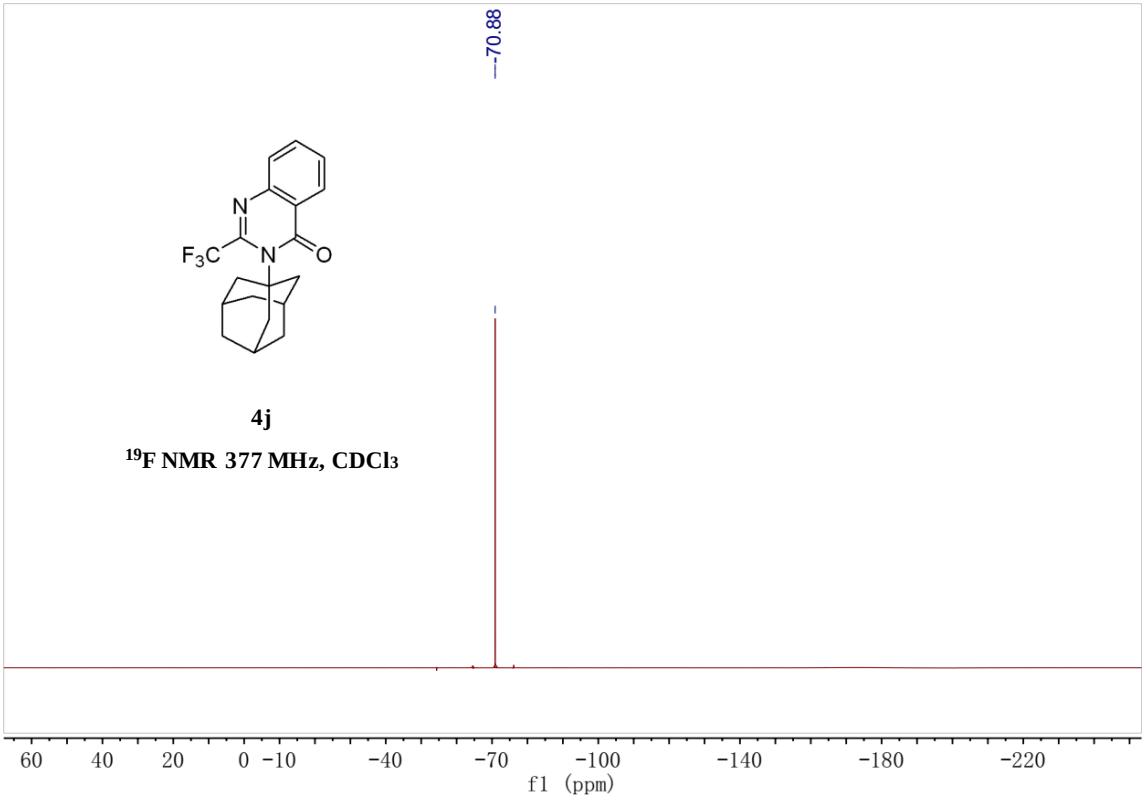
4j

^{1}H NMR 400 MHz, $CDCl_3$



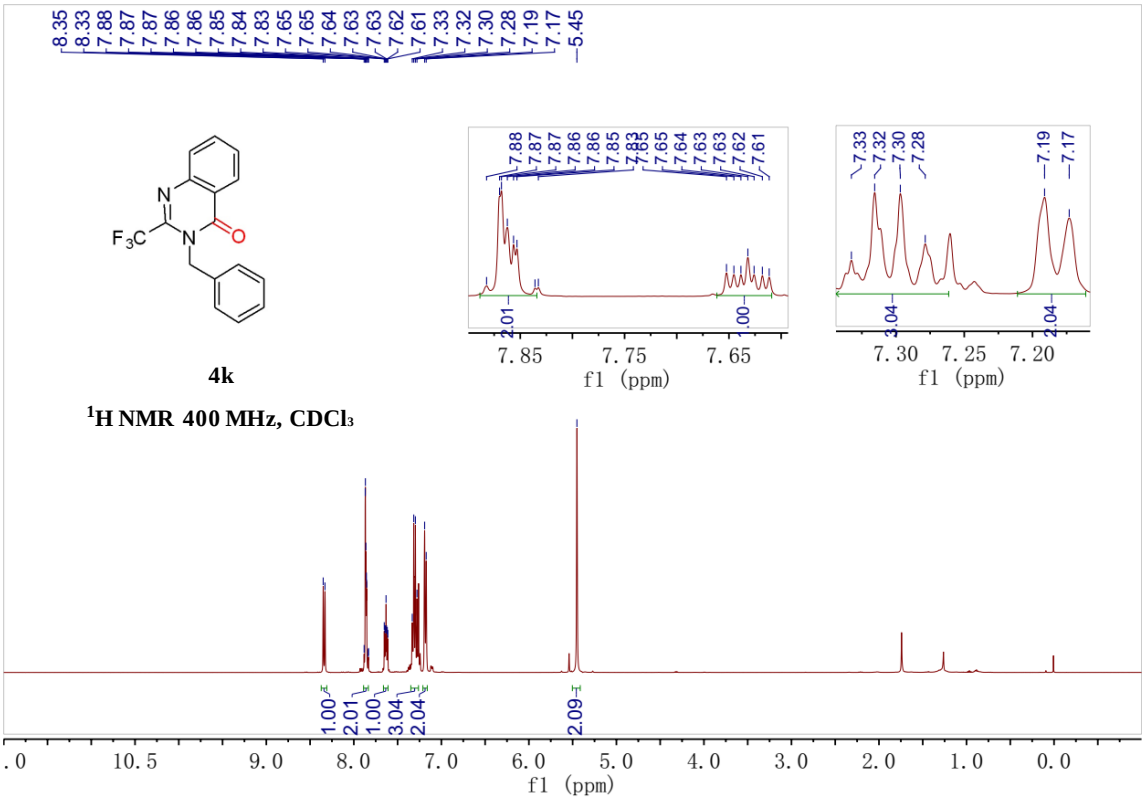
4j

^{13}C NMR 101 MHz, $CDCl_3$



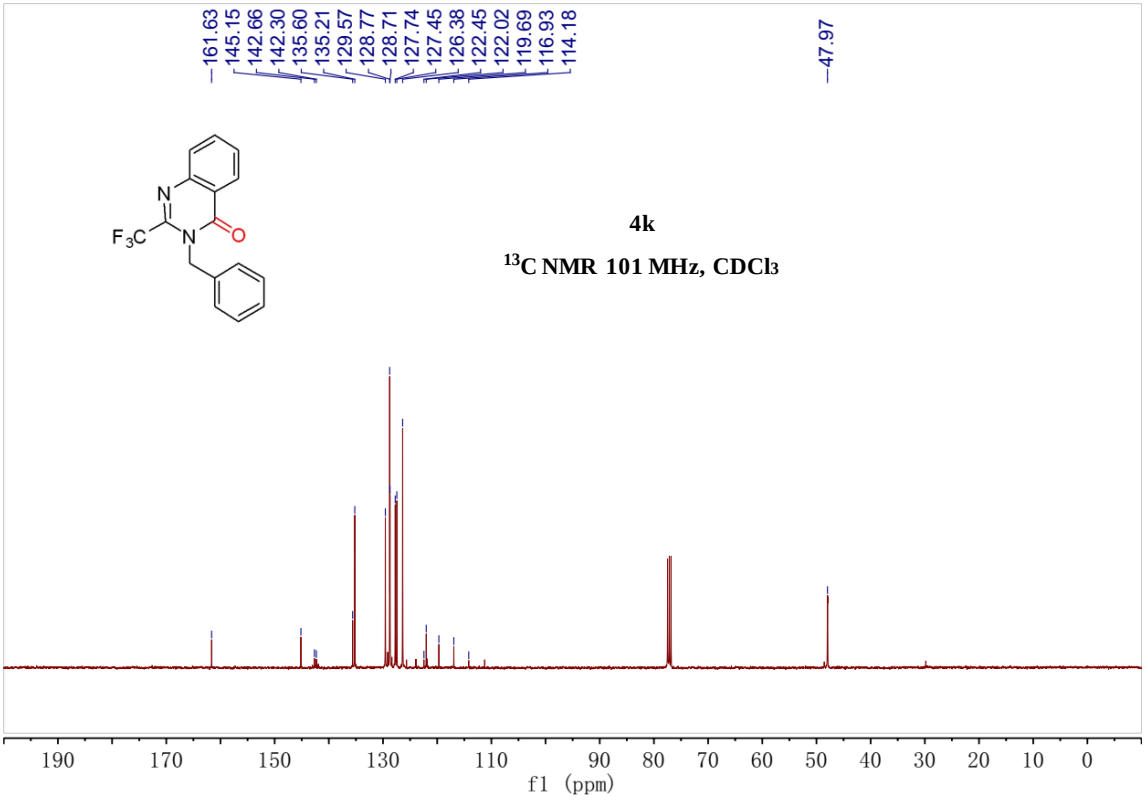
4j

^{19}F NMR 377 MHz, CDCl$_3$



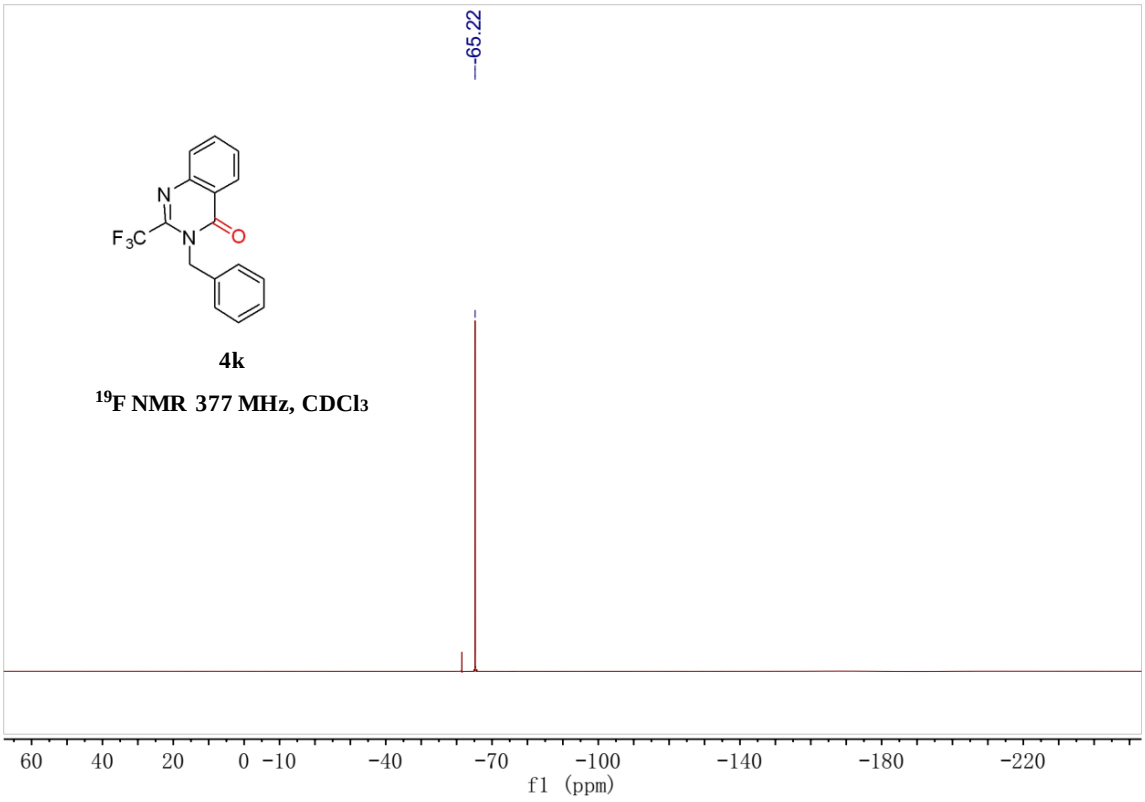
4k

^{1}H NMR 400 MHz, CDCl$_3$



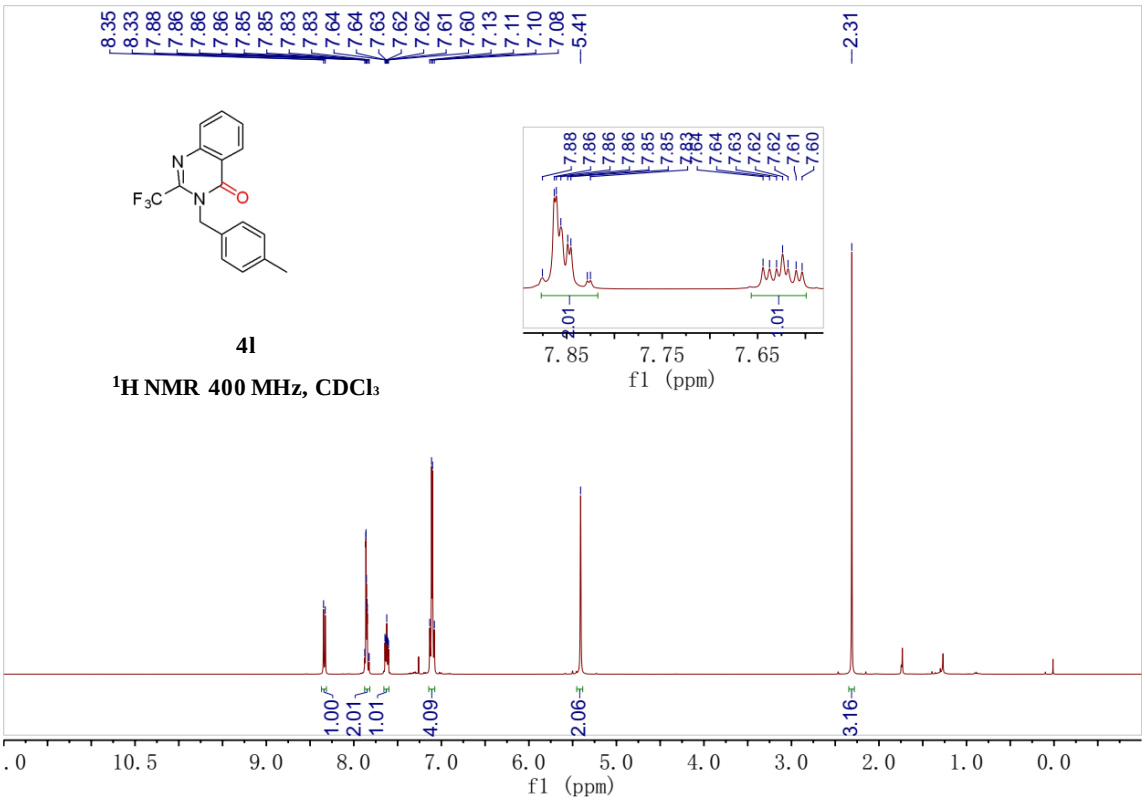
4k

^{13}C NMR 101 MHz, CDCl$_3$



4k

^{19}F NMR 377 MHz, CDCl$_3$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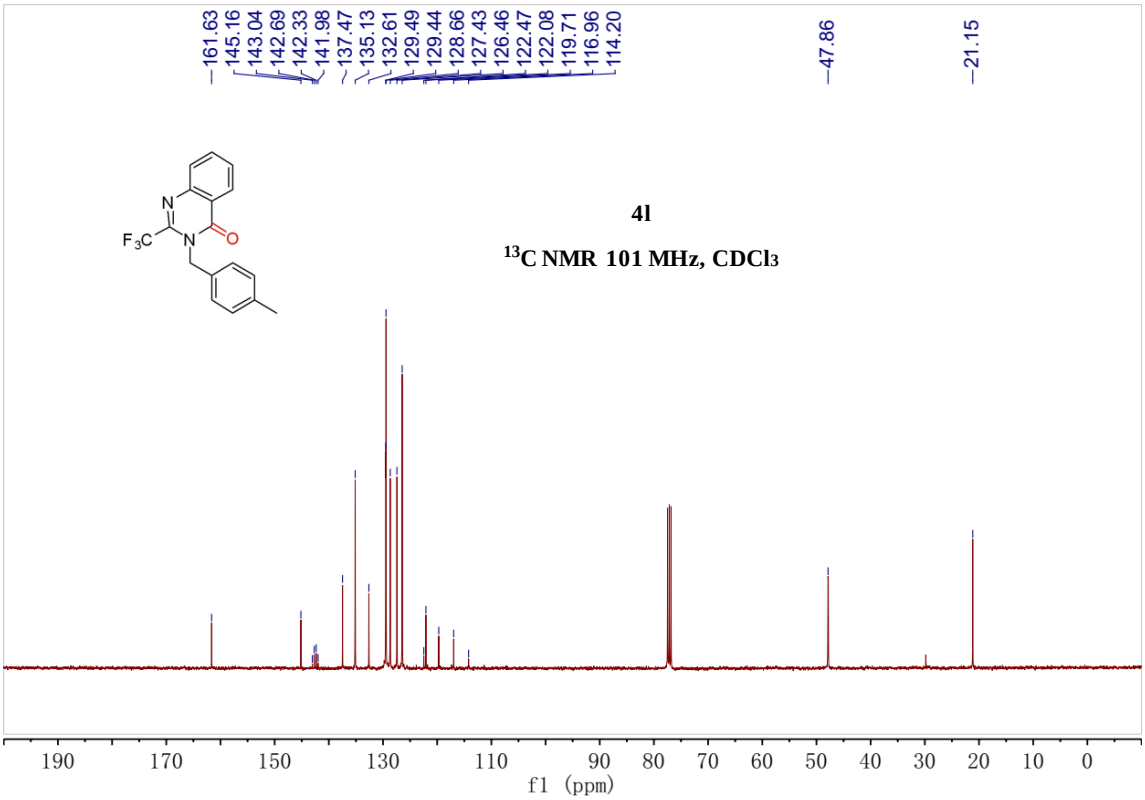
7.63
7.62
7.62
7.61
7.60
7.13
7.11
7.10
7.08
5.41
2.31
F3C
N
N
O
4l
1H NMR 400 MHz, CDCl3
7.85
7.75
7.65
f1 (ppm)
1.00
2.01
1.01
4.09
2.06
3.16
f1 (ppm)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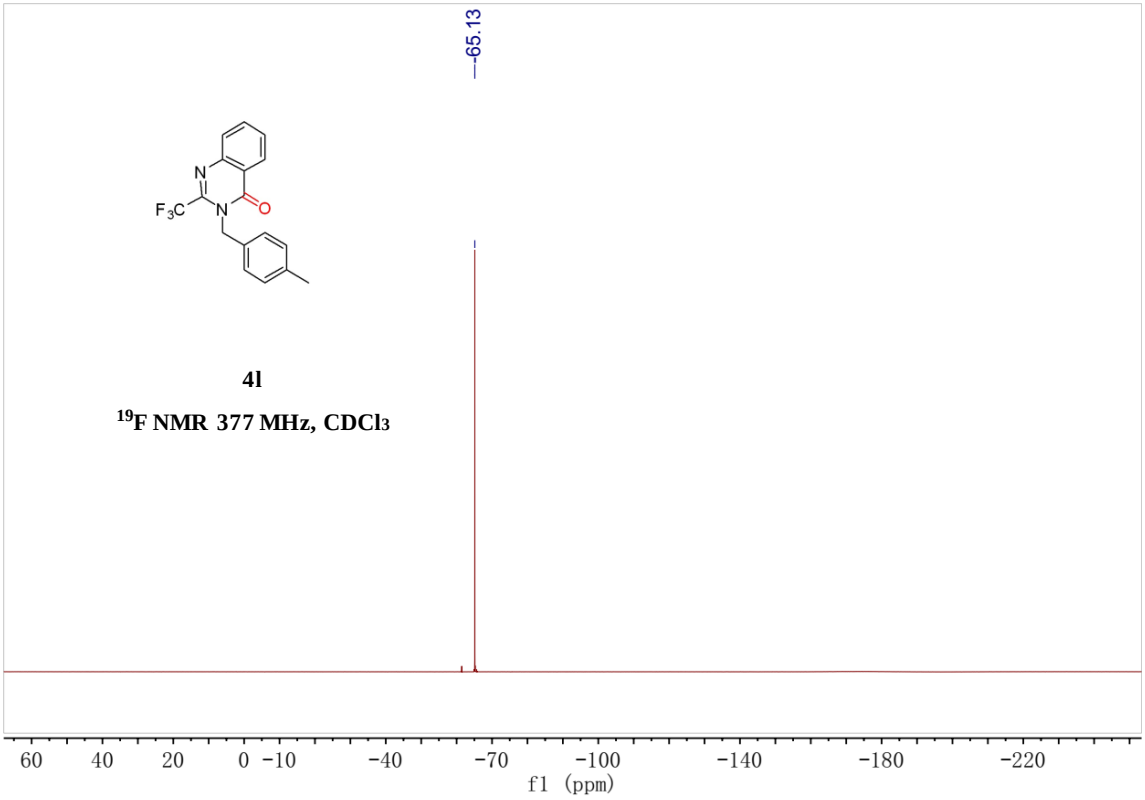
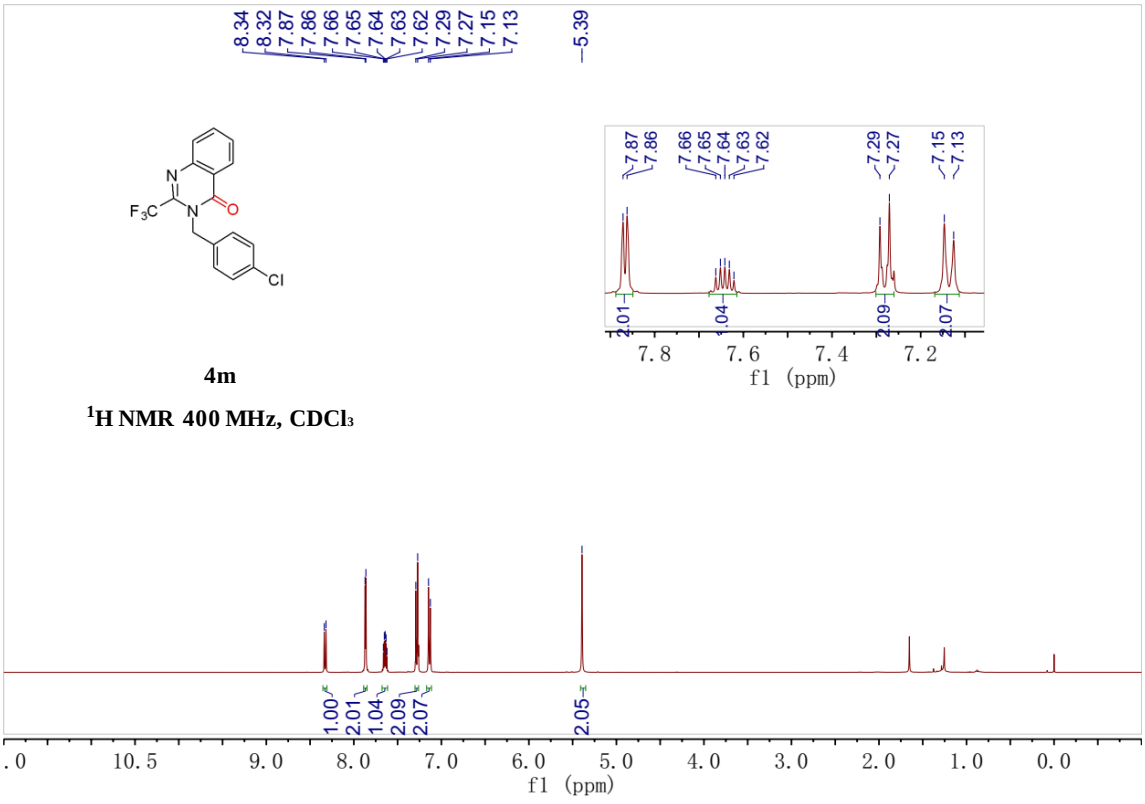
122.47
122.08
119.71
116.96
114.20
47.86
21.15
F3C
N
N
O
4l
13C NMR 101 MHz, CDCl3
f1 (ppm)



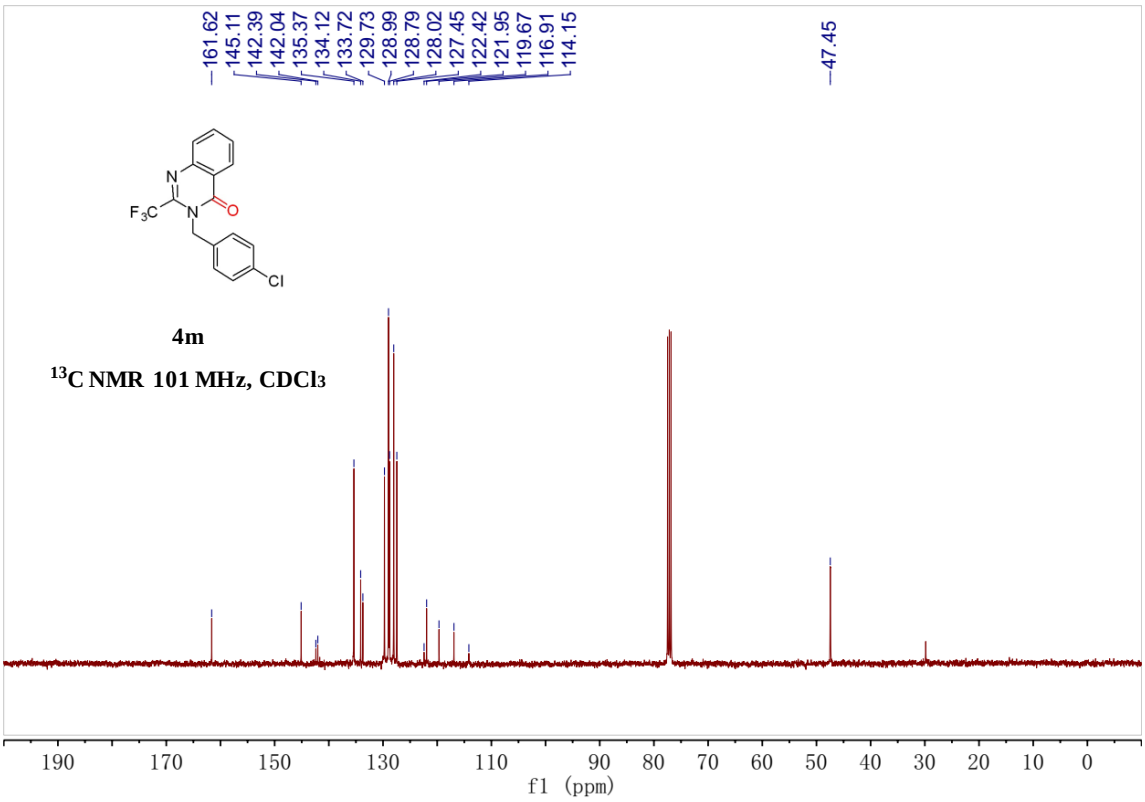
4l

^{19}F NMR 377 MHz, CDCl$_3$



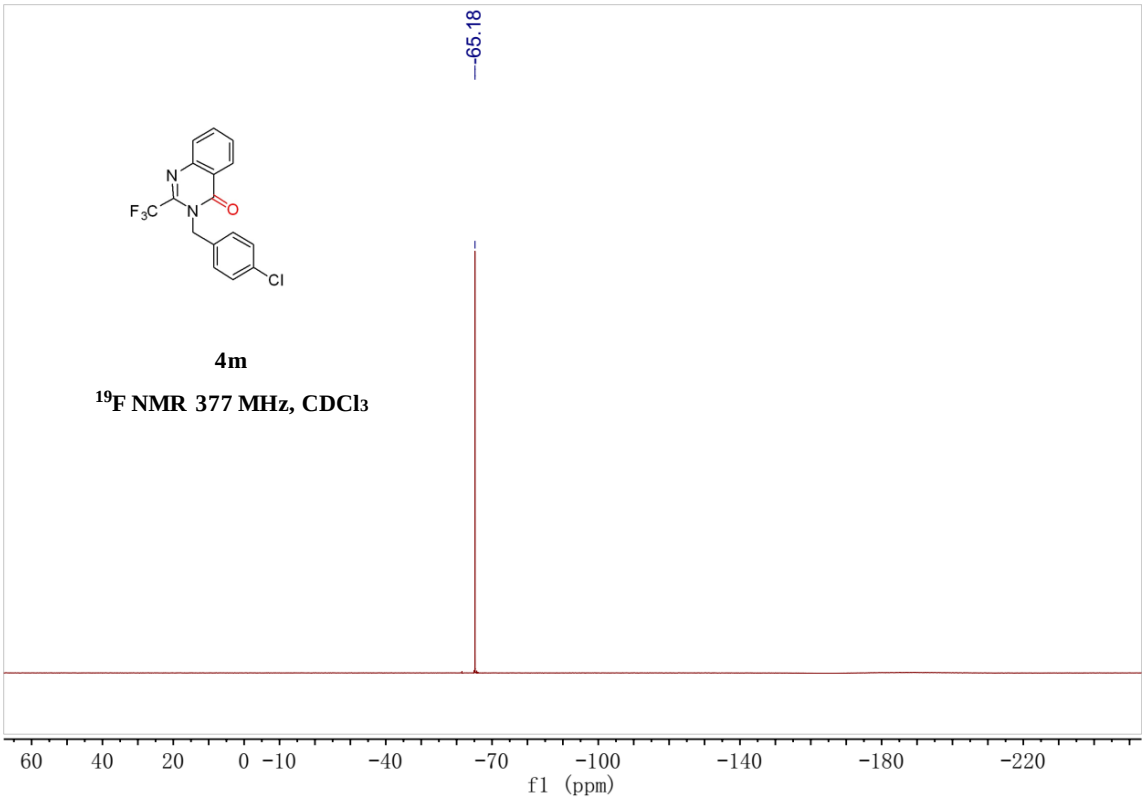
4m

^{1}H NMR 400 MHz, CDCl$_3$



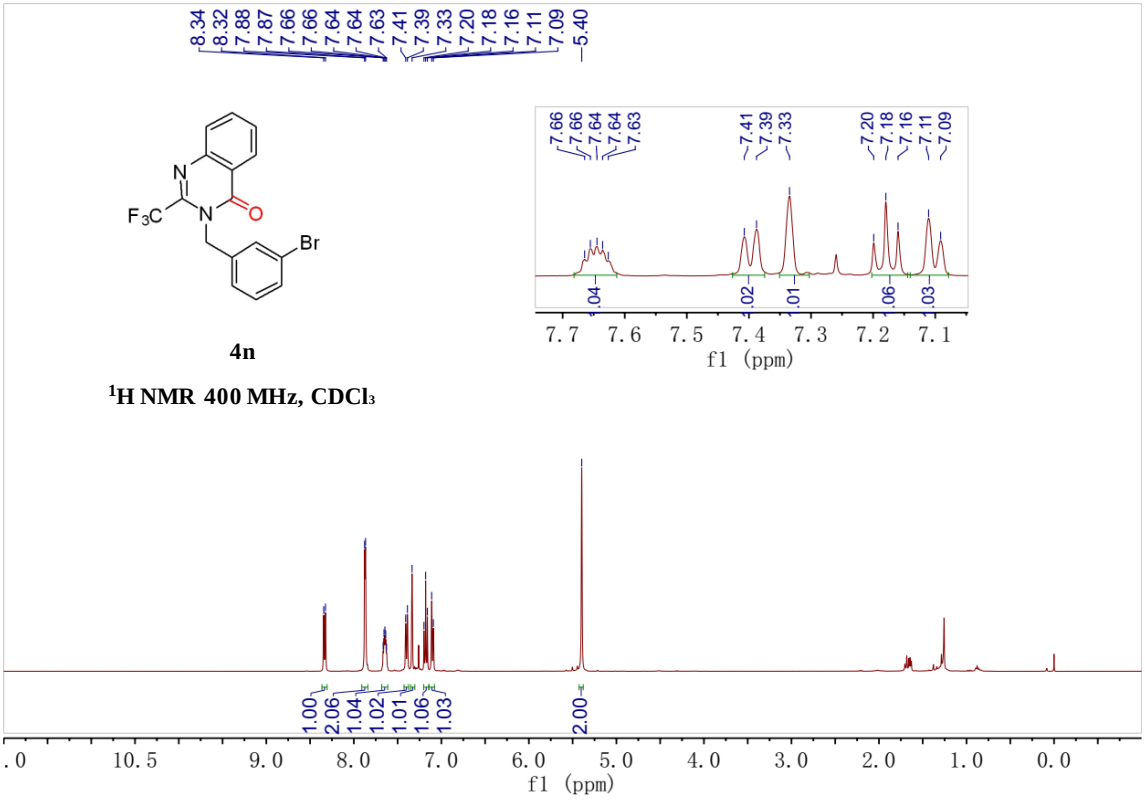
4m

^{13}C NMR 101 MHz, CDCl$_3$



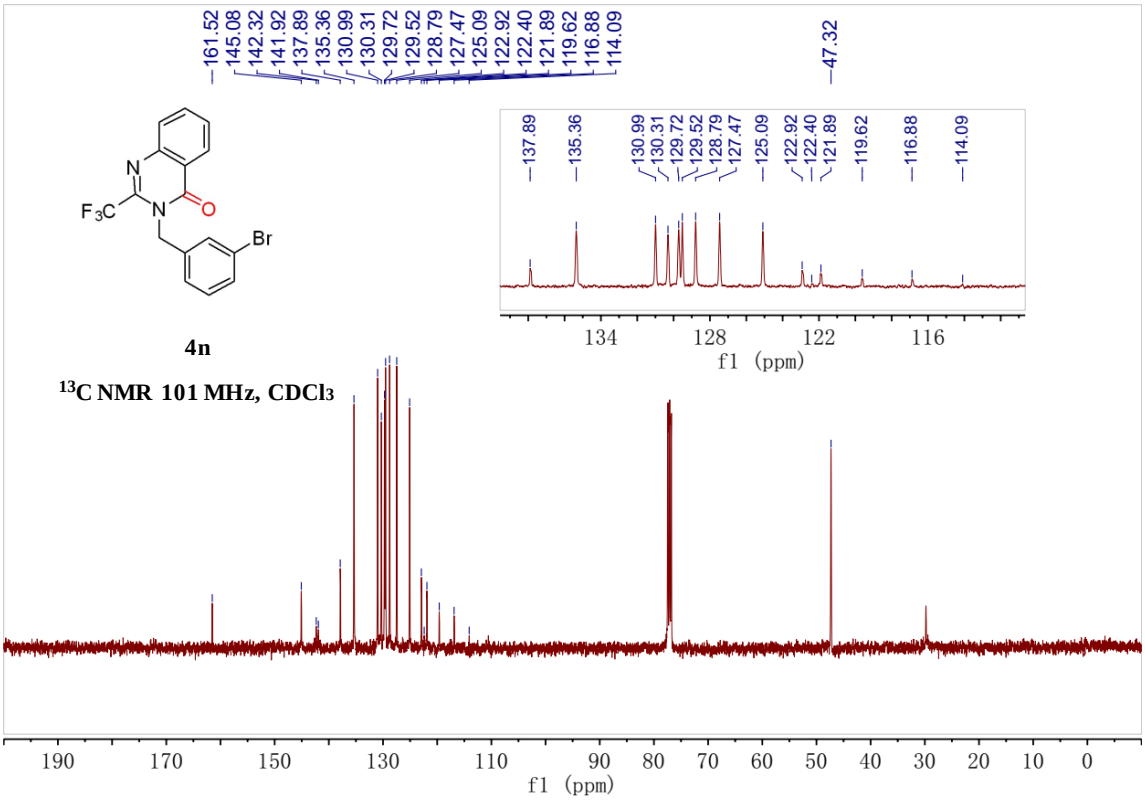
4m

^{19}F NMR 377 MHz, CDCl$_3$



4n

^{1}H NMR 400 MHz, $CDCl_3$



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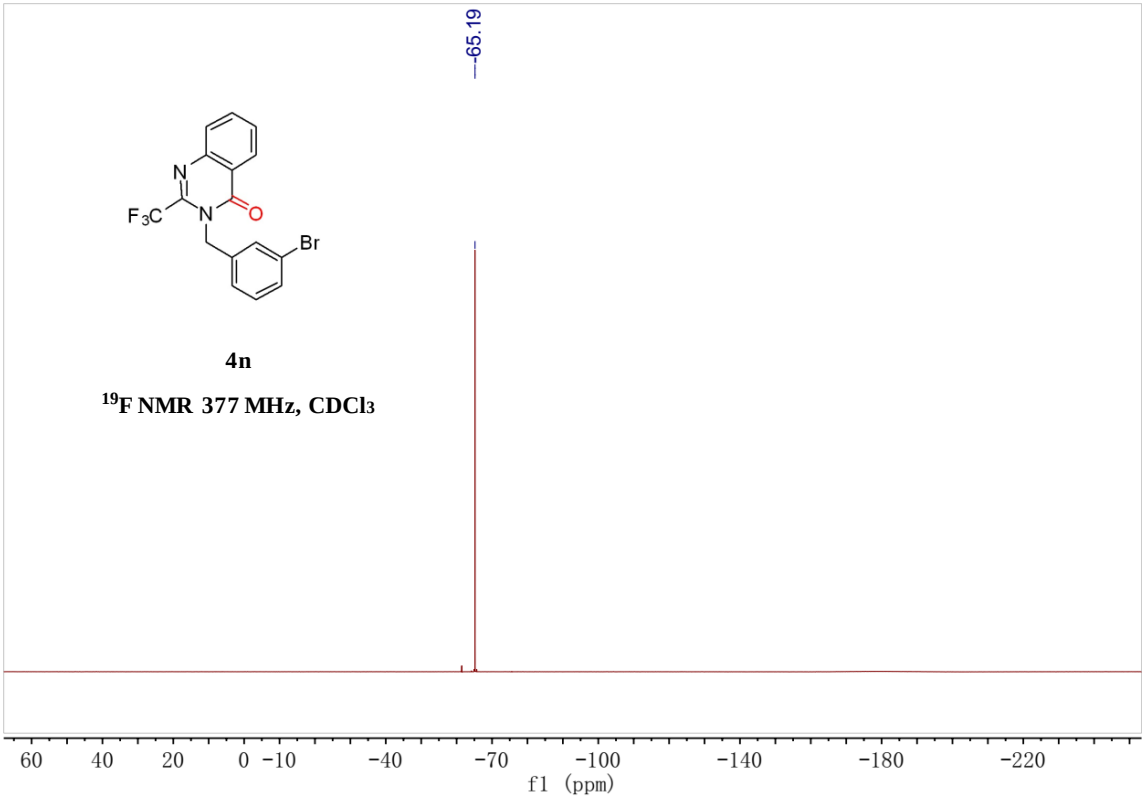
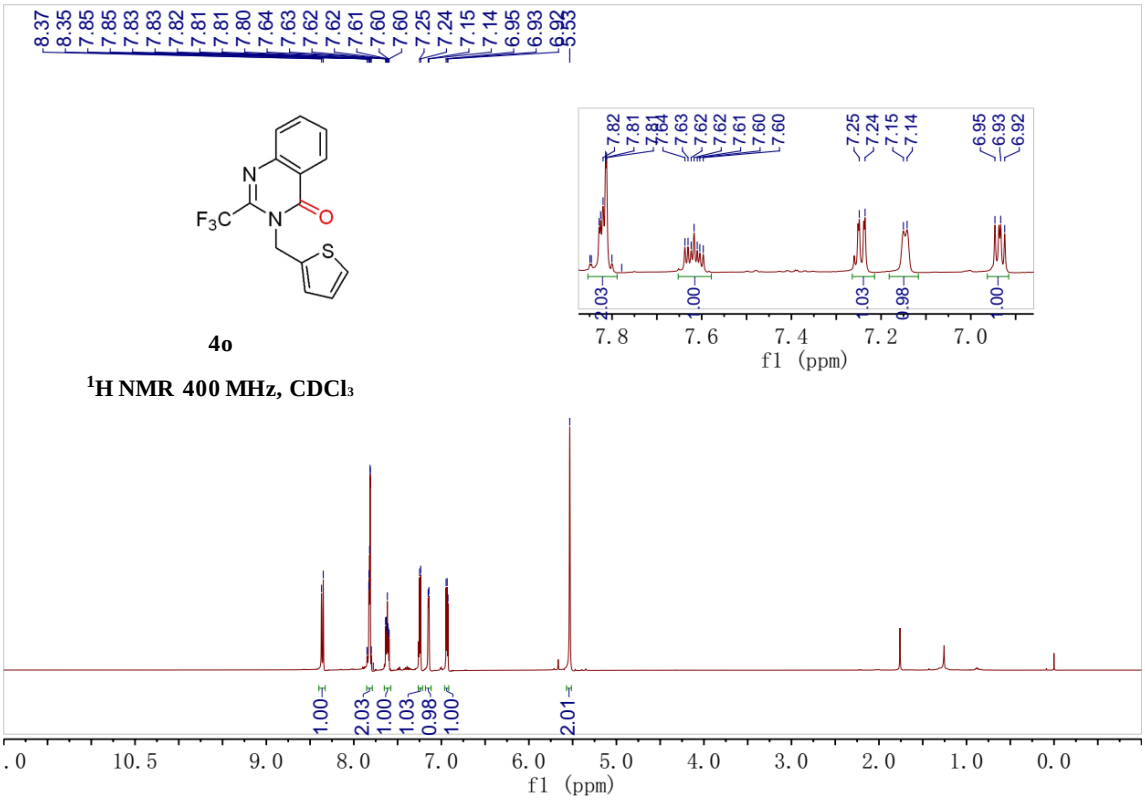
^{13}C NMR 101 MHz, $CDCl_3$



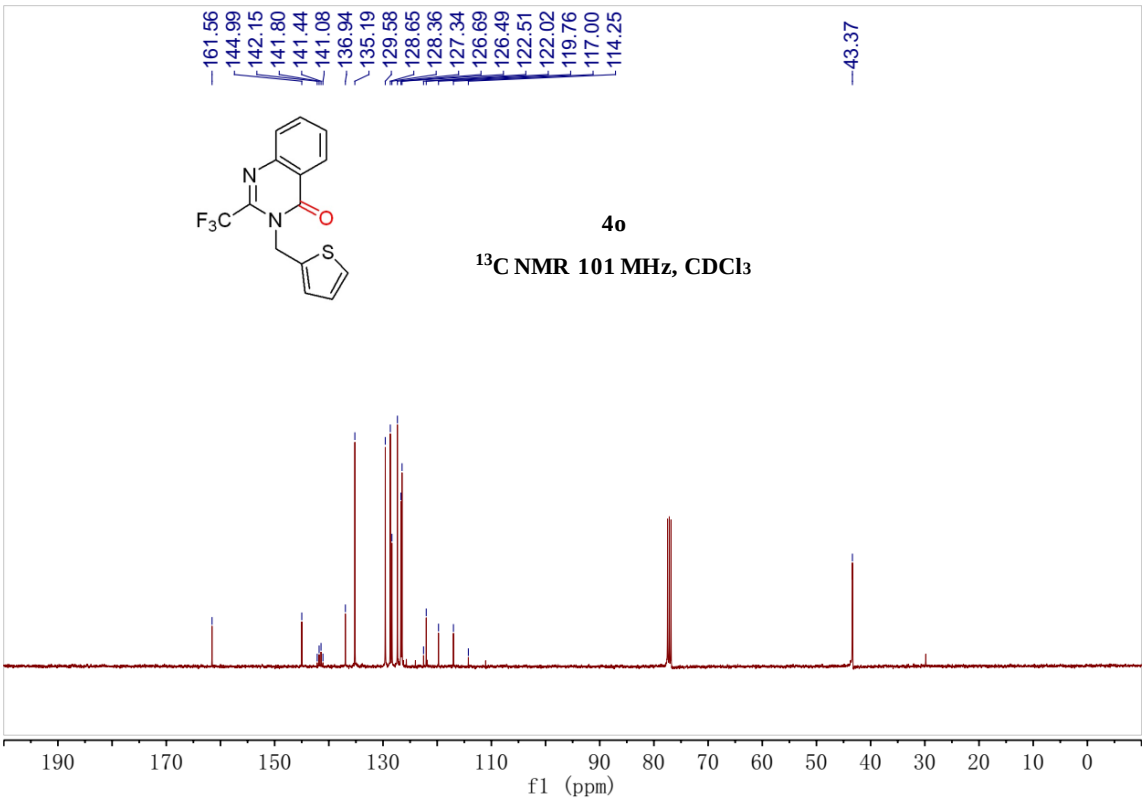
4n

^{19}F NMR 377 MHz, CDCl$_3$



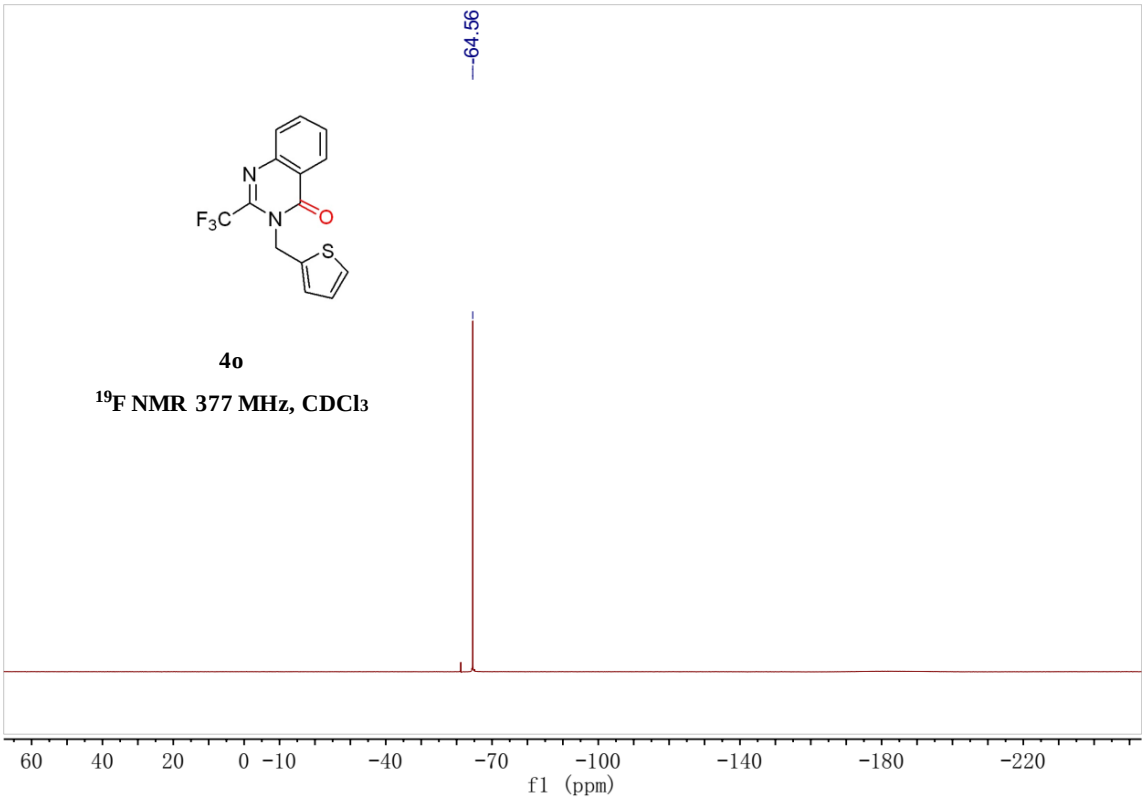
4o

^{1}H NMR 400 MHz, CDCl$_3$



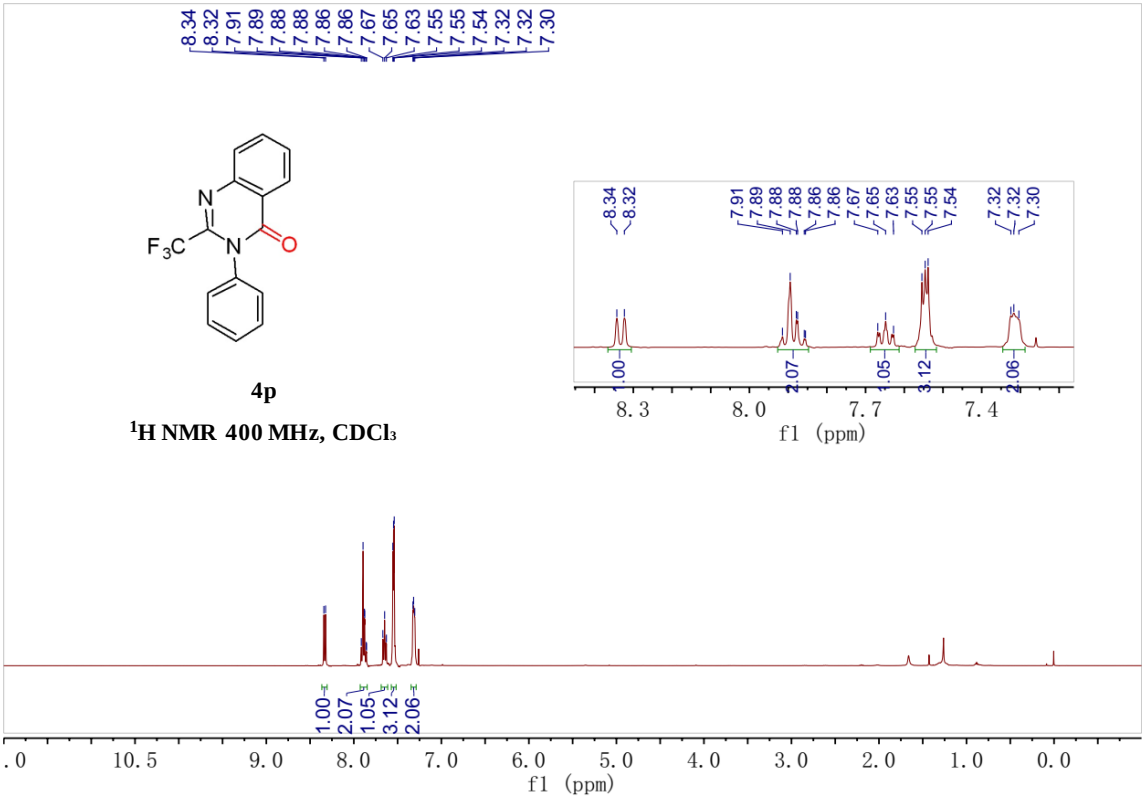
4o

^{13}C NMR 101 MHz, $CDCl_3$



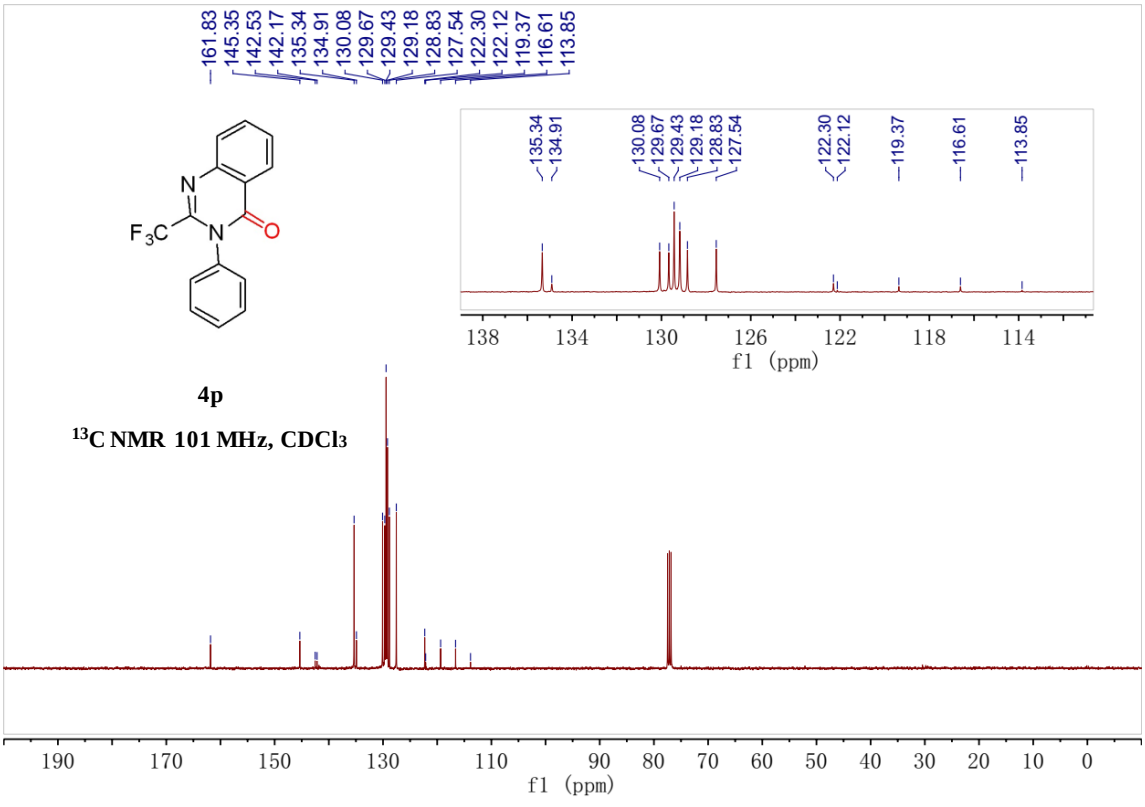
4o

^{19}F NMR 377 MHz, $CDCl_3$



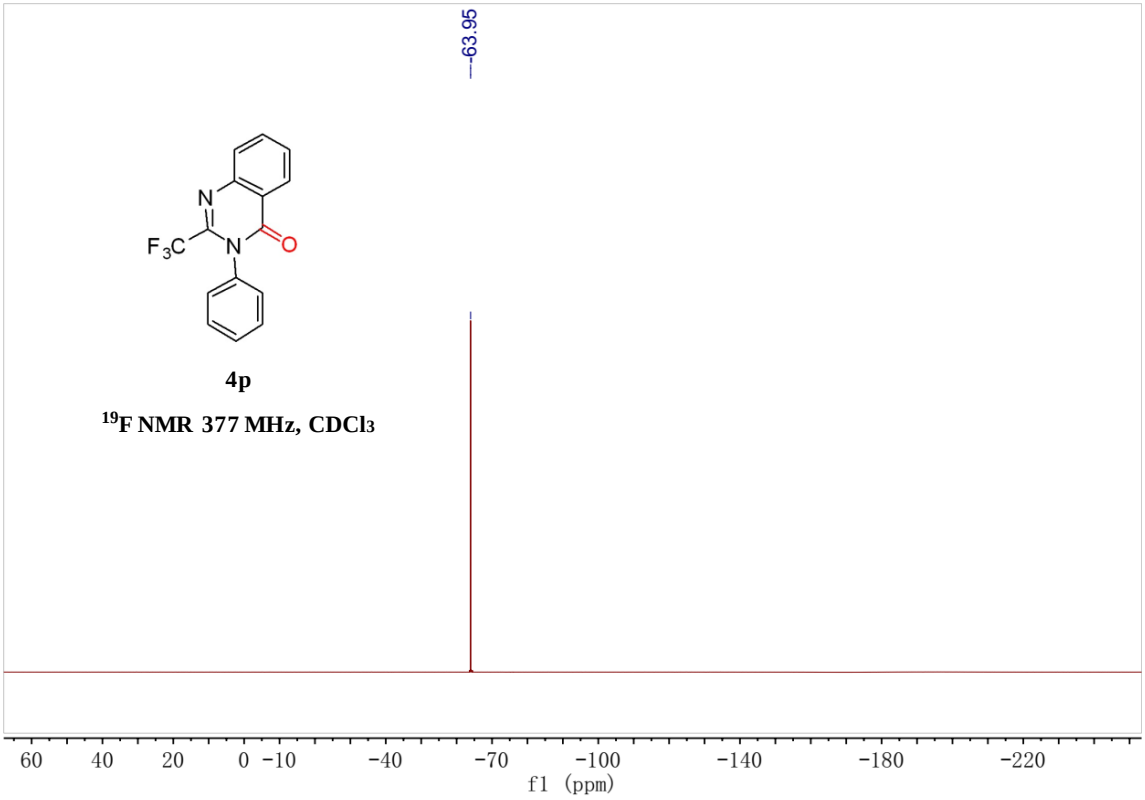
4p

^{1}H NMR 400 MHz, CDCl$_3$



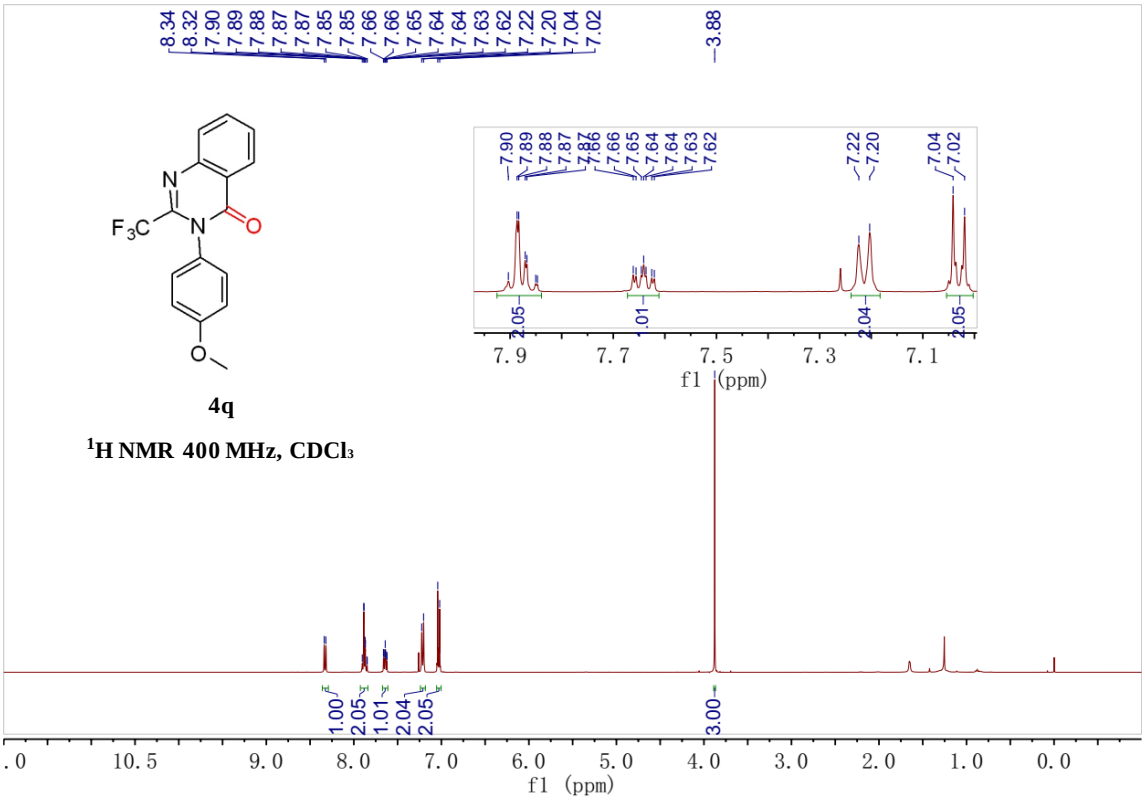
4p

^{13}C NMR 101 MHz, CDCl$_3$



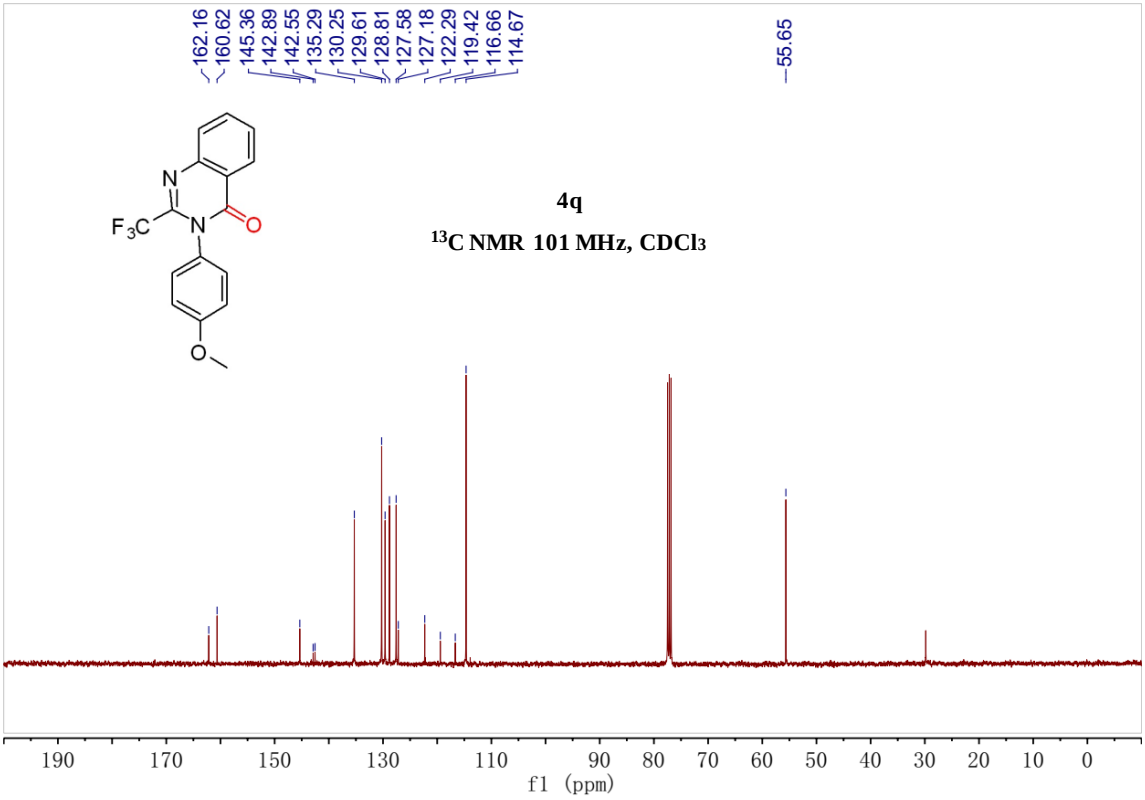
4p

^{19}F NMR 377 MHz, CDCl$_3$



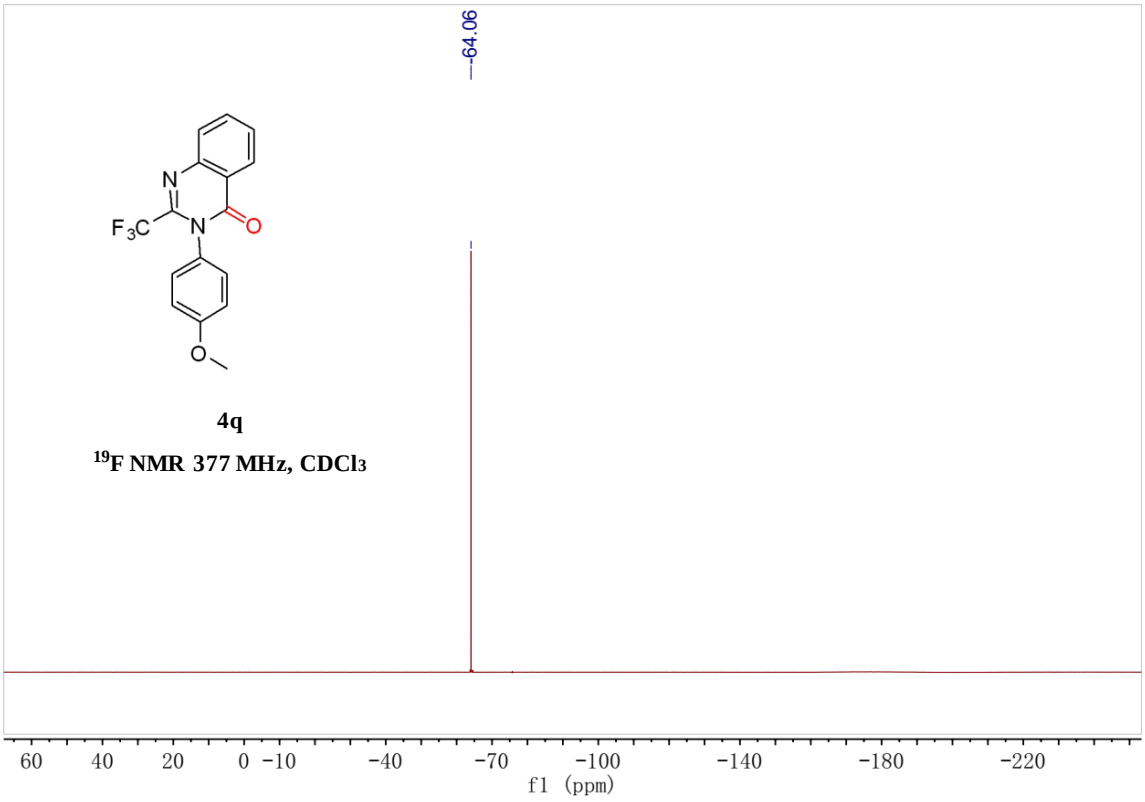
4q

^{1}H NMR 400 MHz, CDCl$_3$



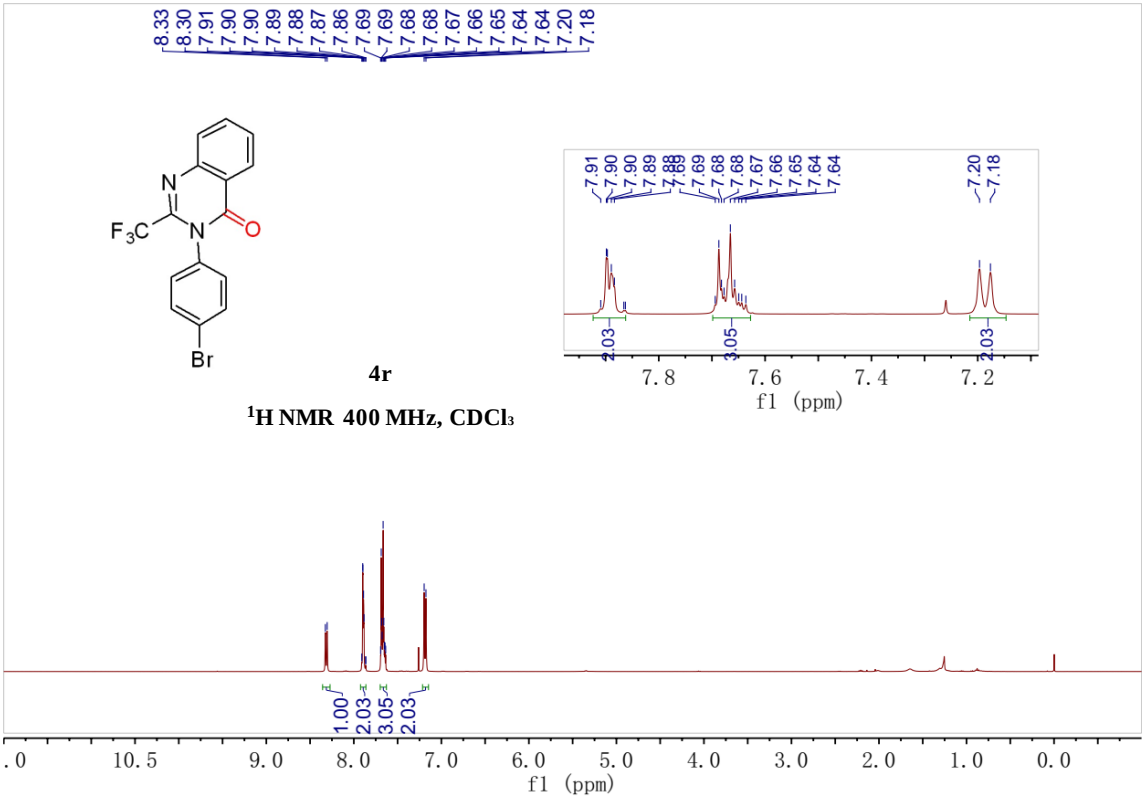
4q

^{13}C NMR 101 MHz, CDCl$_3$



4q

^{19}F NMR 377 MHz, CDCl$_3$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7.66
7.65
7.64
7.64
7.20
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N
F3C
N
O
Br
7.91
7.90
7.90
7.89
7.69
7.68
7.68
7.67
7.66
7.65
7.64
7.64
7.20
7.18
2.03
3.05
2.03
7.8
7.6
7.4
7.2
f1 (ppm)
4r
1H NMR 400 MHz, CDCl3
1.00
2.03
3.05
2.03
.0
10.5
9.0
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7.0
6.0
5.0
4.0
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2.0
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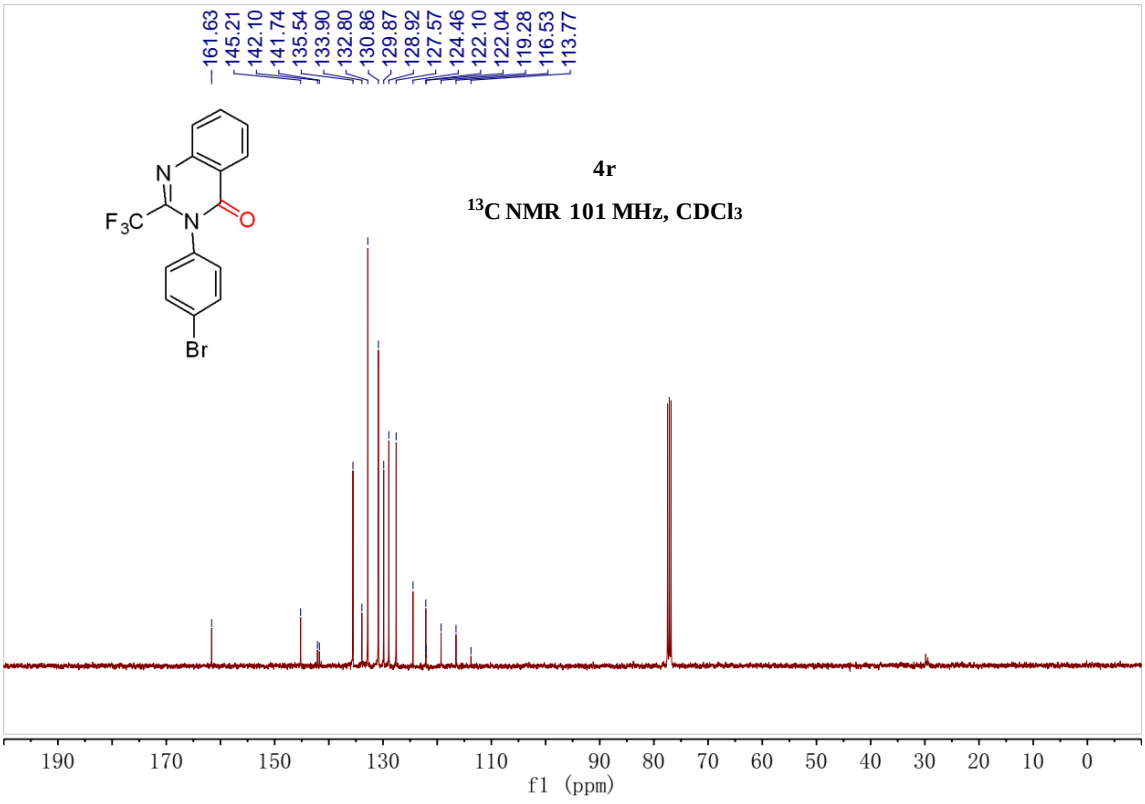
f1 (ppm)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124.46
122.10
122.04
119.28
116.53
113.77
N
F3C
N
O
Br
4r
13C NMR 101 MHz, CDCl3
190
170
150
130
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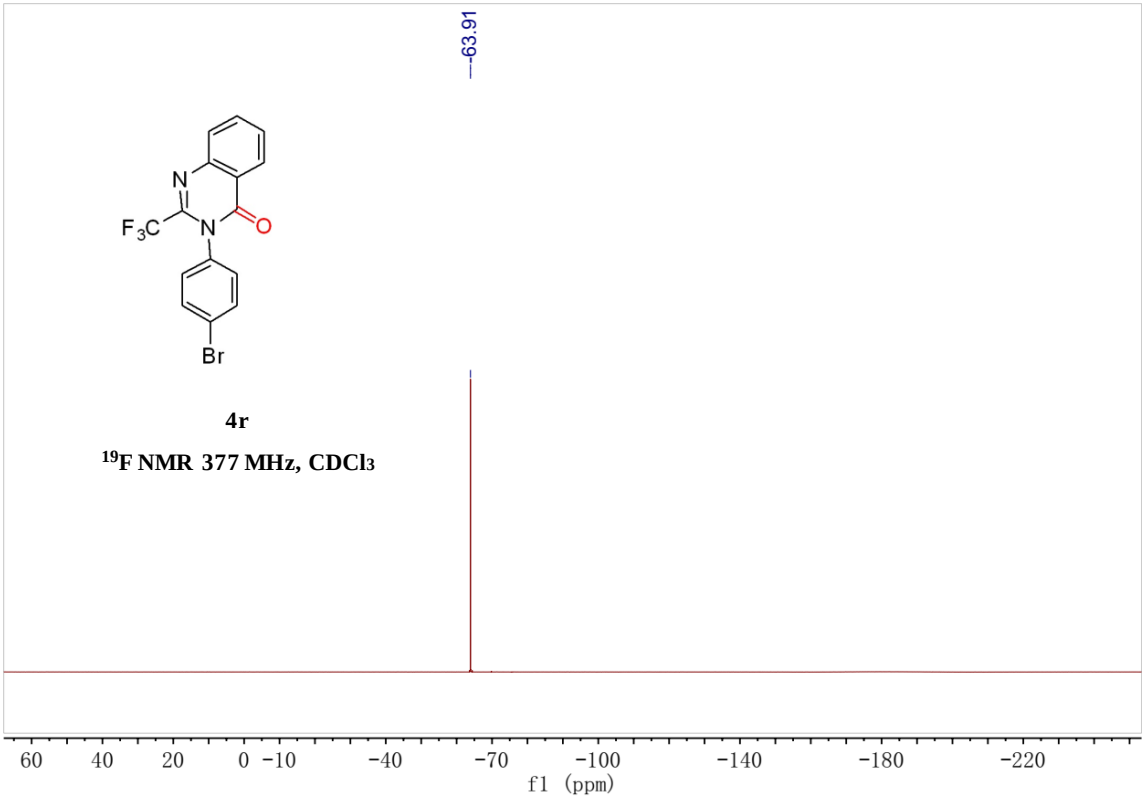
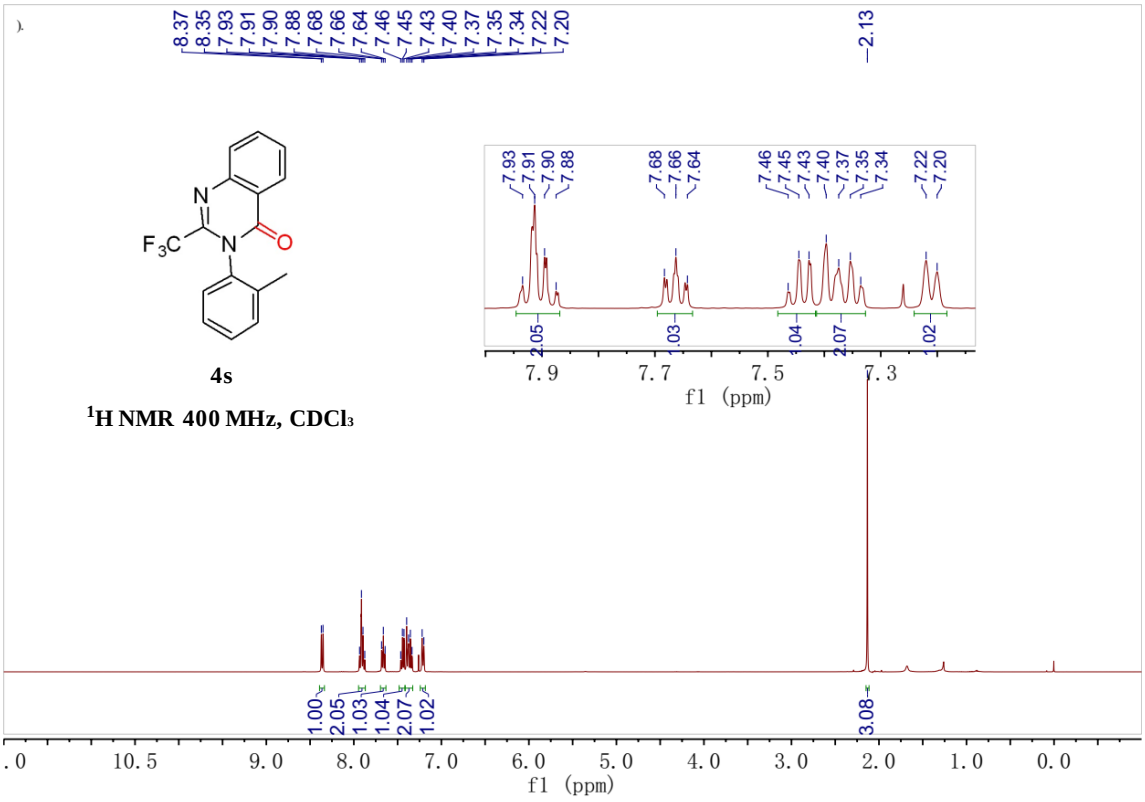
90
80
70
60
50
40
30
20
10
0
f1 (ppm)



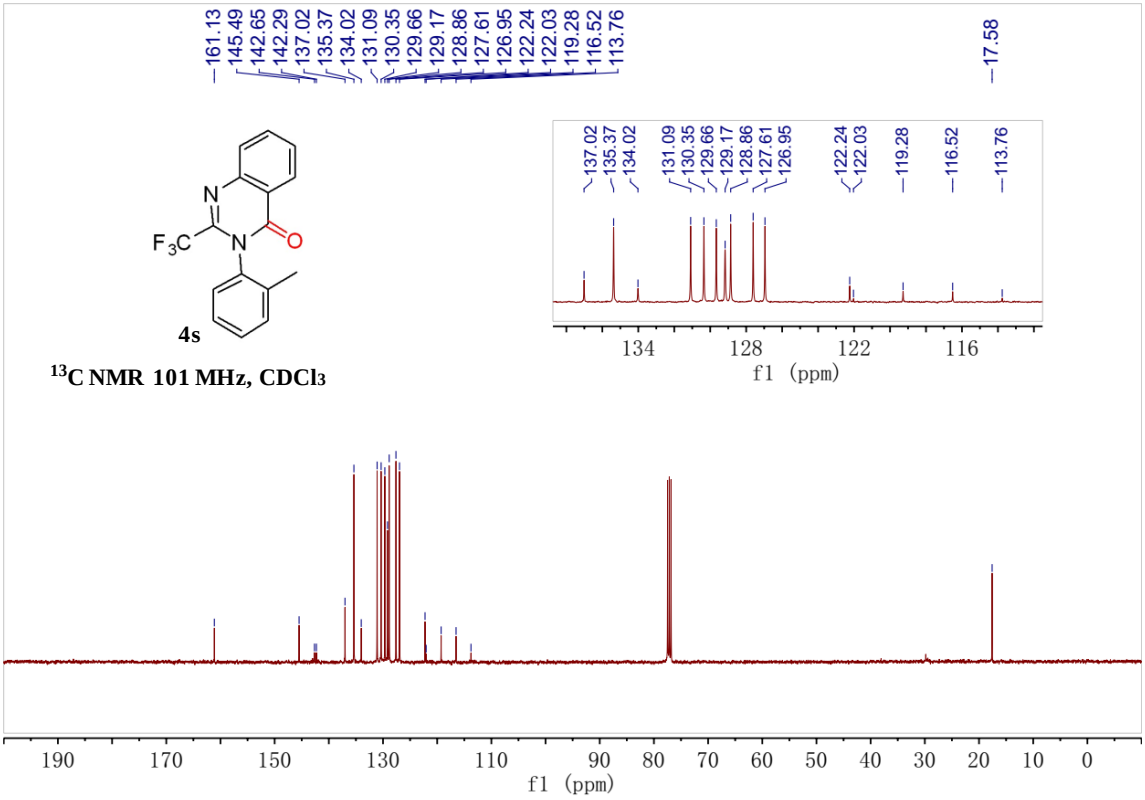
4r

^{19}F NMR 377 MHz, CDCl$_3$

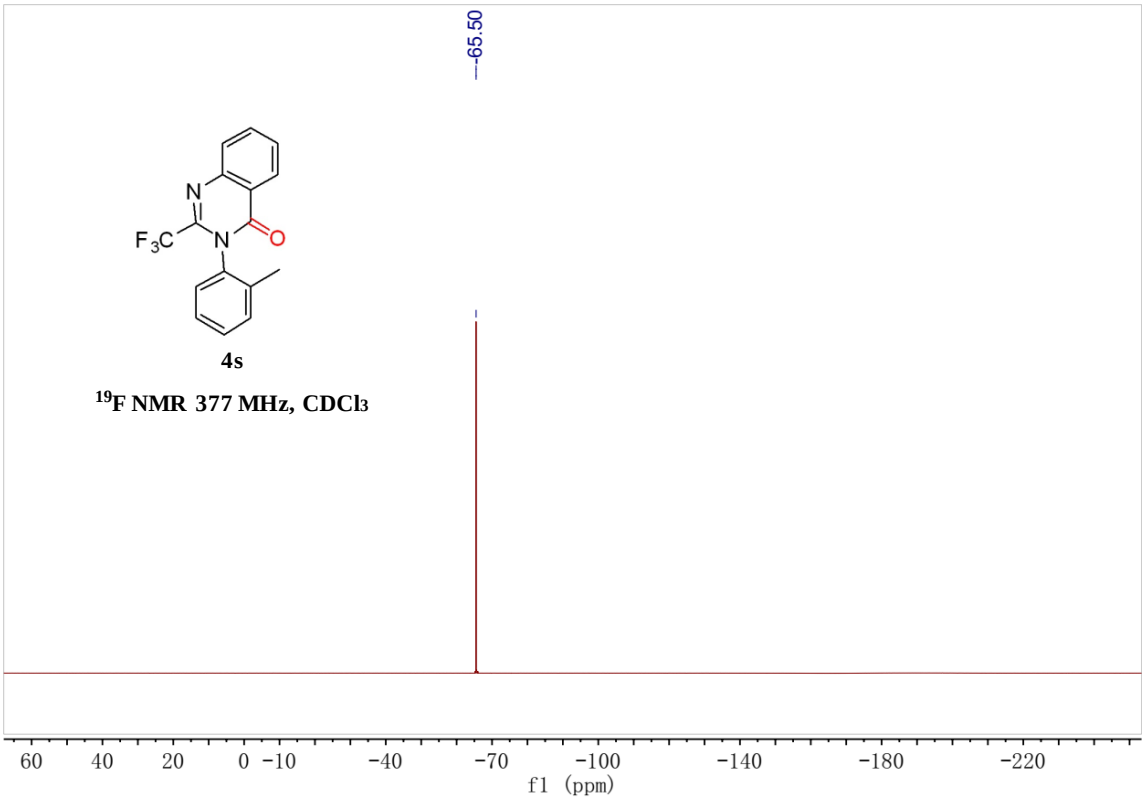


4s

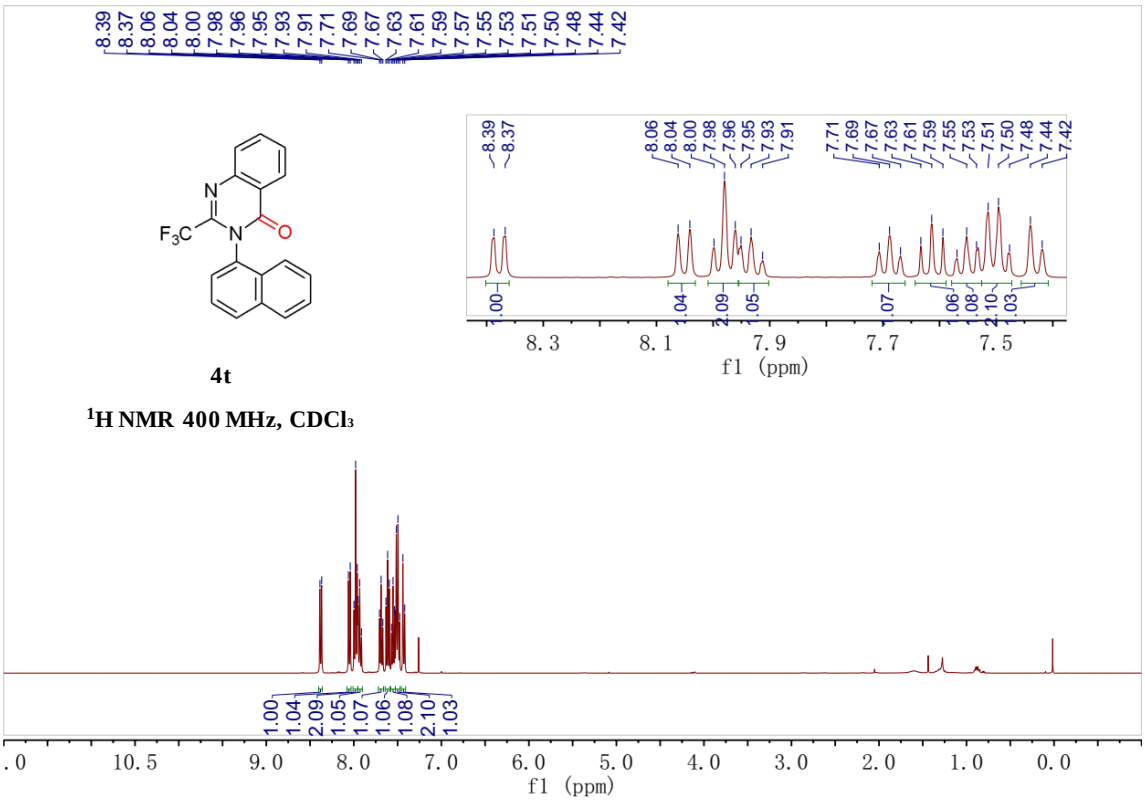
^{1}H NMR 400 MHz, CDCl$_3$



^{13}C NMR 101 MHz, CDCl$_3$

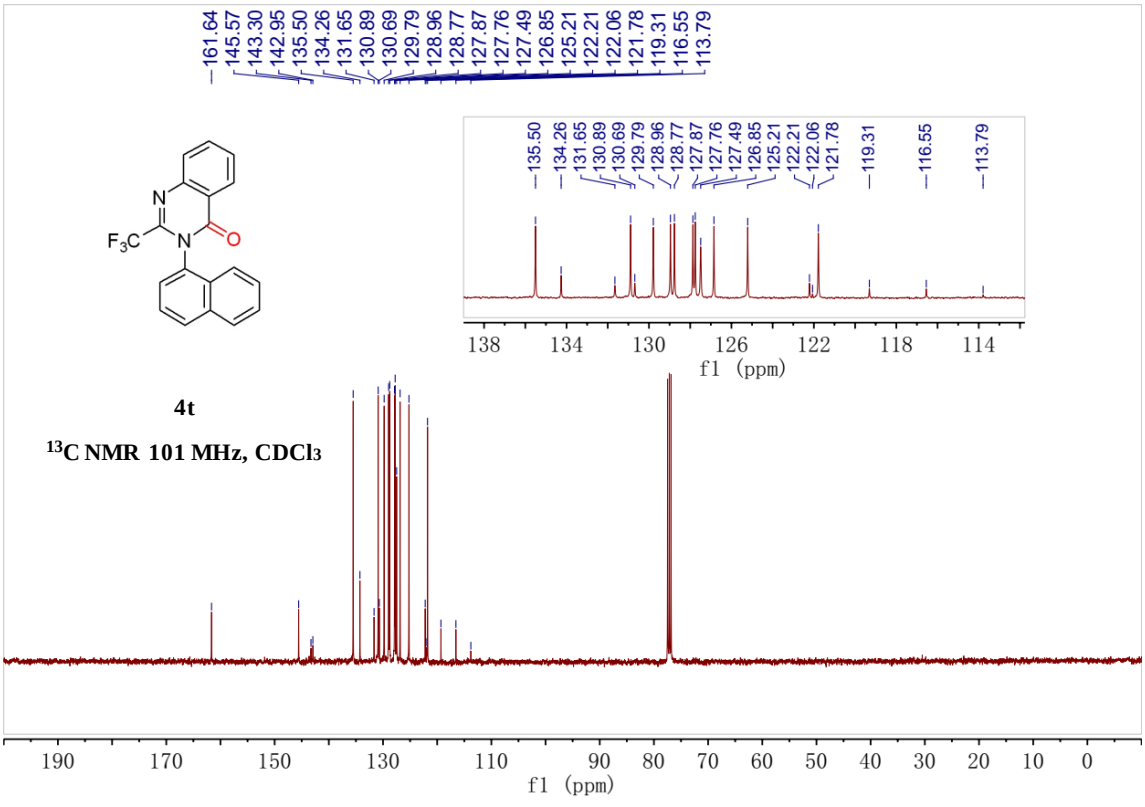


^{19}F NMR 377 MHz, CDCl$_3$



4t

^{1}H NMR 400 MHz, $CDCl_3$



4t

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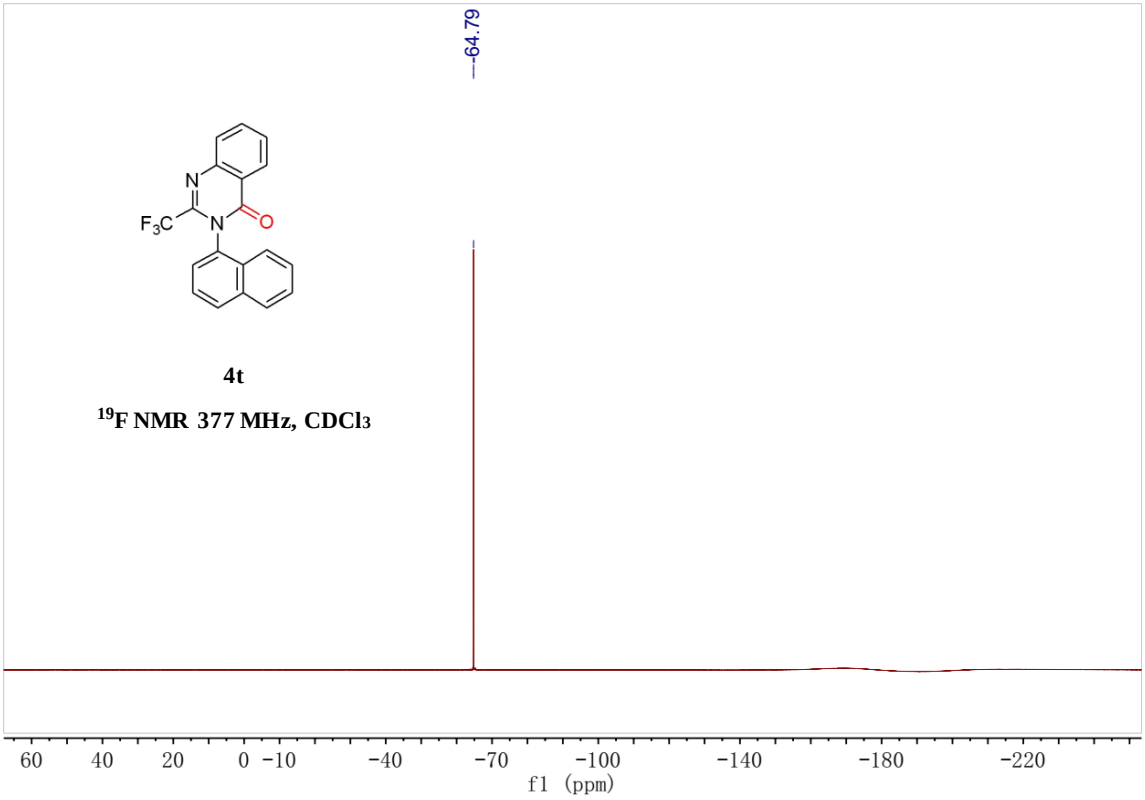
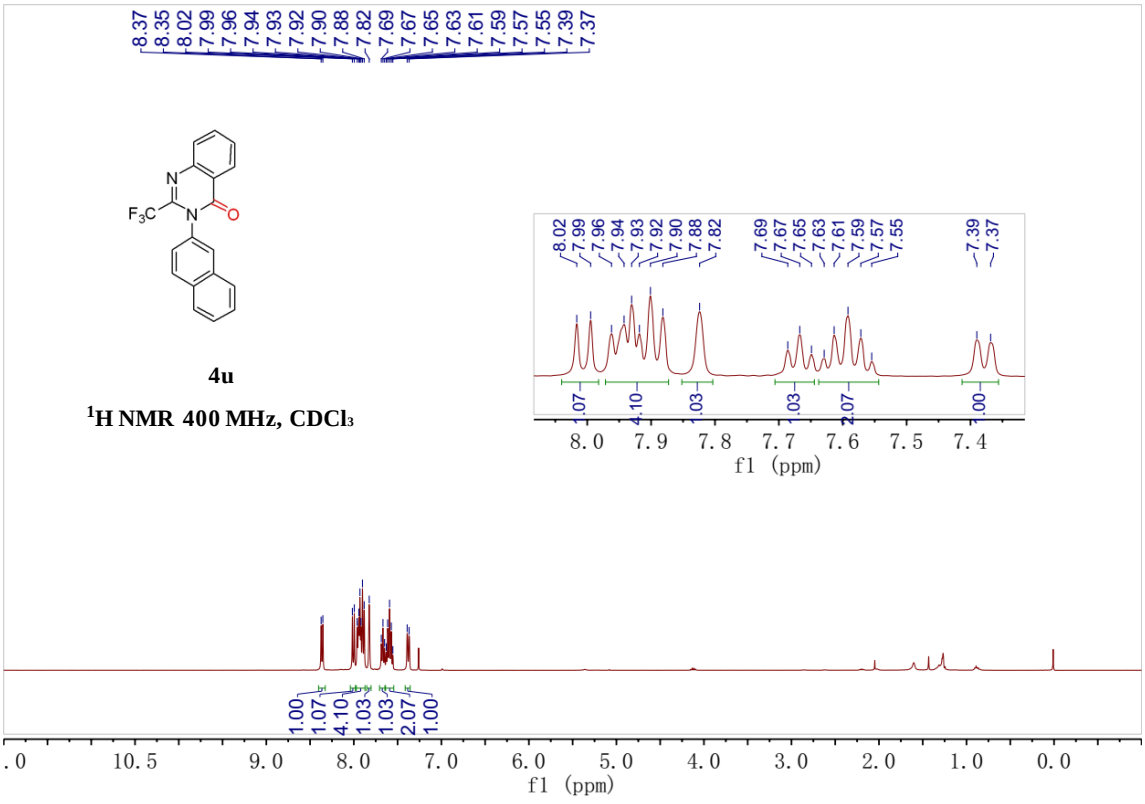


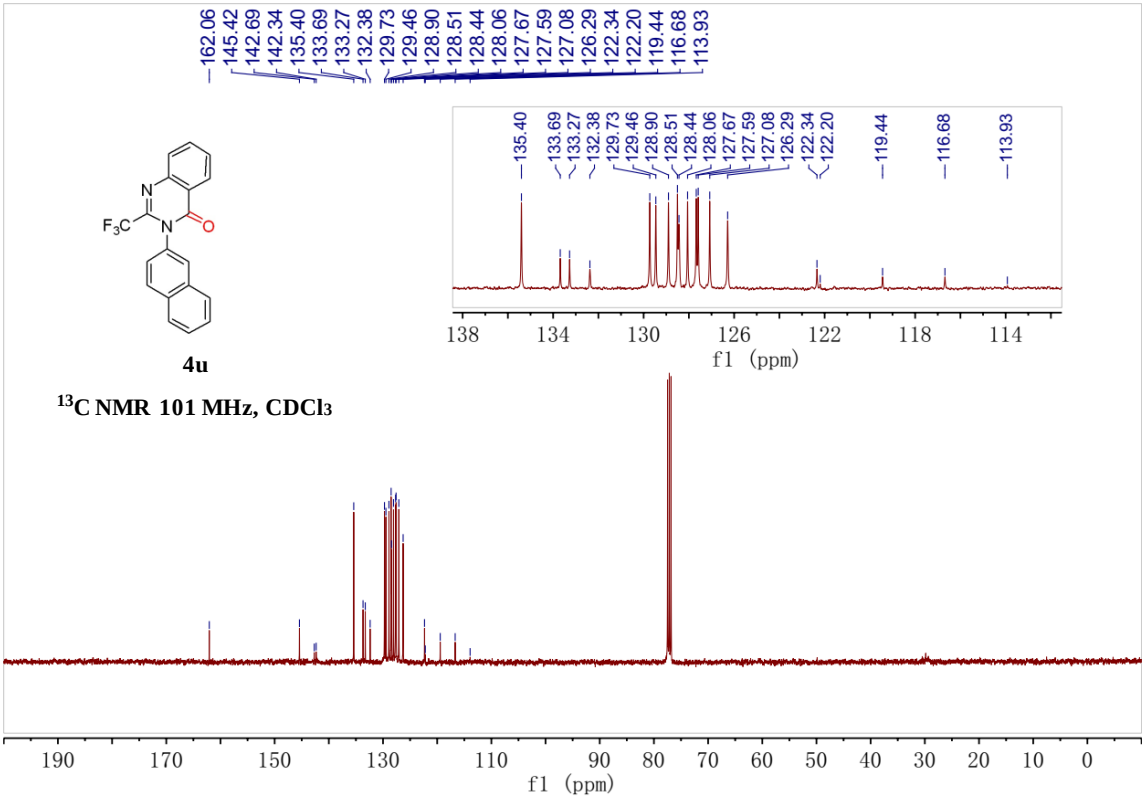
4t

^{19}F NMR 377 MHz, CDCl$_3$



4u

^{1}H NMR 400 MHz, CDCl$_3$



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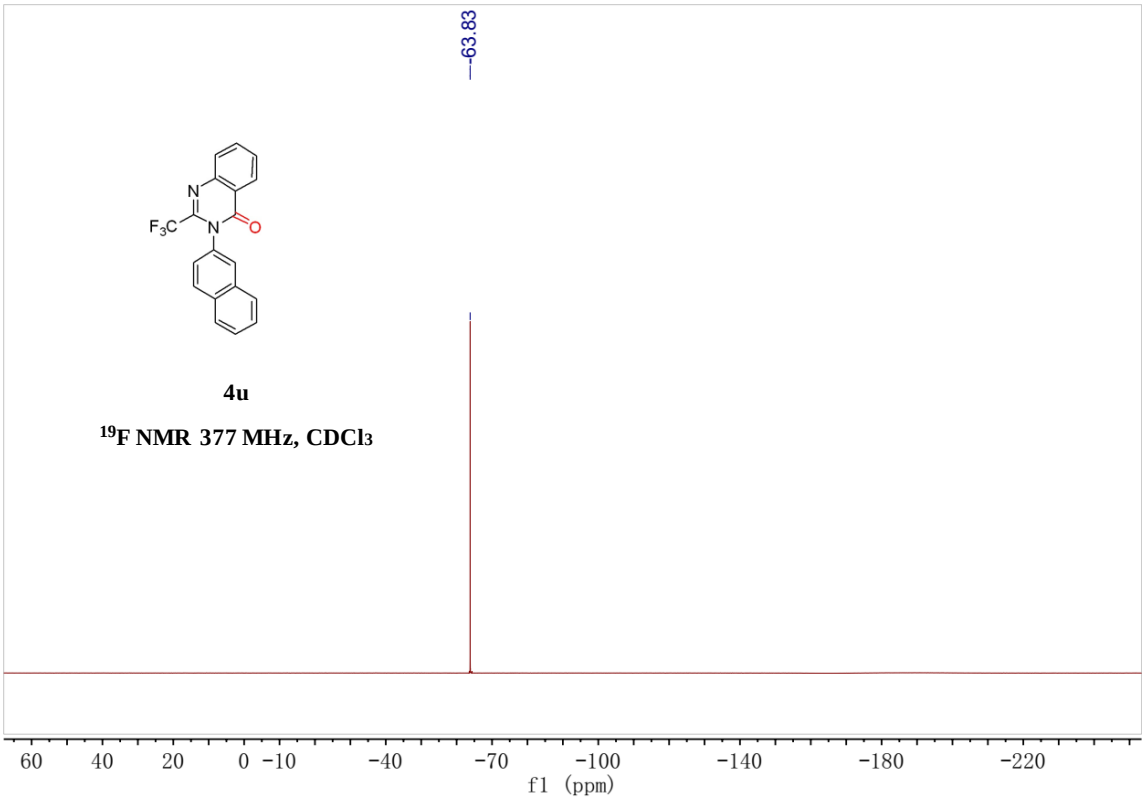
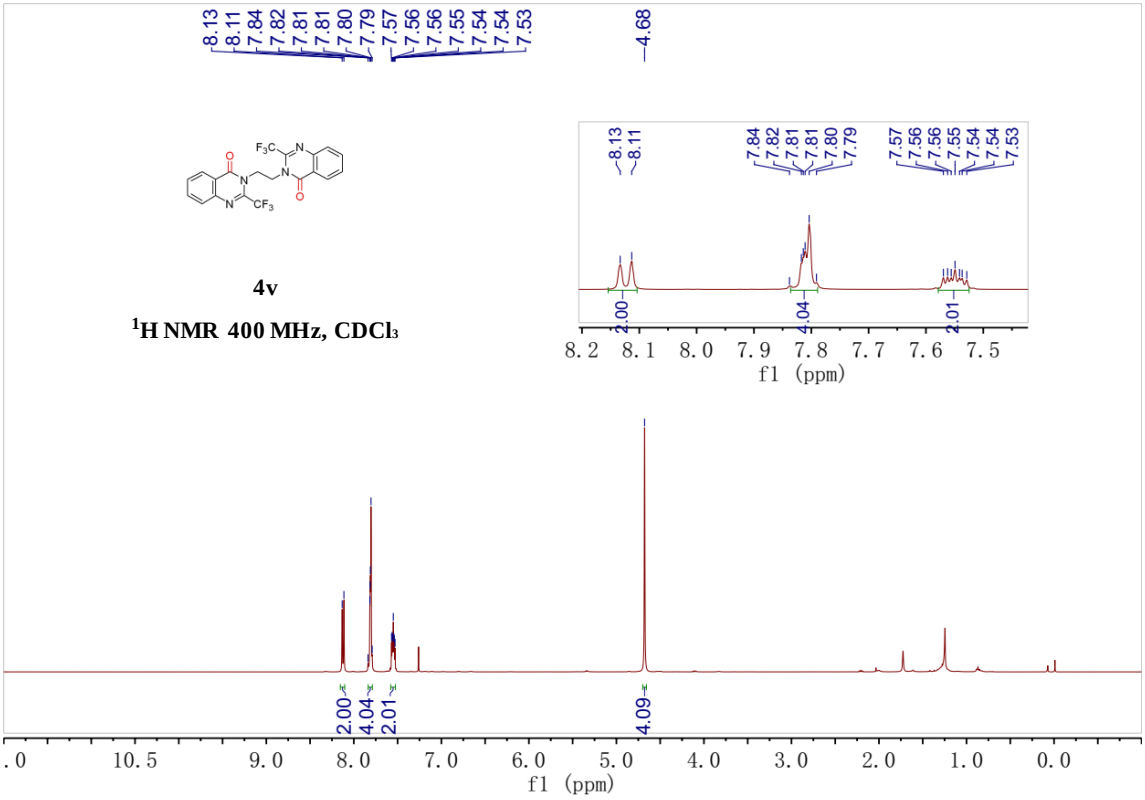


4u

^{19}F NMR 377 MHz, CDCl$_3$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7.54
7.54
7.53
4.68
F3C
N
O
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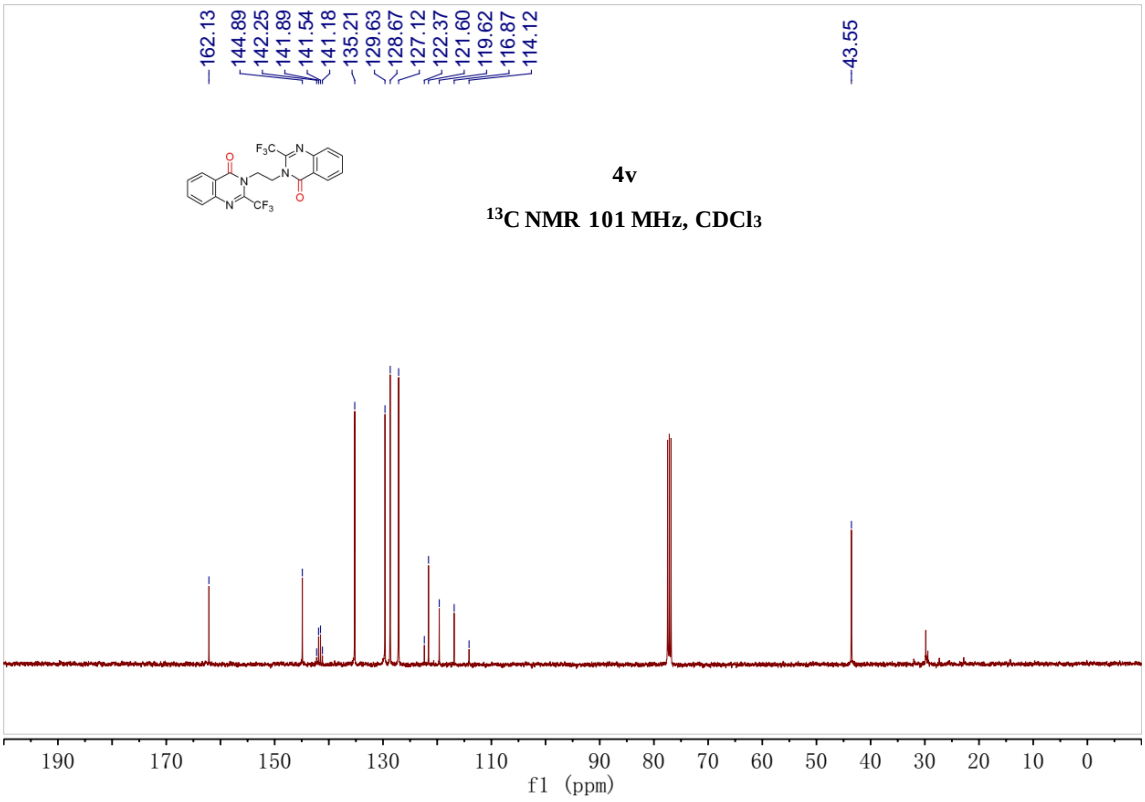
O
CF3
4v
1H NMR 400 MHz, CDCl3
2.00
4.04
2.01
4.09
f1 (ppm)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F3C
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O
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N
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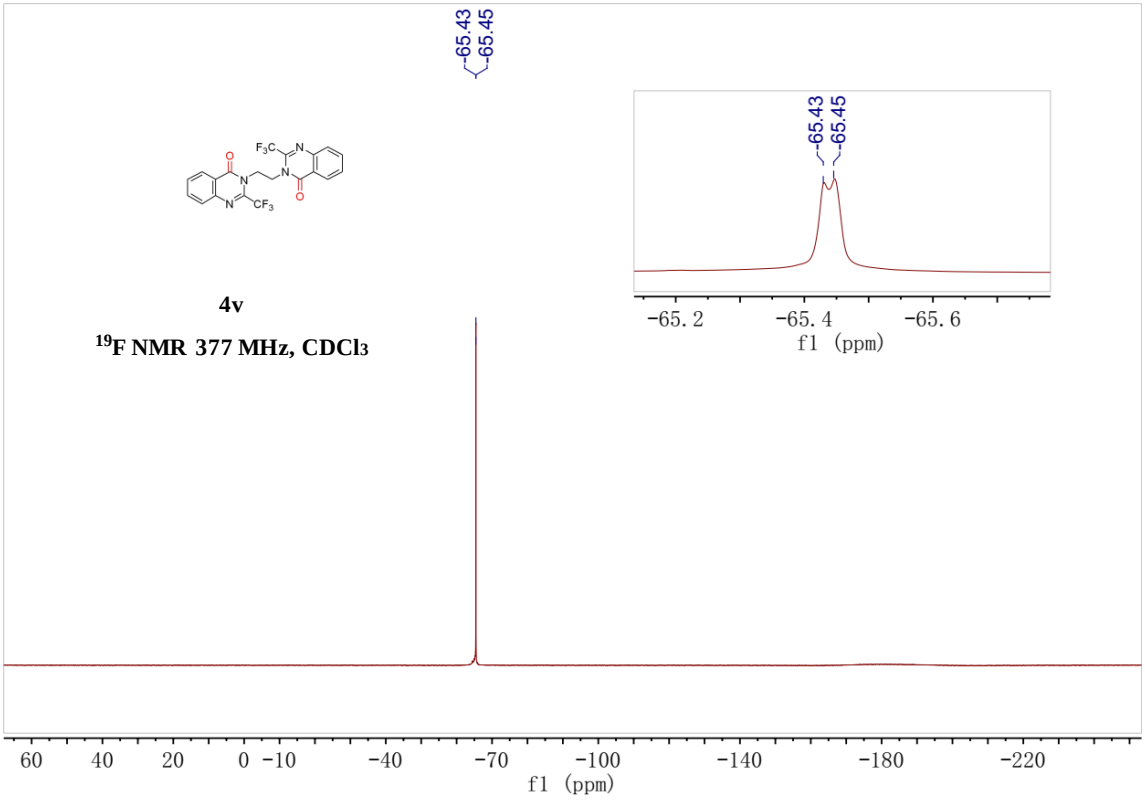
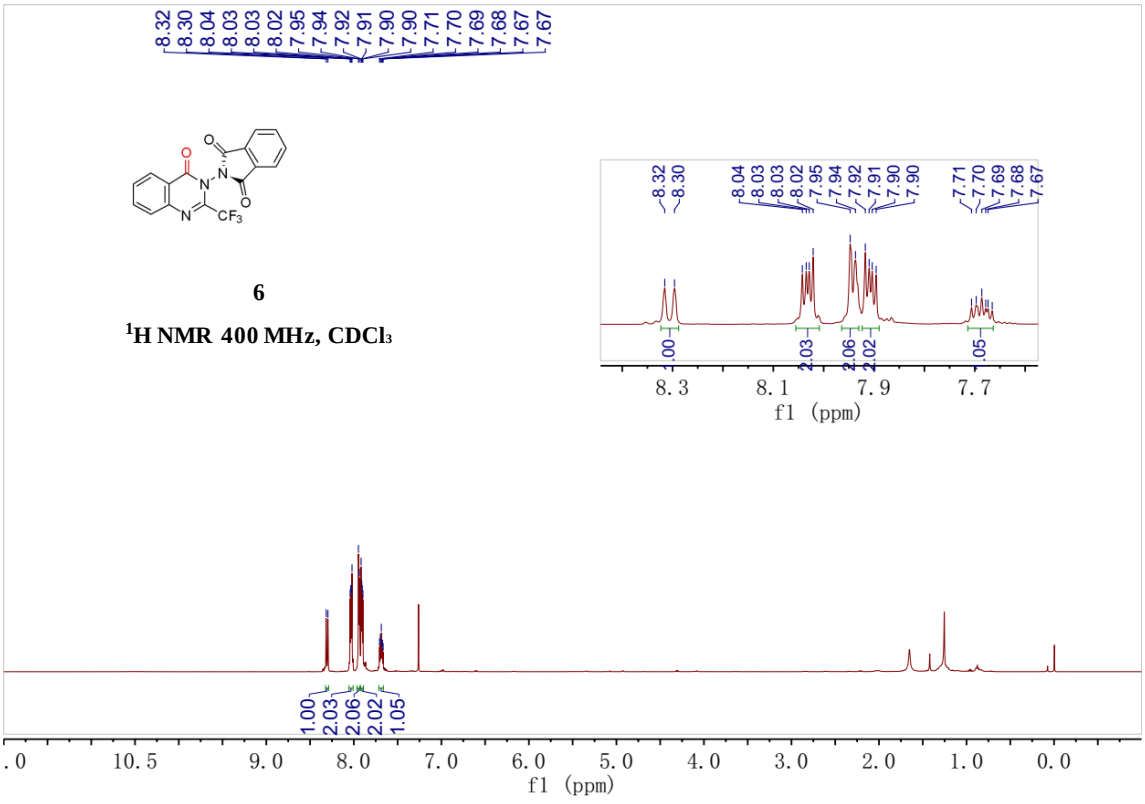
CF3
4v
13C NMR 101 MHz, CDCl3
f1 (ppm)



4v

^{19}F NMR 377 MHz, CDCl$_3$



6

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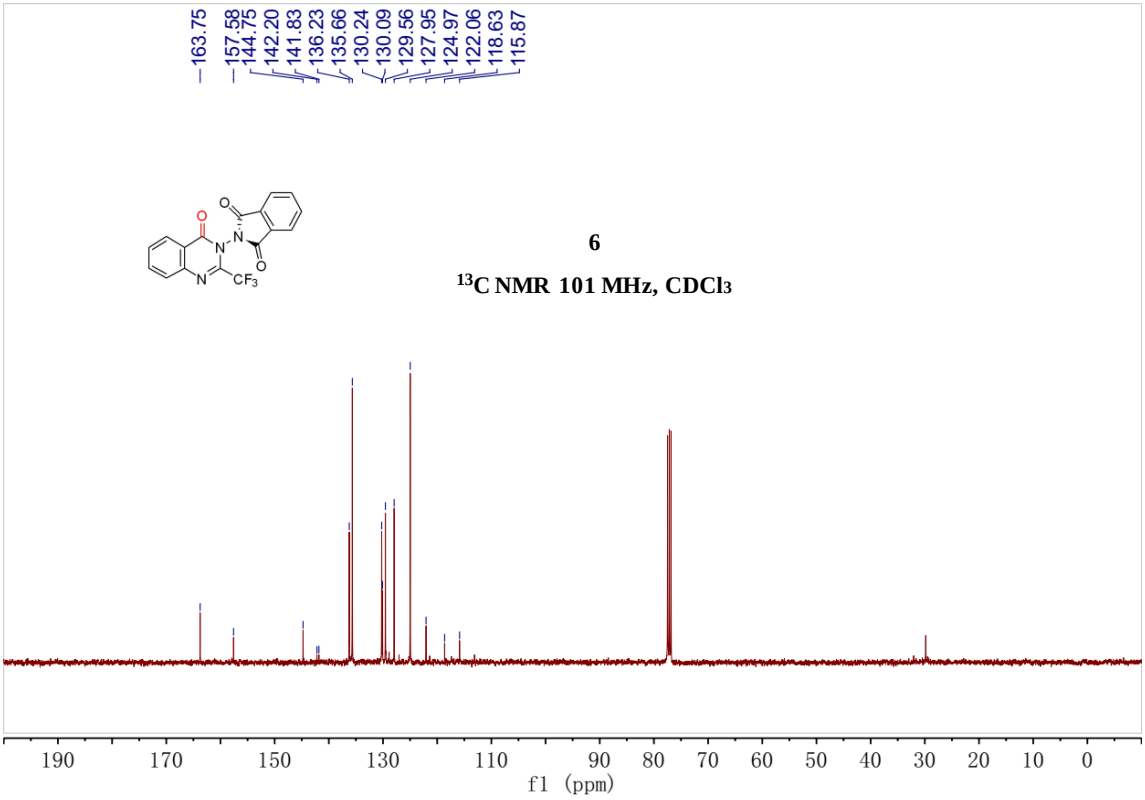
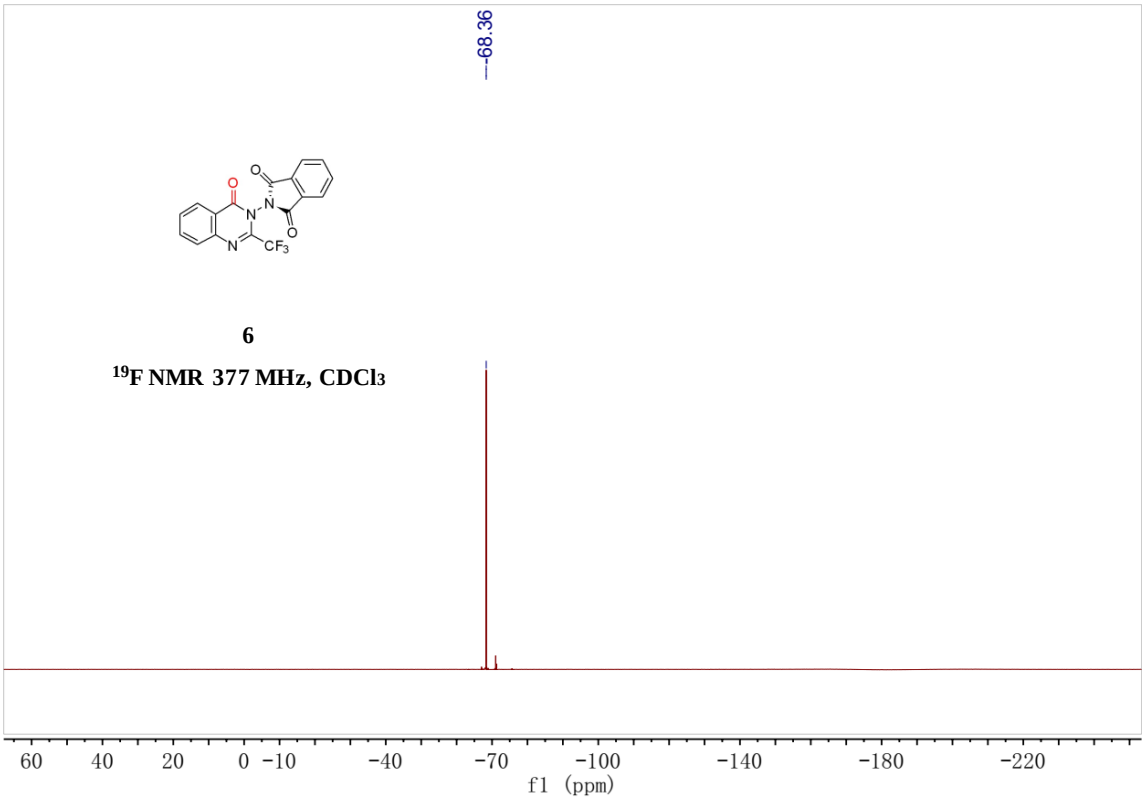


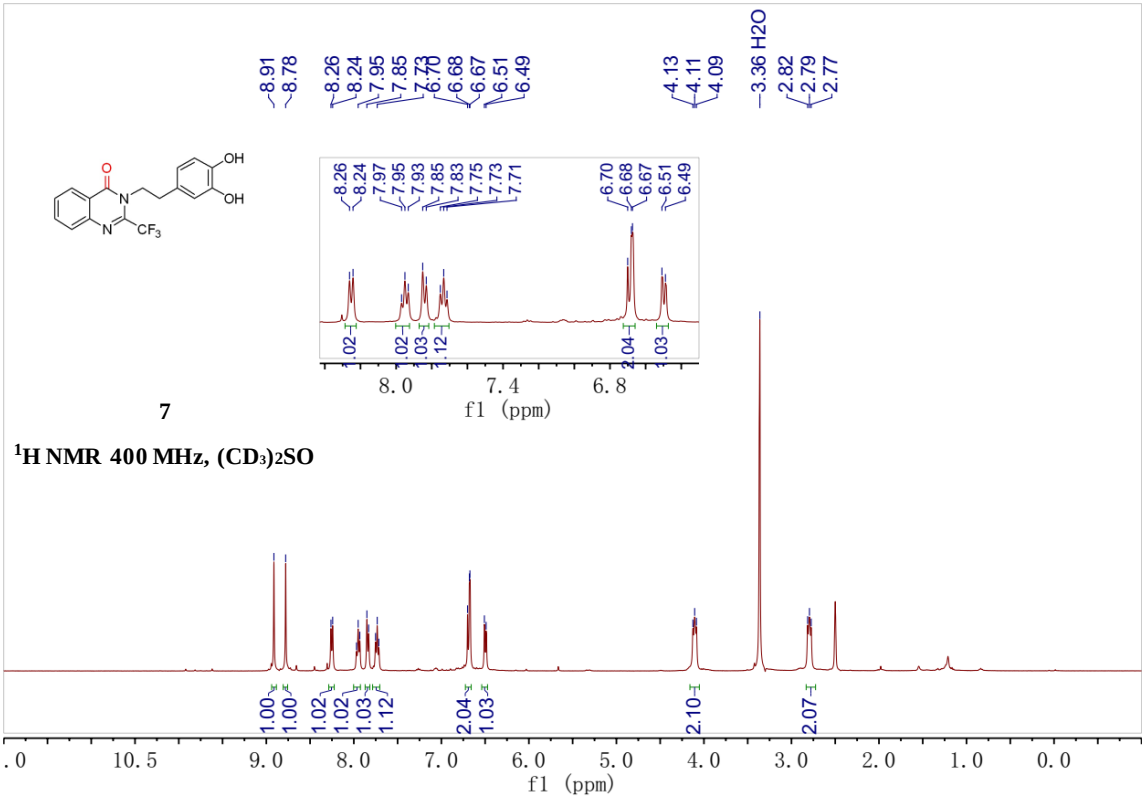
6

^{13}C NMR 101 MHz, CDCl$_3$



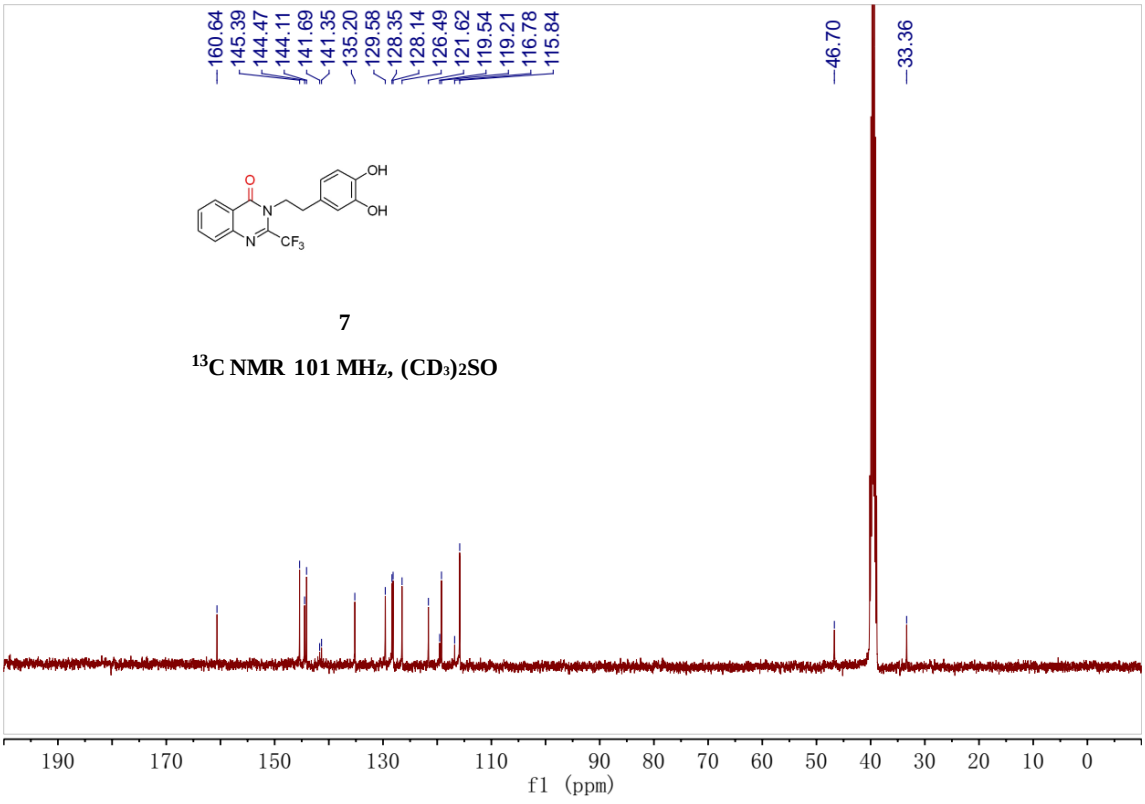
6

^{19}F NMR 377 MHz, CDCl$_3$



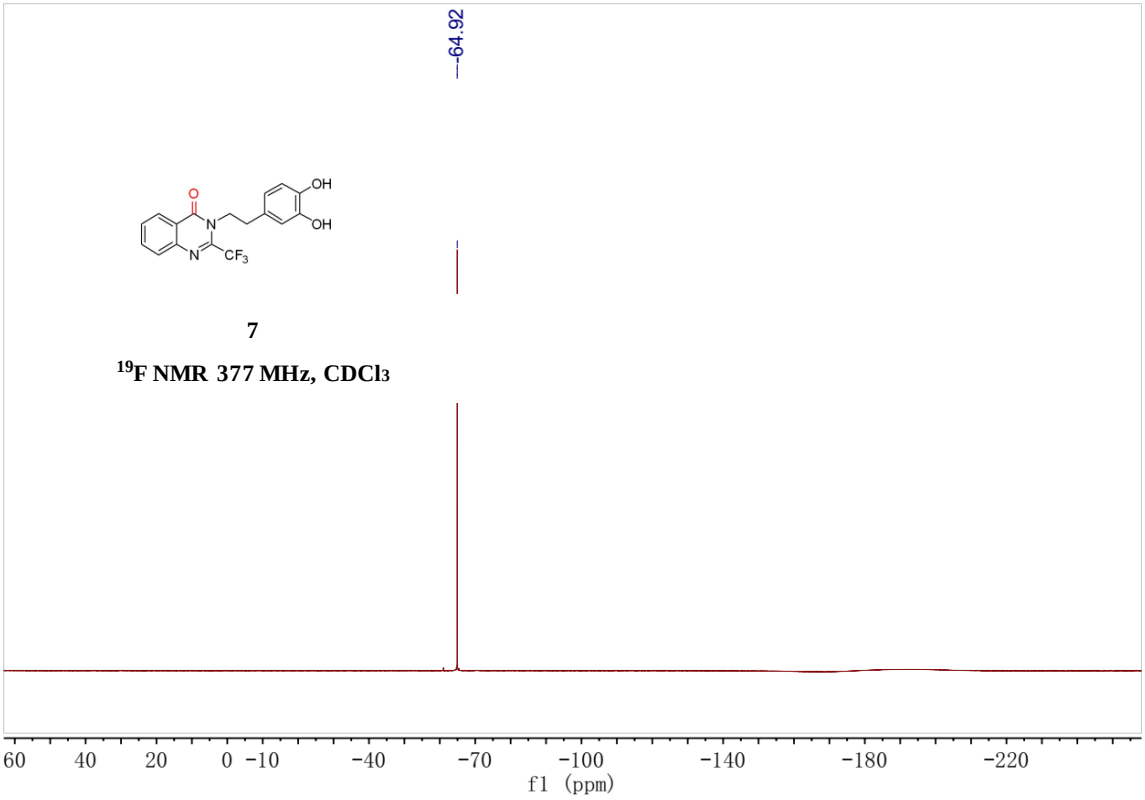
7

^{1}H NMR 400 MHz, $(CD_3)_2SO$



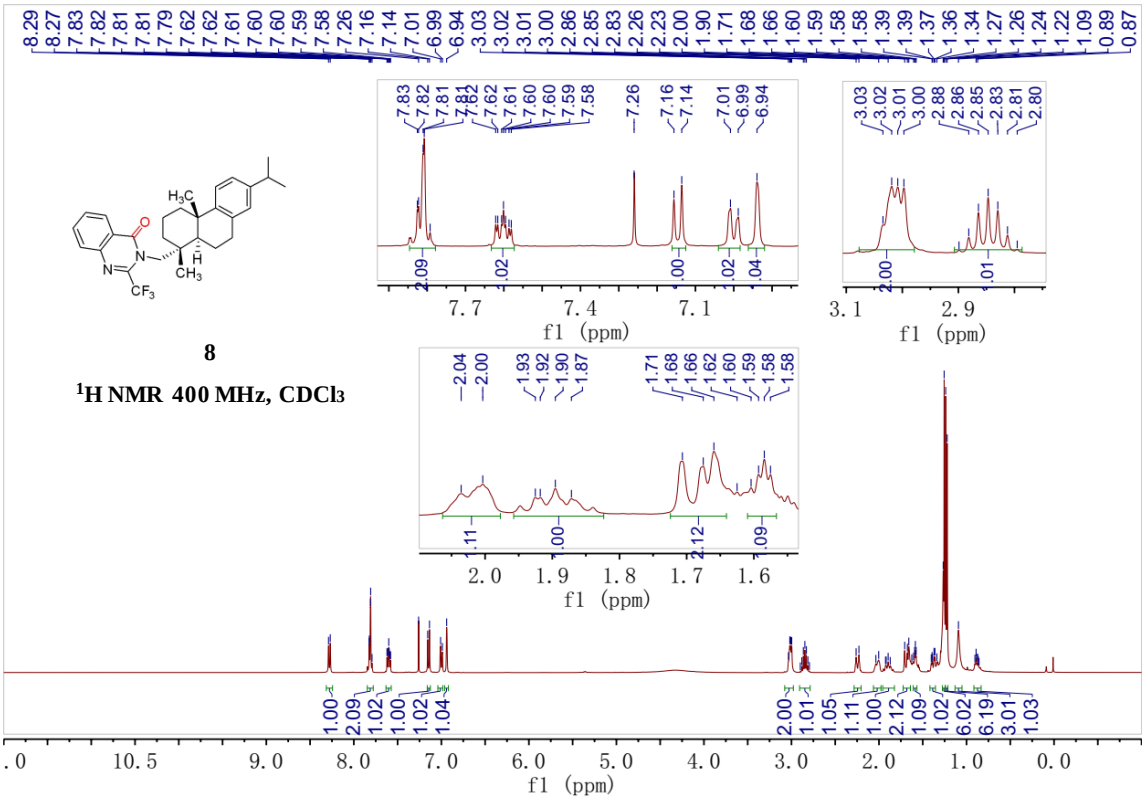
7

^{13}C NMR 101 MHz, $(CD_3)_2SO$



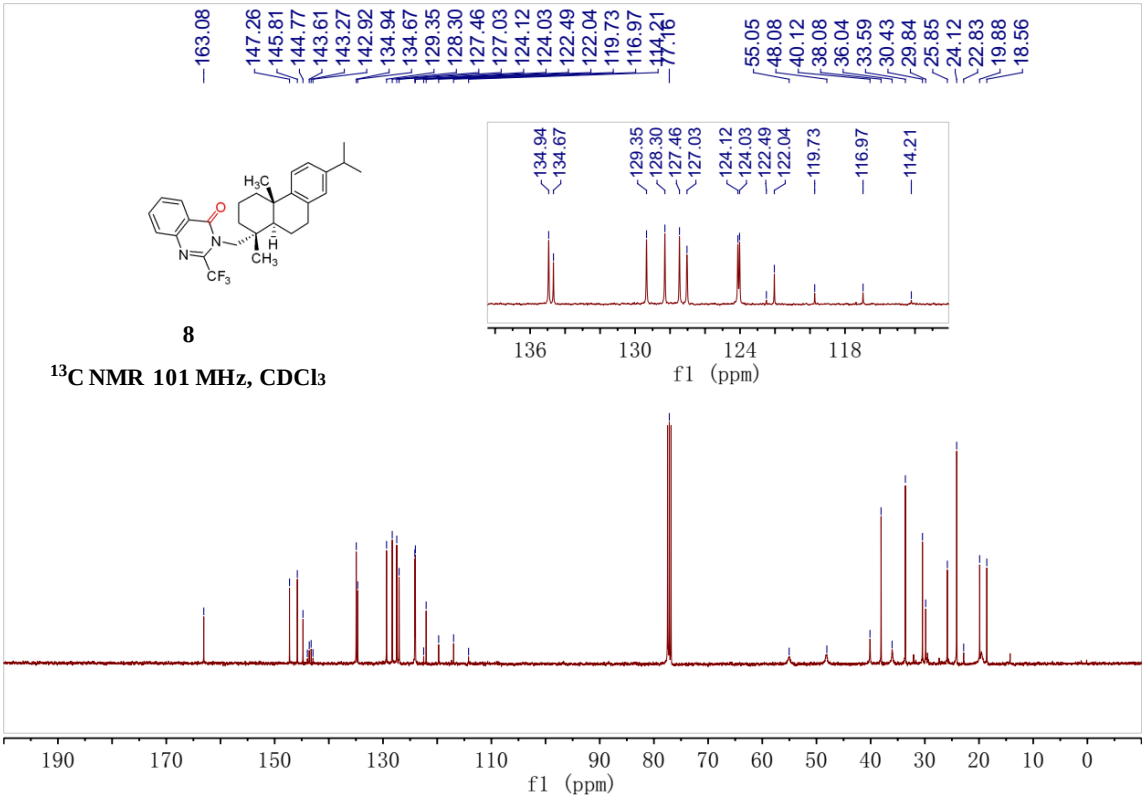
7

^{19}F NMR 377 MHz, CDCl$_3$



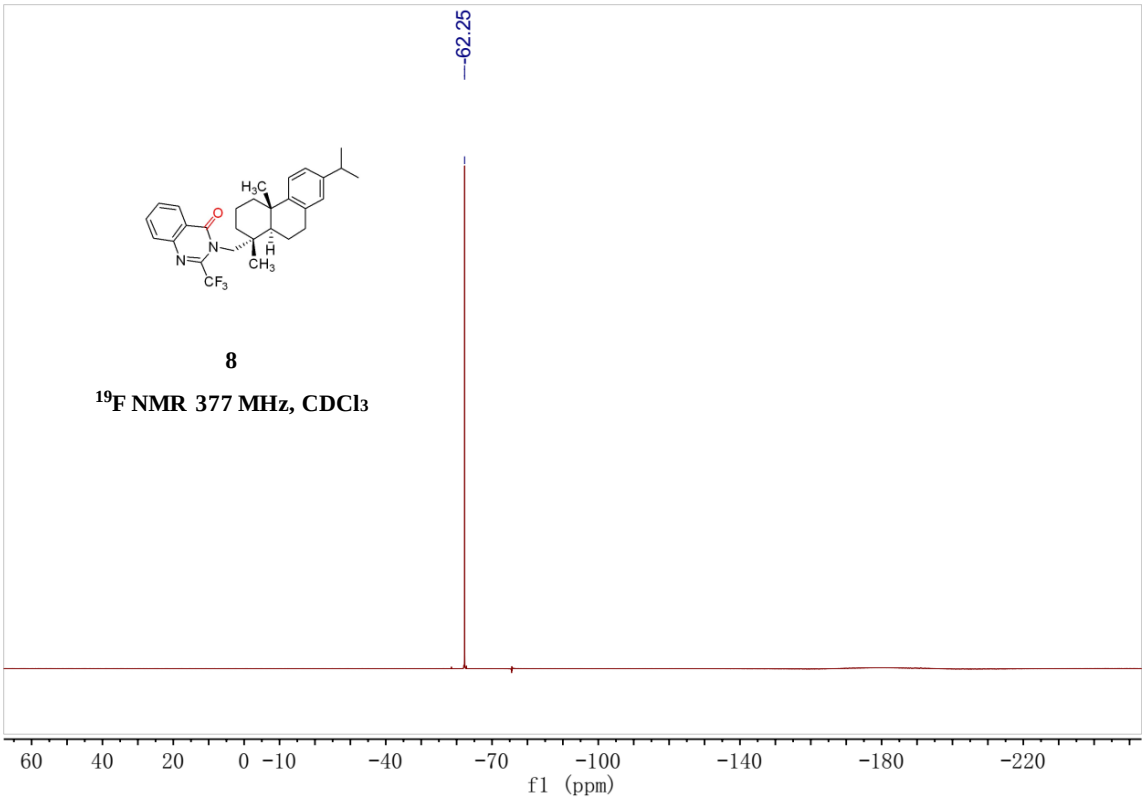
8

^{1}H NMR 400 MHz, CDCl$_3$



8

^{13}C NMR 101 MHz, CDCl$_3$



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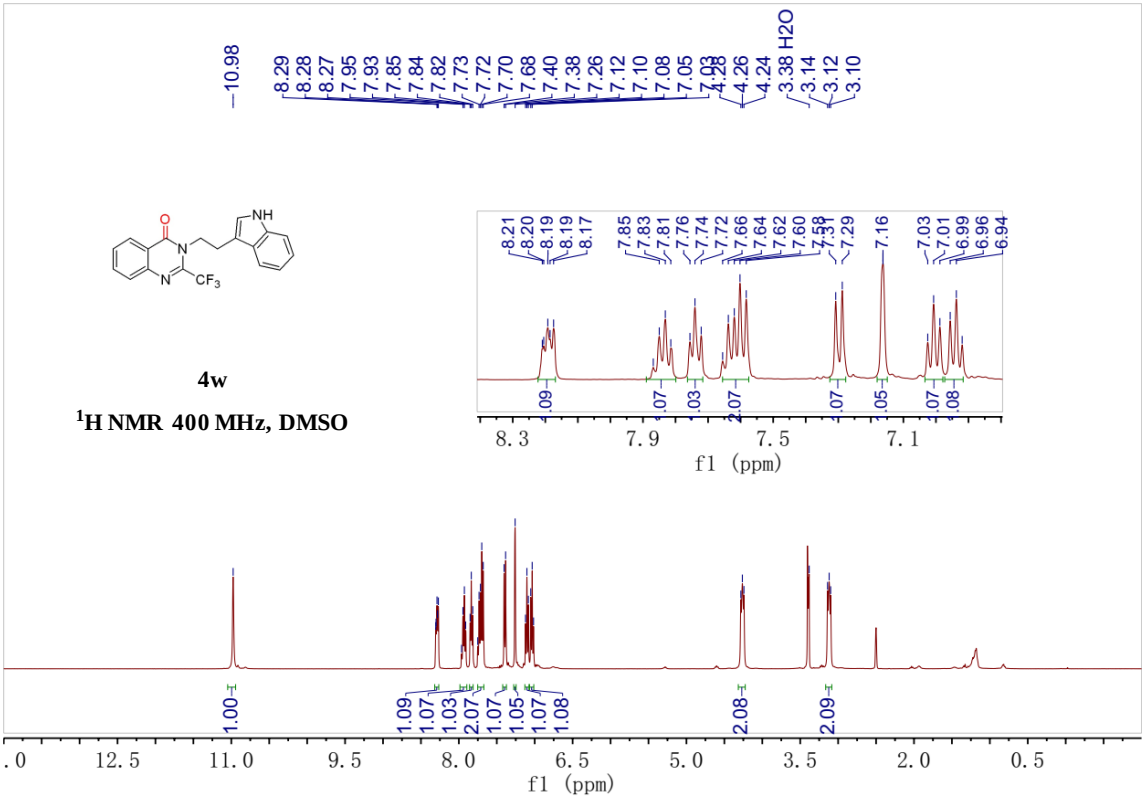
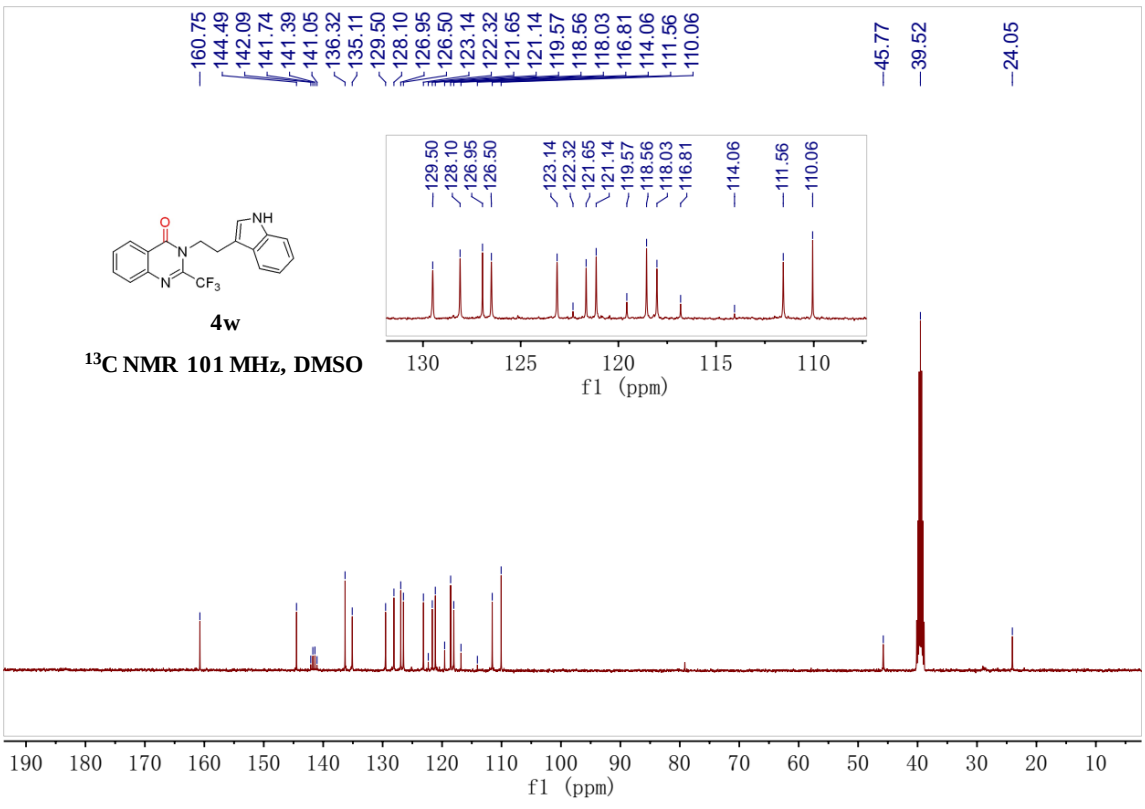


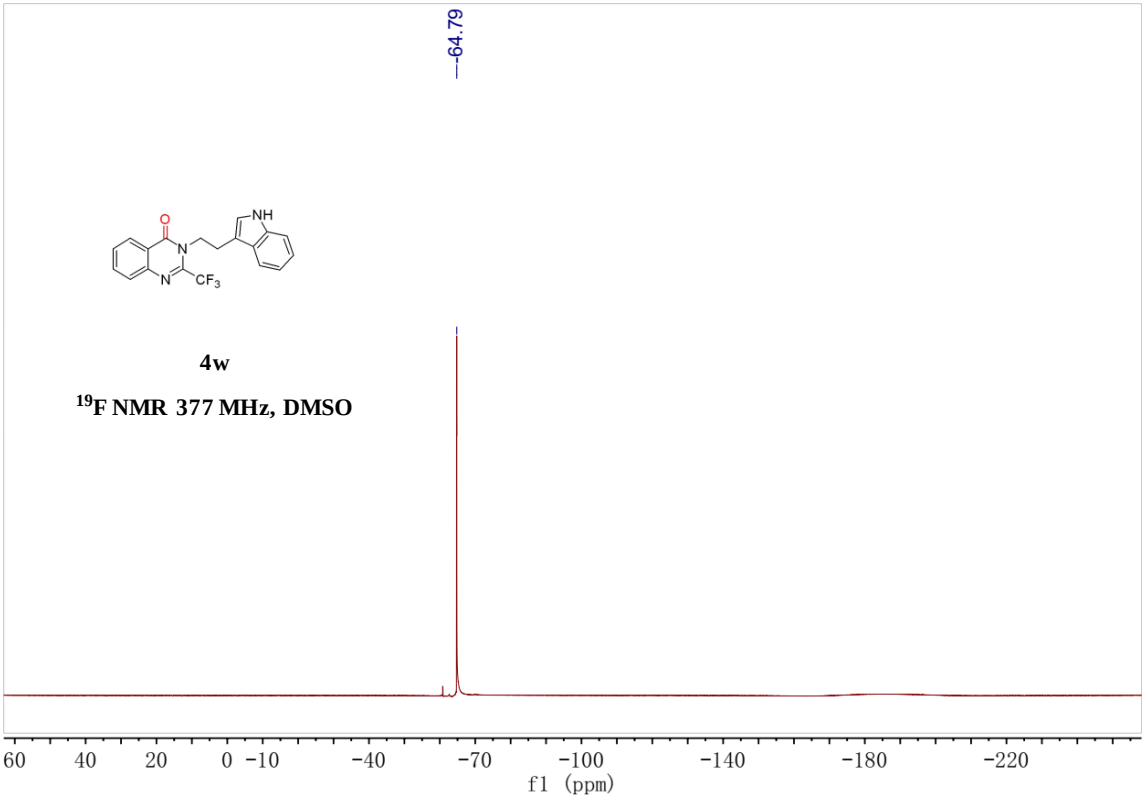
4w

^{1}H NMR 400 MHz, DMSO



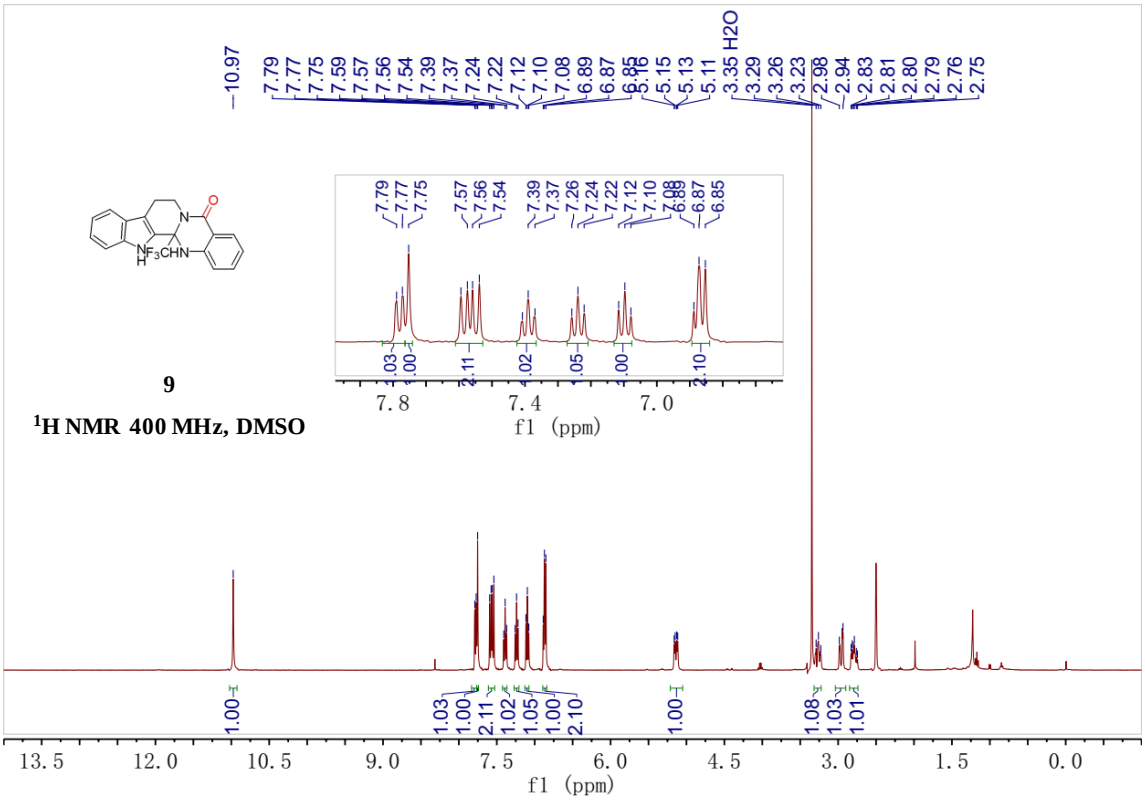
4w

^{13}C NMR 101 MHz, DMSO



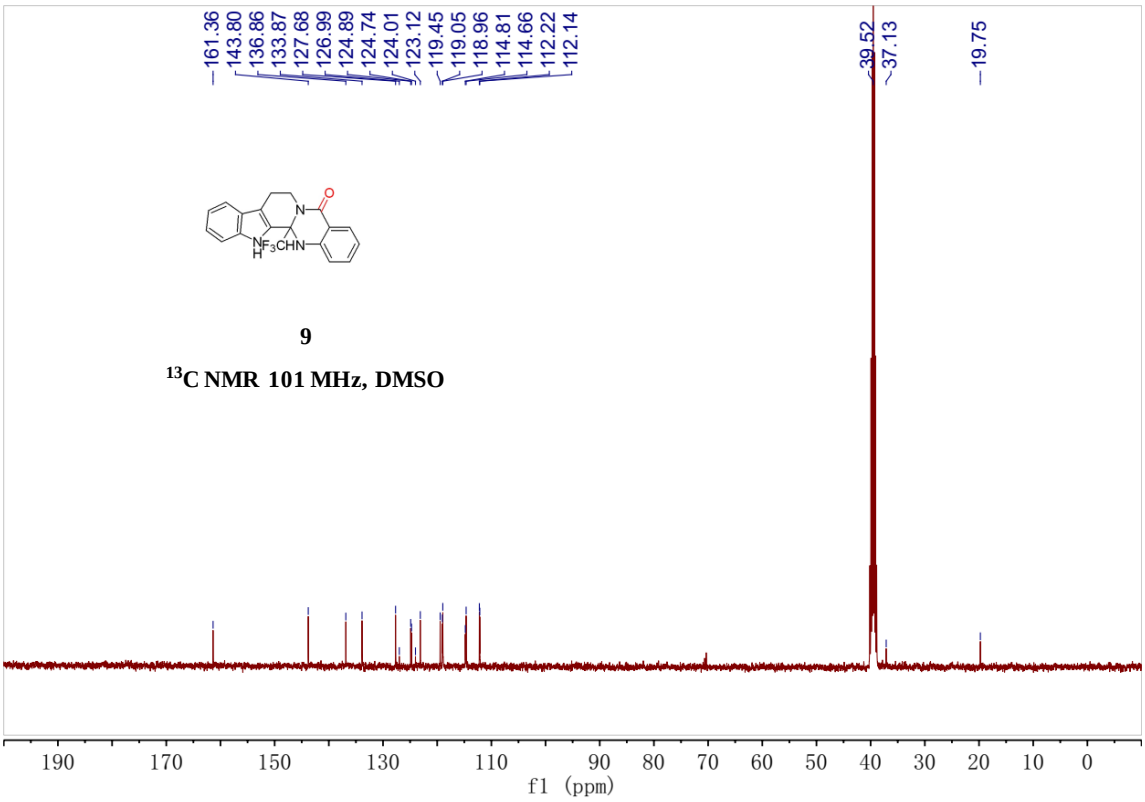
4w

^{19}F NMR 377 MHz, DMSO



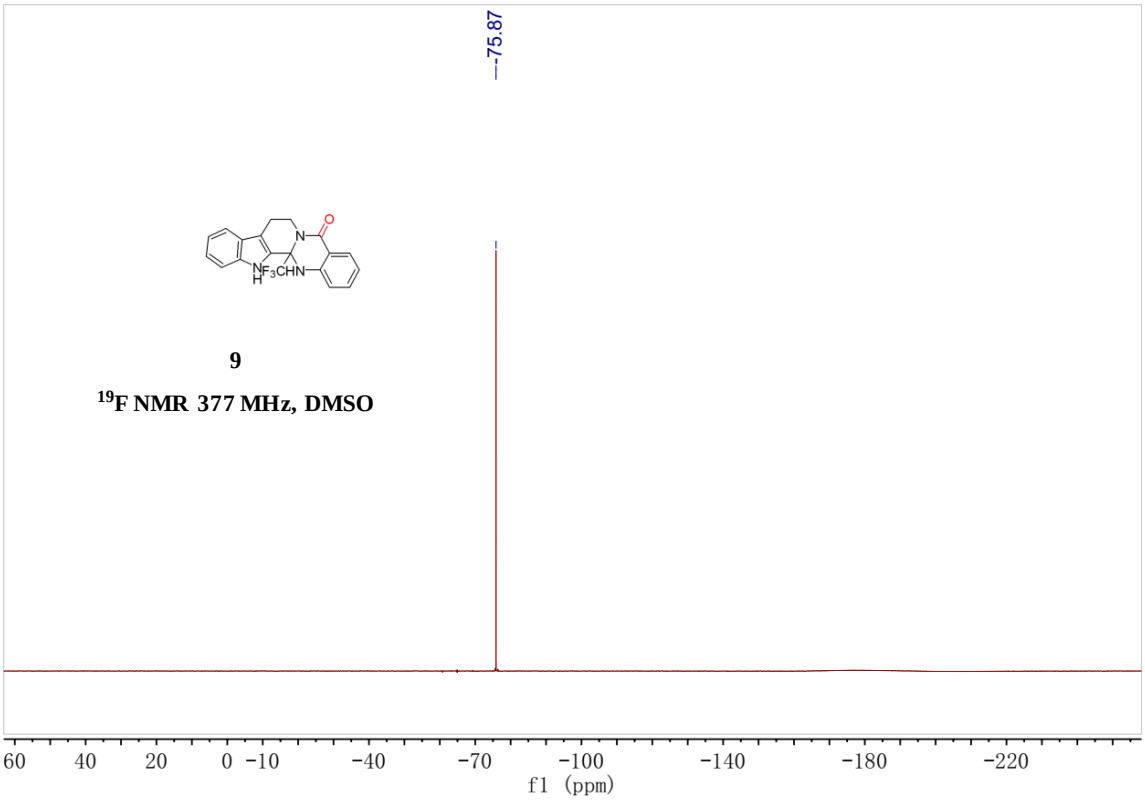
9

^{1}H NMR 400 MHz, DMSO



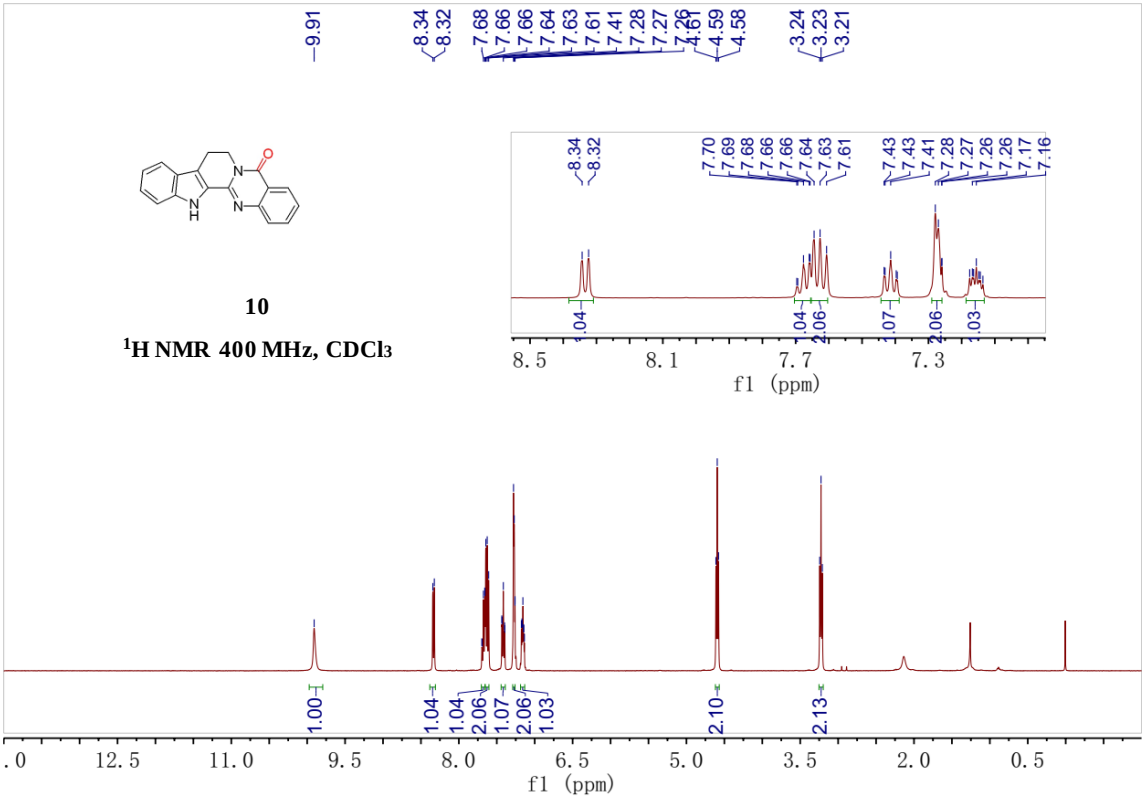
9

^{13}C NMR 101 MHz, DMSO



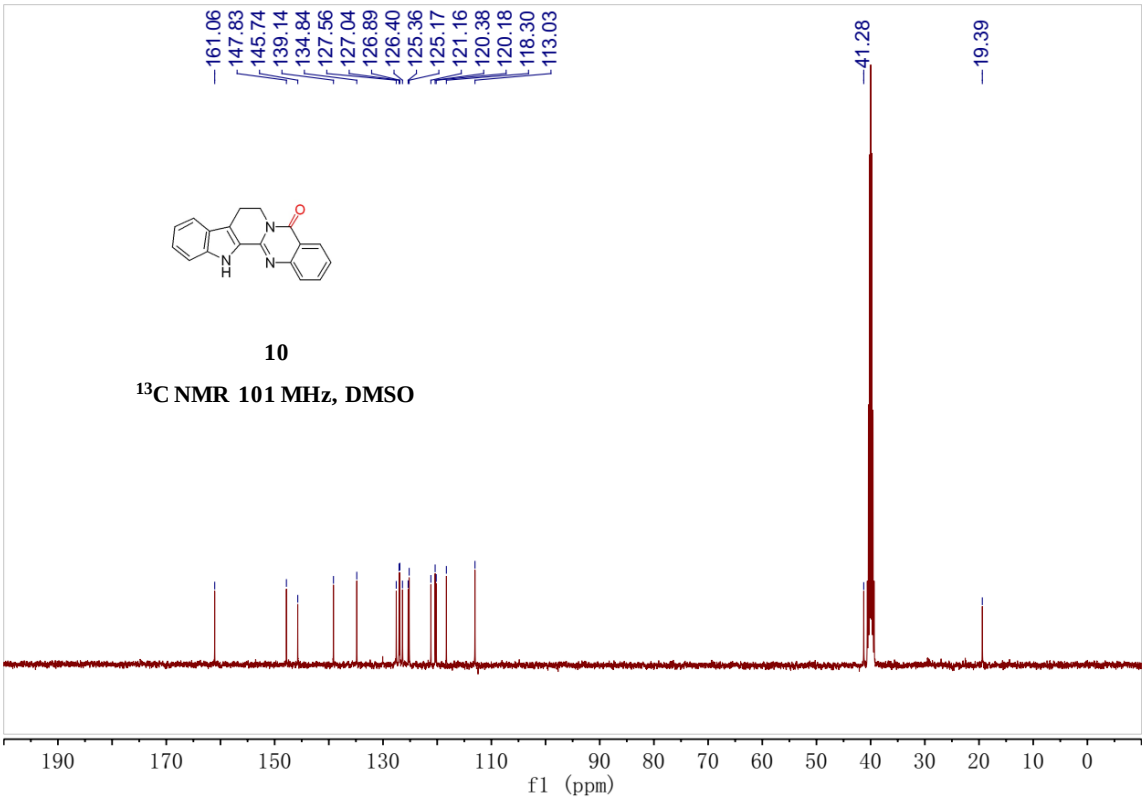
9

^{19}F NMR 377 MHz, DMSO



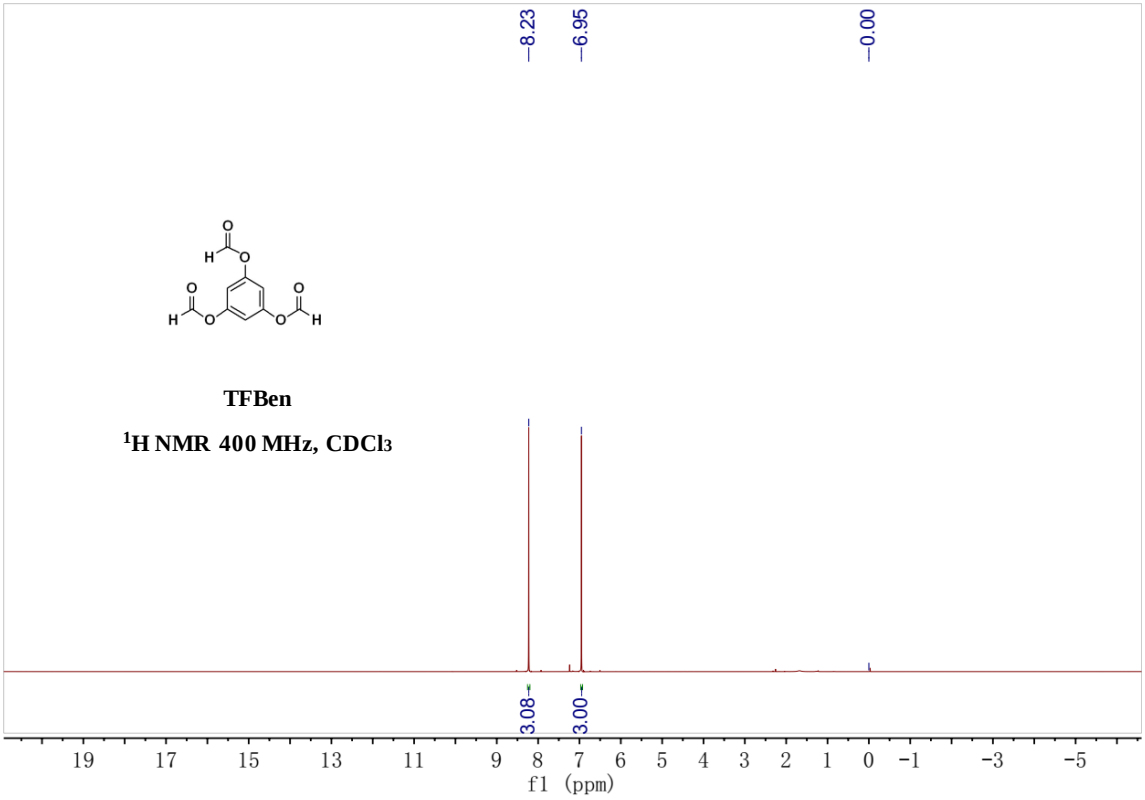
10

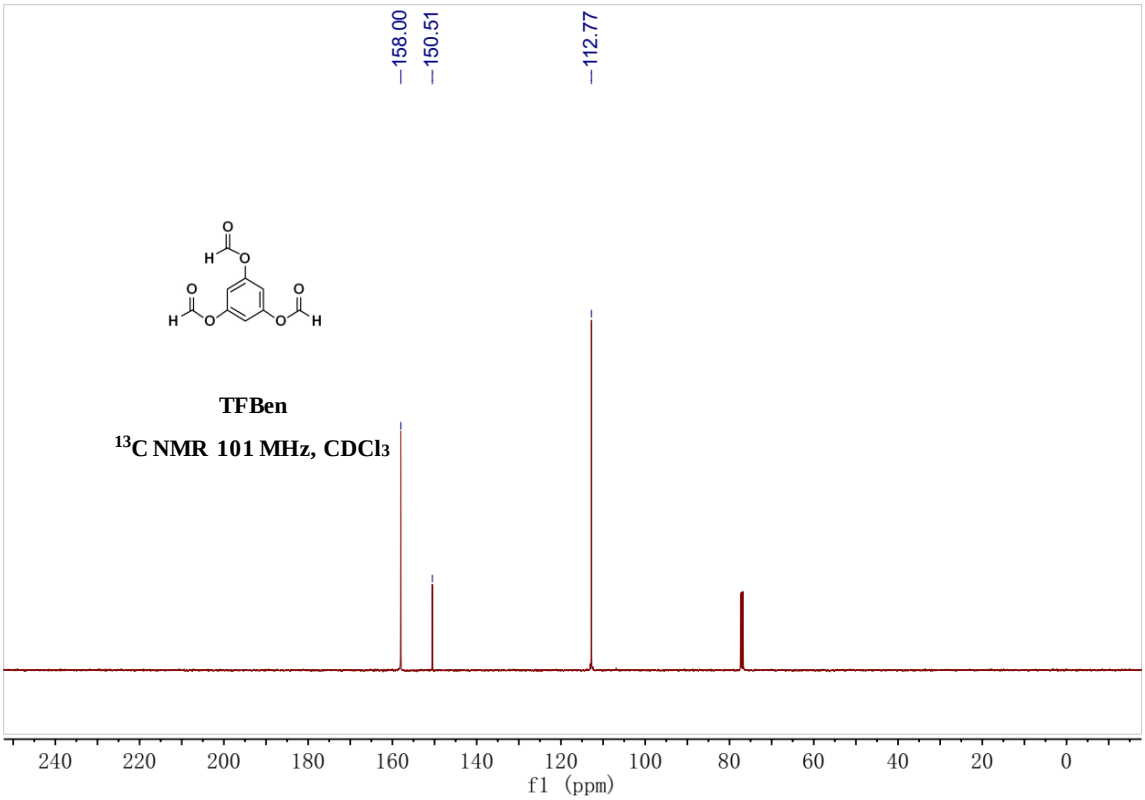
^{1}H NMR 400 MHz, CDCl$_3$

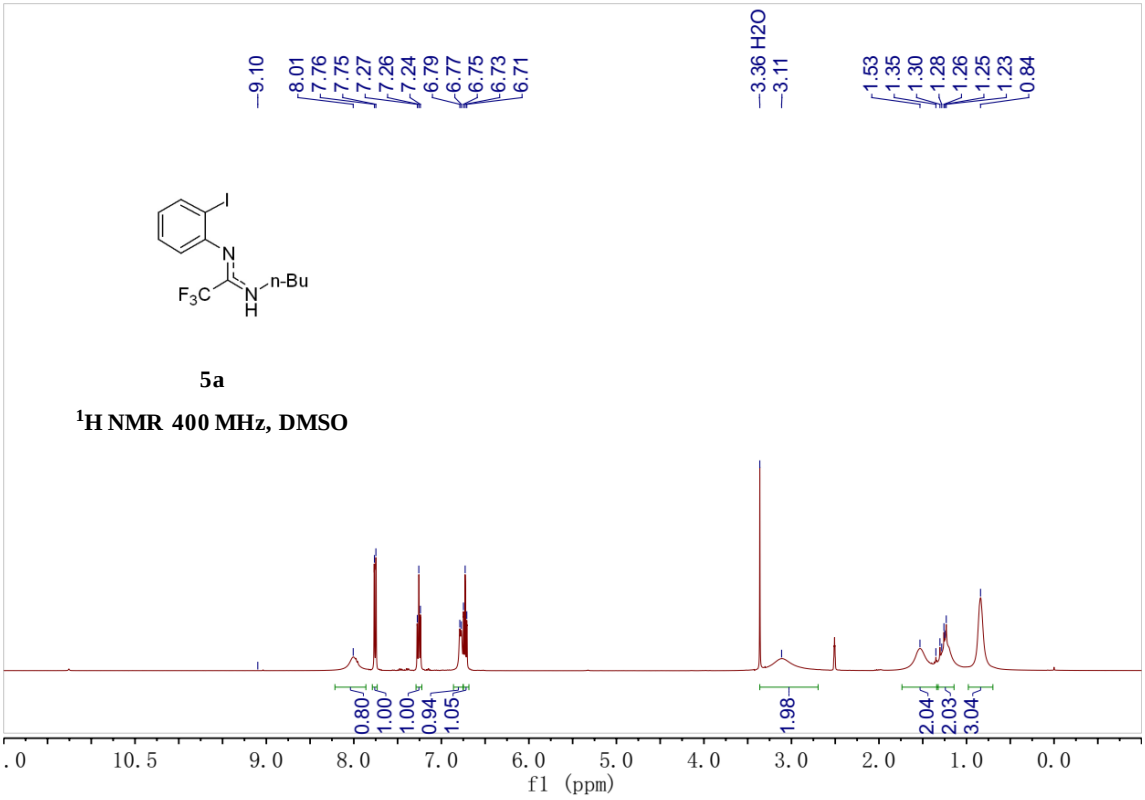


10

^{13}C NMR 101 MHz, DMSO

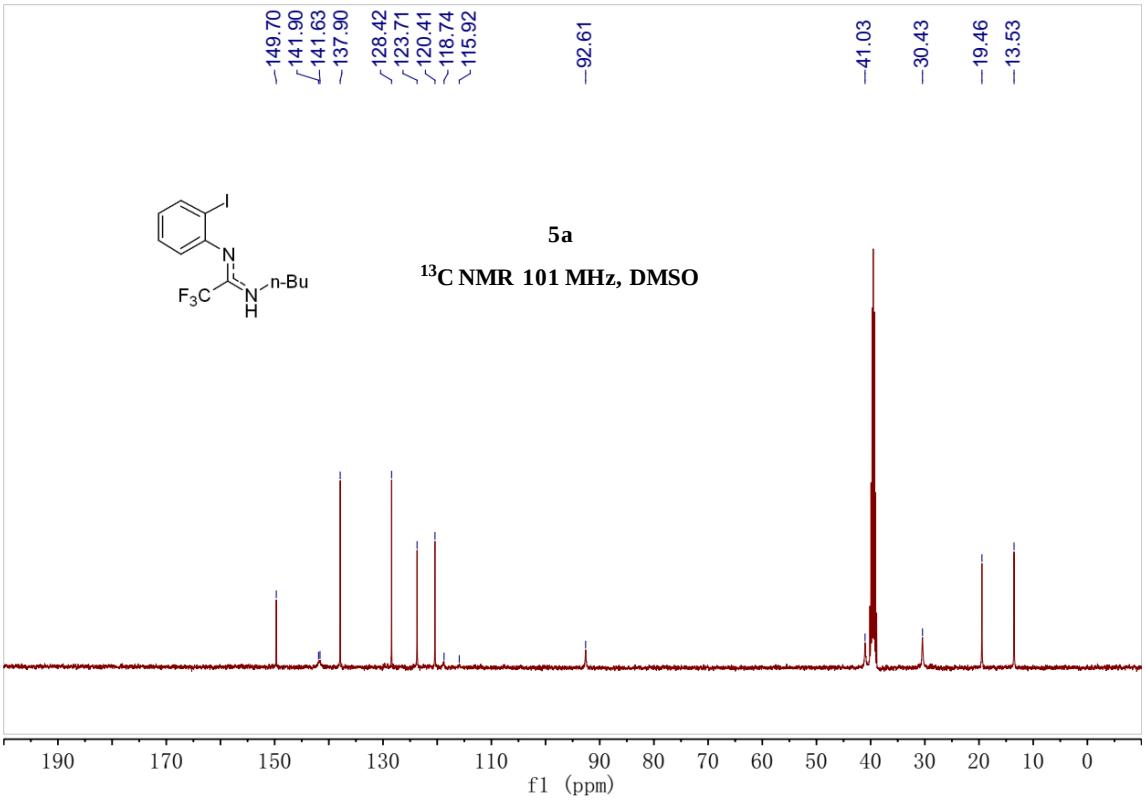

8.23
6.95
0.00
TFBen
1H NMR 400 MHz, CDCl3
3.08
3.00
19 17 15 13 11 9 8 7 6 5 4 3 2 1 0 −1 −3 −5
f1 (ppm)


158.00
150.51
112.77
TFBen
13C NMR 101 MHz, CDCl3
240 220 200 180 160 140 120 100 80 60 40 20 0
f1 (ppm)



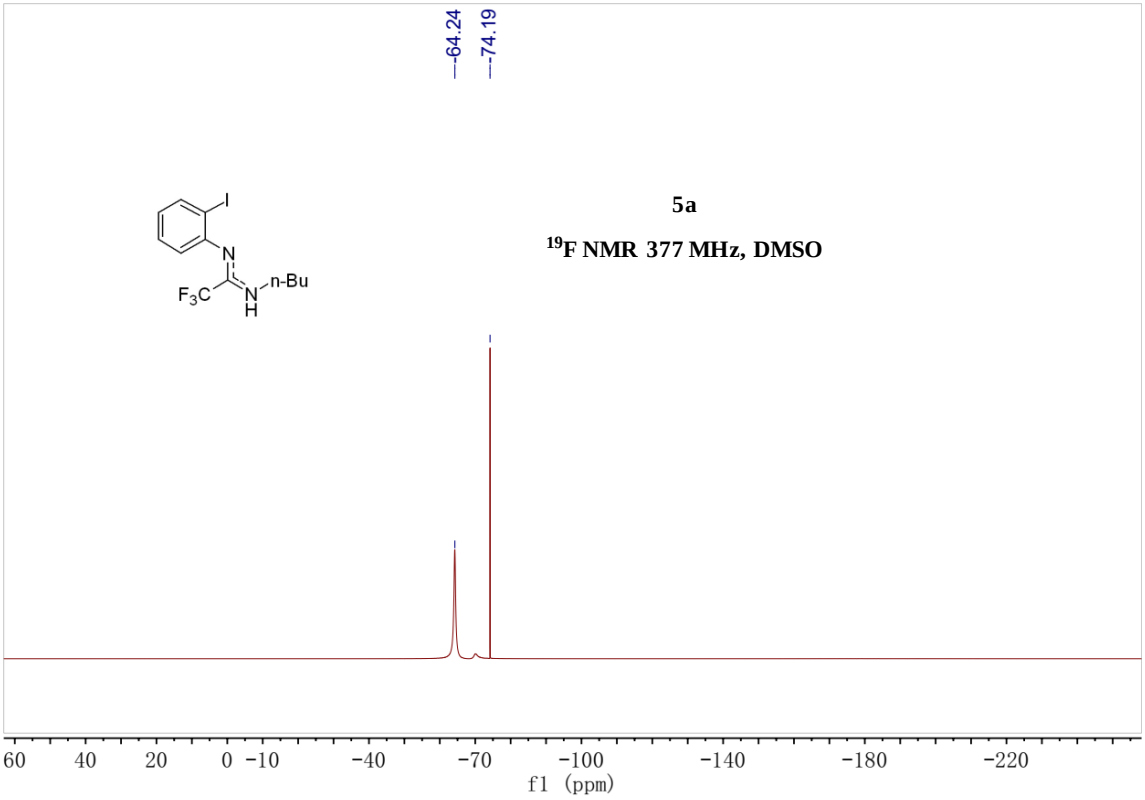
5a

^{1}H NMR 400 MHz, DMSO



5a

^{13}C NMR 101 MHz, DMSO



5a

^{19}F NMR 377 MHz, DMSO