Supporting Information

Visible-light promoted three-component tandem reaction：one-pot synthesis of difluoromethylated oxazolidin-2-imine

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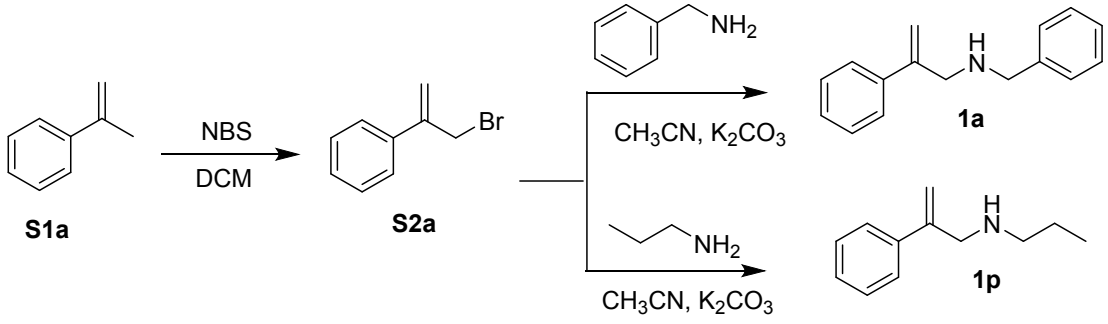
1. General information

Unless otherwise mentioned, all manipulations were conducted with a standard Schlenk tube under N_2 atmosphere, and reagents were purchased from commercial sources and used without further purification. Reactions were monitored by thin layer chromatography purchased from commercial suppliers. Subsequent to elution, spots were visualized using UV radiation (254 nm). Flash chromatography was performed using 200-300 mesh silica gel. NMR spectra were obtained on a BRUCKER AVANCE III 500 (500 MHz for ^{1}H NMR, 126 MHz for ^{13}C NMR) or Zhongke-Niujin WNMR-I-400 (376 MHz for ^{19}F NMR). ^{1}H NMR and ^{13}C NMR chemical shifts were determined relative to internal $(CH_3)_4Si$ (TMS) at δ 0.0. High Resolution MS (HRMS) were performed on an Agilent 6224 TOF LC/MS spectrometer.

Commercially available chemicals were obtained from Adamas, Energy-Chemical, Aladdin, Macklin, Bidepharm and used as received unless otherwise stated. Anhydrous *N*, *N*-Dimethylformamide (DMF) was purchased from Shanghai Energy-Chemical, and stored over molecular sieves under nitrogen unless otherwise stated. The Isocyanate were purchased from Aladdin, Macklin, Bidepharm and Adamas. DABCO and $Ru(bpy)_3Cl_2·6H_2O$ were obtained from Energy-Chemical. Allylamines **1a-1o**, 2-(difluoromethylsulfonyl)benzo[*d*]thiazole **2**, were synthesized according to the literature procedure.

2. Typical procedure for the synthesis of 1a-1p

2.1 The procedure for the synthesis of 1a, 1p

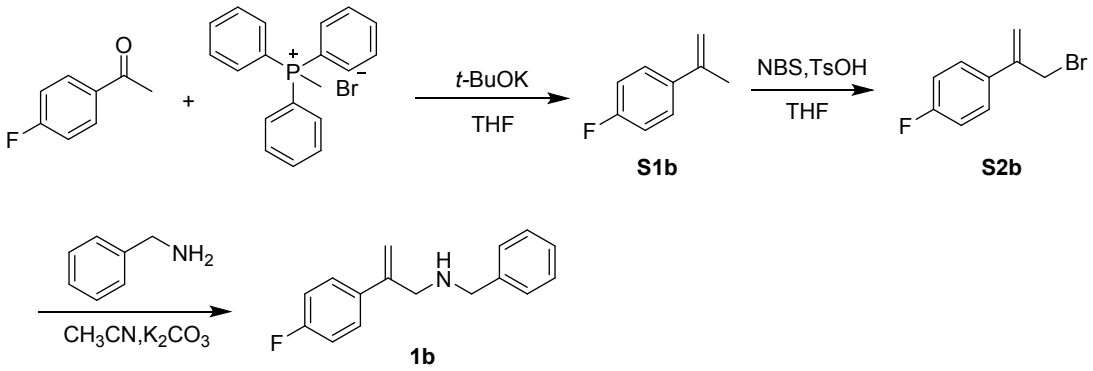


Compound **1a** and **1p** were prepared according to the reported procedures.[1,2] Prop-1-en-2-yl-benzene **S1a** (30 mmol, 1.0 equiv.) was dissolved in a round bottomed flask containing 50 mL DCM. The NBS (60 mmol, 2.0 equiv.) was added to the solution

and the mixture was stirred at 45 ºC for 18 h. After completion of reaction, the resulting system was quenched with aqueous $NaHCO_3$ solution (100 mL) and the mixture was extracted with DCM (80 mL × 3). The combined organic layer was washed with brine and dried over anhydrous Na_2SO_4. The solvent was removed under vacuum and the resulting crude product **S2a** was used directly in the next step.[1]

The mixture of (3-bromoprop-1-en-2-yl)-benzene **S2a** (3.0 mmol, 1.0 equiv.), benzyl amine or *n*-propyl amine (3.6 mmol, 1.2 equiv.), and K_2CO_3 (3.0 mmol, 1.0 equiv.) in 20 mL CH_3CN were refluxed overnight. After removing of CH_3CN under vacuum and the mixture was extracted with ethyl acetate (50 mL × 3). The combined organic layer was washed with brine and dried over Na_2SO_4. The solvent was removed under vacuum and the residue was purified by column chromatography over silica gel (200-300 mesh) using petroleum ether/ethyl acetate as eluent to afford **1a**, **1p** as yellow oil, respectively.[2]

2.2 General procedure for the synthesis of 1b-1n



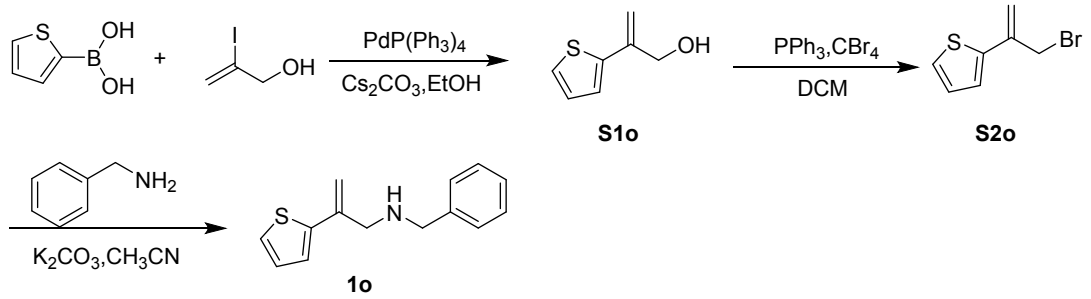
The *t*-BuOK (1.95 mmol, 1.5 equiv.) was added to a suspension of methyl triphenylphosphonium bromide (1.95 mmol, 1.5 equiv.) in 20 mL anhydrous THF at 0 ºC, and the resulting mixture was stirred in ice bath for 45 minutes. Then, a solution of substituted 1-(4-fluorophenyl)ethan-1-one (1.3 mmol, 1.0 equiv.) in 2 mL THF was added dropwise to the mixture and stirred at room temperature for 16 h. The reaction mixture was filtered over Celite and the filtrate was concentrated under vacuum to yield **S1b** was used directly in the next step.[3]

The mixture of 1-fluoro-4-(prop-1-en-2-yl)benzene **S1b** (1.3 mmol, 1.0 equiv.)**,** NBS (1.56 mmol, 1.2 equiv.), and TsOH (0.13 mmol, 0.1 equiv.) in 20 mL anhydrous THF were refluxed overnight. After removing of THF under vacuum and the mixture was extracted with petroleum ether (75 mL × 3). The combined organic layer was

dried over anhydrous Na_2SO_4 and the solvent was removed under vacuum to obtain **S2b** was used directly in the next step.[4]

The mixture of the **S2b** (1.3 mmol, 1.0 equiv.), benzylamine (1.56 mmol, 1.2 equiv.), and K_2CO_3 (1.3 mmol, 1.0 equiv.) in 20 mL CH_3CN were refluxed overnight. After removing of CH_3CN under vacuum and the mixture was extracted with ethyl acetate (20 mL × 3). The organic layer was washed with brine and dried over anhydrous Na_2SO_4. The solvent was removed under vacuum and purification by column chromatography over silica gel (200-300 mesh) using petroleum ether/ethyl acetate as eluent afforded **1b** as a yellow oil.[2] The **1c**-**1n** were prepared in similar manner.

2.3 The procedure for the synthesis of 1o



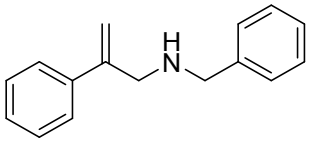
The mixture of the thiophen-2-ylboronic acid (5.0 mmol, 1.0 equiv.), 2-iodoprop-2-en-1-ol (6.0 mmol, 1.2 equiv.), $Pd(PPh_3)_4$ (0.025 mmol, 5% equiv.) and Cs_2CO_3 (10.0 mmol, 2.0 equiv.) in 20 mL EtOH was purged with nitrogen and then stirred at 70 ℃ for 12 h. After removing of EtOH under vacuum and extracted with ethyl acetate (60 mL × 3). The organic layer was washed with brine and dried over anhydrous Na_2SO_4. The solvent was removed under vacuum and purification by column chromatography over silica gel (200-300 mesh) using petroleum ether/ethyl acetate as eluent afforded desired 2-(thiophen-2-yl)prop-2-en-1-ol **S1o** as a yellow oil.

To a solution of **S1o** (1.2 mmol, 1.0 equiv.) in 10 mL CH_2Cl_2, PPh_3 (1.4 mmol, 1.2 equiv.) was added in ice bath. The mixture was stirred for 10 min, then CBr_4 (1.3 mmol, 1.1 equiv.) was added portionwise to the system and the mixture was stirred in ice bath for 3 h. After the completion of reaction, the resulting solution was extracted with DCM and dried over anhydrous Na_2SO_4. The solvent was removed under vacuum to obtain **S2o**.[5]

The mixture of the 2-(3-bromoprop-1-en-2-yl)thiophene **S2o** (1.2 mmol, 1.0 equiv.), phenylmethanamine (1.4 mmol, 1.2 equiv.), and K_2CO_3 (2.3 mmol, 2.0 equiv.) in 15 mL CH_3CN was refluxed overnight. After removing of CH_3CN under vacuum and the mixture was extracted with ethyl acetate (20 mL × 3). The organic layer was washed with brine and dried over anhydrous Na_2SO_4. The solvent was removed under vacuum and purification by column chromatography over silica gel (200-300 mesh) using petroleum ether/ethyl acetate as eluent to afforded **1o** as a yellow oil.[2]

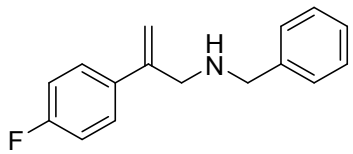
3. Characterization data of 1a-1o

N-benzyl-2-phenylprop-2-en-1-amine (1a)



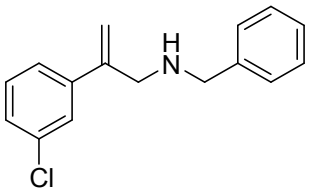
^{1}H NMR (500 MHz, DMSO-d_6) δ 7.49 – 7.47 (m, 2H), 7.36 – 7.32 (m, 4H), 7.31 – 7.28 (m, 3H), 7.24 – 7.22 (m, 1H), 5.45 (d, J = 1.5 Hz, 1H), 5.29 (d, J = 2.0 Hz, 1H), 3.72 (s, 2H), 3.55 (s, 2H), 3.32 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 144.30, 140.03, 139.20, 128.79, 128.37, 128.29, 128.21, 127.03, 126.66, 107.38, 53.01, 50.18. MS (ESI): m/z calcd. for $C_{16}H_{18}N$ $[M+H]^+$ 224.14, found: 224.15.

N-benzyl-2-(4-fluorophenyl)prop-2-en-1-amine (1b)



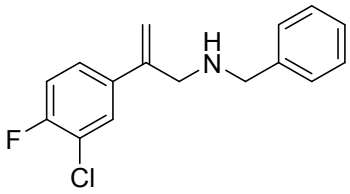
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.41 (dd, J = 8.5, 5.5 Hz, 2H), 7.34 – 7.27 (m, 5H), 7.04 (t, J = 9.0 Hz, 2H), 5.40 (s, 1H), 5.29 (s, 1H), 3.83 (s, 2H), 3.68 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 163.48 (d, J = 247.3 Hz), 144.42, 138.89, 135.56 (d, J = 3.3 Hz), 128.50, 128.48, 127.95, 127.88, 127.32, 115.43, 115.26, 114.37, 52.52, 52.22. MS (ESI): m/z calcd. for $C_{16}H_{17}FN$ $[M+H]^+$ 242.13, found: 242.15.

N-benzyl-2-(3-chlorophenyl)prop-2-en-1-amine (1c)



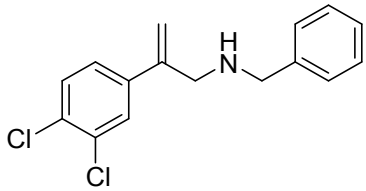
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.43 – 7.42 (m, 1H), 7.33 – 7.29 (m, 5H), 7.26 – 7.24 (m, 3H), 5.44 (d, *J* = 1.0 Hz, 1H), 5.31 (d, *J* = 1.5 Hz, 1H), 3.81 (s, 2H), 3.64 (d, *J* = 1.5 Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 145.08, 141.74, 139.91, 134.34, 129.61, 128.41, 128.23, 127.67, 127.04, 126.47, 124.37, 114.79, 52.95, 52.50. HRMS (ESI): m/z calcd. for $C_{16}H_{17}ClN$ $[M+H]^+$ 258.1044, found: 258.1044.

N-benzyl-2-(3-chloro-4-fluorophenyl)prop-2-en-1-amine (1d)



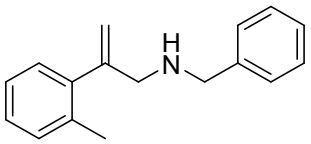
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.50 (dd, *J* = 7.0, 2.5 Hz, 1H), 7.35 – 7.26 (m, 6H), 7.11 (t, *J* = 8.5 Hz, 1H), 5.39 (s, 1H), 5.29 (d, *J* = 1.5 Hz, 1H), 3.81 (s, 2H), 3.60 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 158.55 (d, *J* = 249.7 Hz), 144.27, 139.93, 137.12 (d, *J* = 3.9 Hz), 128.51, 128.43, 128.20, 127.07, 126.01 (d, *J* = 7.1 Hz), 120.91 (d, *J* = 17.9 Hz), 116.43 (d, *J* = 21.2 Hz), 114.68 (d, *J* = 1.5 Hz), 53.04, 52.68. HRMS (ESI): m/z calcd. for $C_{16}H_{16}ClFN$ $[M+H]^+$ 276.0950, found: 276.0949.

N-benzyl-2-(3,4-dichlorophenyl)prop-2-en-1-amine (1e)



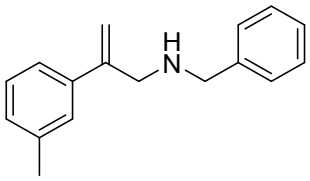
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.53 (d, *J* = 2.0 Hz, 1H), 7.40 (d, *J* = 8.0 Hz, 1H), 7.36 – 7.27 (m, 6H), 5.46 (s, 1H), 5.34 (s, 1H), 3.83 (s, 2H), 3.63 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 143.79, 139.74, 139.28, 132.53, 131.61, 130.30, 128.52, 128.36, 128.28, 127.28, 125.61, 115.65, 52.83, 52.20. MS (ESI): m/z calcd. for $C_{16}H_{16}Cl_2N$ $[M+H]^+$ 292.07, found: 292.05.

N-benzyl-2-(o-tolyl)prop-2-en-1-amine (1f)



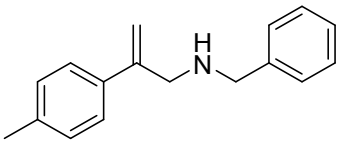
^{1}H NMR (500 MHz, DMSO-d_6) δ 7.31 – 7.27 (m, 4H), 7.22 – 7.19 (m, 1H), 7.17 – 7.12 (m, 3H), 7.07 (dd, J = 6.5, 1.5 Hz, 1H), 5.43 (q, J = 2.0 Hz, 1H), 4.94 – 4.93 (m, 1H), 3.72 (s, 2H), 3.31 (s, 2H), 2.22 (s, 3H). ^{13}C NMR (126 MHz, DMSO-d_6) δ 147.41, 141.01, 140.24, 134.04, 129.44, 127.64, 127.60, 127.42, 126.41, 126.04, 124.91, 113.18, 53.12, 51.60, 19.02. MS (ESI): m/z calcd. for $C_{17}H_{20}N$ $[M+H]^+$ 238.16, found: 238.20.

N-benzyl-2-(m-tolyl)prop-2-en-1-amine (1g)



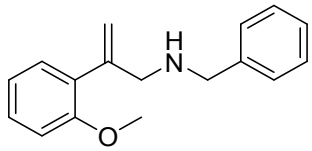
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.35 – 7.31 (m, 4H), 7.27 – 7.23 (m, 4H), 7.13 – 7.10 (m, 1H), 5.42 (s, 1H), 5.27 (d, J = 1.0 Hz, 1H), 3.82 (s, 2H), 3.68 (s, 2H), 2.36 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 146.12, 139.87, 139.71, 138.03, 128.52, 128.41, 128.39, 128.36, 127.05, 126.99, 123.34, 113.63, 52.81, 52.53, 21.54. MS (ESI): m/z calcd. for $C_{17}H_{20}N$ $[M+H]^+$ 238.16, found: 238.20.

N-benzyl-2-(p-tolyl)prop-2-en-1-amine (1h)



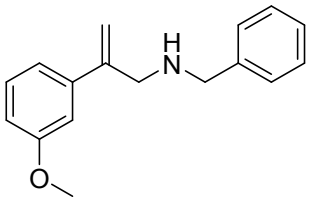
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.34 – 7.33 (m, 1H), 7.32 – 7.30 (m, 5H), 7.27 – 7.23 (m, 1H), 7.16 (d, J = 7.5 Hz, 2H), 5.41 (d, J = 1.5 Hz, 1H), 5.24 (q, J = 1.5 Hz, 1H), 3.81 (s, 2H), 3.67 (s, 2H), 2.35 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 145.67, 139.74, 137.55, 136.75, 129.19, 128.41, 128.37, 127.06, 126.09, 113.12, 52.79, 52.50, 21.15. MS (ESI): m/z calcd. for $C_{17}H_{20}N$ $[M+H]^+$ 238.16, found: 238.20.

N-benzyl-2-(2-methoxyphenyl)prop-2-en-1-amine (1i)



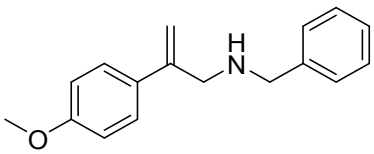
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.22 – 7.12 (m, 7H), 6.87 (t, *J* = 7.5 Hz, 1H), 6.79 (d, *J* = 8.5 Hz, 1H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.12 (d, *J* = 2.0 Hz, 1H), 3.68 (s, 3H), 3.66 (s, 2H), 3.58 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 156.66, 147.11, 140.49, 130.50, 130.26, 128.87, 128.32, 128.30, 126.84, 120.77, 115.36, 110.72, 55.39, 53.34, 52.65. HRMS (ESI): m/z calcd. for $C_{17}H_{20}NO$ $[M+H]^+$ 254.1539, found: 254.1541.

N-benzyl-2-(3-methoxyphenyl)prop-2-en-1-amine (1j)



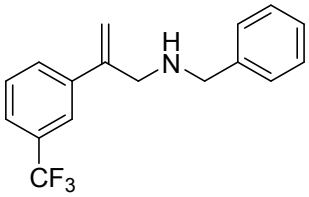
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.29 – 7.25 (d, *J* = 5.0 Hz, 4H), 7.23 – 7.19 (m, 2H), 6.98 – 6.96 (m, 1H), 6.95 (dd, *J* = 2.5, 1.5 Hz, 1H), 6.81 – 6.78 (m, 1H), 5.39 (d, *J* = 1.5 Hz, 1H), 5.22 (d, *J* = 1.0 Hz, 1H), 3.76 (s, 5H), 3.62 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 159.69, 146.11, 141.38, 140.04, 129.46, 128.41, 128.30, 127.02, 118.74, 113.94, 113.05, 112.17, 55.25, 52.93, 52.72. MS (ESI): m/z calcd. for $C_{17}H_{20}NO$ $[M+H]^+$ 254.15, found: 254.20.

N-benzyl-2-(4-methoxyphenyl)prop-2-en-1-amine (1k)



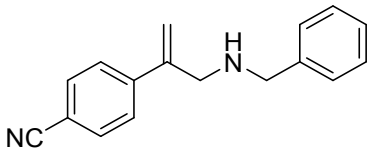
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.39 – 7.36 (m, 2H), 7.31 – 7.29 (m, 4H), 7.25 – 7.24 (m, 1H), 6.88 – 6.85 (m, 2H), 5.35 (d, *J* = 1.5 Hz, 1H), 5.18 (d, *J* = 1.0 Hz, 1H), 3.81 (s, 3H), 3.80 (s, 2H), 3.64 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 159.70, 145.95, 140.60, 132.69, 128.75, 128.65, 127.74, 127.34, 114.25, 112.49, 55.69, 53.39, 53.25. MS (ESI): m/z calcd. for $C_{17}H_{20}NO$ $[M+H]^+$ 254.15, found: 254.20.

N-benzyl-2-(3-(trifluoromethyl)phenyl)prop-2-en-1-amine (1l)



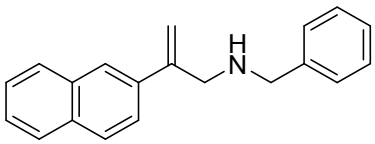
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.63 (s, 1H), 7.55 (d, *J* = 7.5 Hz, 1H), 7.47 (d, *J* = 7.5 Hz, 1H), 7.39 (t, *J* = 7.5 Hz, 1H), 7.27 – 7.23 (m, 4H), 7.20 – 7.17 (m, 1H), 5.42 (d, *J* = 1.0 Hz, 1H), 5.30 (d, *J* = 1.0 Hz, 1H), 3.76 (s, 2H), 3.60 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 144.00, 139.62, 138.72, 129.86 (d, *J* = 32.1 Hz), 128.50, 127.80, 127.42, 127.22, 126.09, 123.34 (q, *J* = 3.5 Hz), 122.11 (q, *J* = 3.8 Hz), 114.31, 52.00, 51.52. HRMS (ESI): m/z calcd. for $C_{17}H_{17}F_3N$ $[M+H]^+$ 292.1308, found: 292.1315.

4-(3-(benzylamino)prop-1-en-2-yl)benzonitrile (1m)



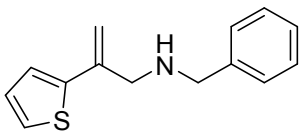
^{1}H NMR (500 MHz, DMSO-d_6) δ 7.80 – 7.78 (m, 2H), 7.69 – 7.67 (m, 2H), 7.29 (d, *J* = 4.5 Hz, 4H), 7.22 (dd, *J* = 8.5, 4.0 Hz, 1H), 5.63 (s, *J* = 1.0 Hz, 1H), 5.42 (d, *J* = 1.5 Hz, 1H), 3.68 (s, 2H), 3.55 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 143.80, 143.41, 138.68, 131.15, 127.42, 127.19, 126.13, 125.89, 117.87, 115.63, 110.09, 52.01, 51.32. MS (ESI): m/z calcd. for $C_{17}H_{17}N_2$ $[M+H]^+$ 249.14, found: 249.15.

N-benzyl-2-(naphthalen-2-yl)prop-2-en-1-amine (1n)



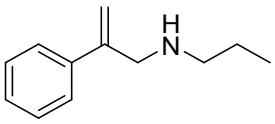
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.84 – 7.81 (m, 4H), 7.61 (d, *J* = 8.5 Hz, 1H), 7.51 – 7.45 (m, 2H), 7.34 – 7.27 (m, 5H), 5.62 (s, 1H), 5.42 (s, 1H), 3.88 (s, 2H), 3.83 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 145.25, 139.10, 136.67, 133.39, 133.00, 128.54, 128.50, 128.25, 128.15, 127.58, 127.28, 126.25, 126.05, 124.95, 124.57, 114.93, 52.63, 52.18. MS (ESI): m/z calcd. for $C_{20}H_{20}N$ $[M+H]^+$ 274.16, found: 274.10.

N-benzyl-2-(thiophen-2-yl)prop-2-en-1-amine (1o)



^{1}H NMR (500 MHz, $CDCl_3$) δ 7.29 – 7.24 (m, 4H), 7.20 – 7.17 (m , 1H), 7.12 (dd, *J* = 5.5, 1.5 Hz, 1H), 7.02 (dd, *J* = 4.0, 1.5 Hz, 1H), 6.92 – 6.90 (m, 1H), 5.46 (s, 1H), 5.13 (s, 1H), 3.78 (s, 2H), 3.58 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 142.40, 138.39, 138.05, 127.42, 127.36, 126.34, 126.14, 123.54, 122.62, 111.58, 51.71, 51.58. MS (ESI): m/z calcd. for $C_{14}H_{16}NS$ $[M+H]^+$ 230.10, found: 230.15.

2-phenyl-N-propylprop-2-en-1-amine (1p)



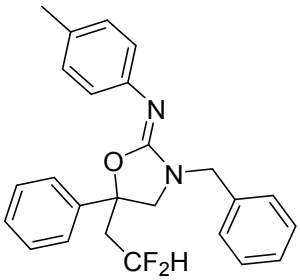
^{1}H NMR (500 MHz, $CDCl_3$) δ 7.44 – 7.42 (m, 2H), 7.36 – 7.32 (m, 2H), 7.30 – 7.26 (m, 1H), 5.39 (m, 1H), 5.24 (q, *J* = 1.5 Hz, 1H), 3.66 (dd, *J* = 1.5, 1.0 Hz, 2H), 2.60 (t, *J* = 7.0 Hz, 2H), 1.53 (h, *J* = 7.5 Hz, 2H), 0.90 (t, *J* = 7.5 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 146.53, 140.04, 128.55, 127.76, 126.28, 113.35, 53.48, 51.19, 23.15, 11.88. MS (ESI): m/z calcd. for $C_{12}H_{18}N$ $[M+H]^+$ 176.14, found: 176.25.

4. General procedure for the synthesis of compound 4aa-4pa, 4ab-4ak

A mixture of aryl allylamine substrate **1** (0.50 mmol, 1.0 equiv.), difluoromethyl sulfone **2** (0.6 mmol, 1.2 equiv.) $Ru(bpy)_3Cl_2{\cdot}6H_2O$ (0.025 mmol, 5% equiv.), DABCO (1.0 mmol, 2.0 equiv.) were added in a Schlenk tube. The tube was evacuated and backfilled with pure N_2 for 3 times, then DMF (2 mL) and the isocyanates **3** was added to the mixture. The mixture was irradiated by a 6 W blue LED for 16 h at 8～10 ℃. After the reaction was complete, H_2O (20 mL) was added. The aqueous layer was extracted with ethyl acetate (15 mL × 3) and the organic phase was combined and dried over anhydrous Na_2SO_4. The solvent was removed under vacuum and the resulting residue was purified by column chromatography over silica gel (200-300 mesh) using petroleum ether/ethyl acetate as eluent to provide products **4aa-4pa**, **4ab-4ak**.

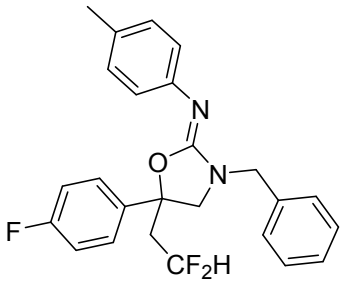
5. Characterization data of compound 4aa-4pa, 4ab-4ak.

3-benzyl-5-(2,2-difluoroethyl)-5-phenyl-N-(p-tolyl)oxazolidin-2-imine (4aa)



White solid, 75% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.39 – 7.36 (m, 2H), 7.35 – 7.31(m, 2H), 7.30 – 7.26 (m, 6H), 7.12 (s, 4H), 5.81 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.68 (d, *J* = 15.0 Hz, 1H), 4.54 (d, *J* = 15.0 Hz, 1H), 3.64 (d, *J* = 9.0 Hz, 1H), 3.52 (d, *J* = 9.0 Hz, 1H), 2.59 – 2.50 (m, 2H), 2.34 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.93, 144.46, 141.09, 136.38, 131.53, 129.29, 128.94, 128.73, 128.42, 128.23, 127.73, 124.29, 123.37, 116.59 (t, *J* = 240.0 Hz), 81.55 (t, *J* = 5.9 Hz), 56.32, 49.18, 44.93 (t, *J* = 21.8 Hz), 20.94. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.52 (dt, *J* = 55.6, 15.4 Hz). HRMS (ESI): m/z calcd. for $C_{25}H_{25}F_2N_2O$ $[M+H]^+$ 407.1929, found: 407.1941.

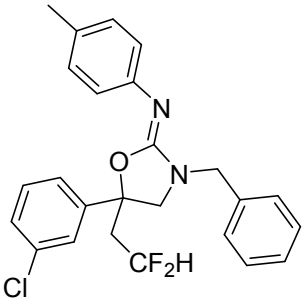
3-benzyl-5-(2,2-difluoroethyl)-5-(4-fluorophenyl)-N-(p-tolyl)oxazolidin-2-imine (4ba)



Light yellow oil, 68% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.34 – 7.32 (m, 1H), 7.31 – 7.27 (m, 4H), 7.25 – 7.22 (m, 2H), 7.13 – 7.03 (m, 6H), 5.82 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.66 (d, *J* = 15.0 Hz, 1H), 4.57 (d, *J* = 15.0 Hz, 1H), 3.63 (d, *J* = 8.5 Hz, 1H), 3.48 (d, *J* = 9.0 Hz, 1H), 2.57 – 2.48 (m, 2H), 2.34 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 163.74 (d, *J* = 248.3 Hz), 150.95, 144.68, 137.25 (d, *J* = 3.8 Hz), 136.60, 131.93, 129.63, 129.06, 128.51, 128.09, 126.58, 126.51, 123.60, 116.76 (t, *J* = 240.5 Hz), 116.26, 116.09, 81.47 (t, *J* = 6.3 Hz), 56.71, 49.45, 45.16 (t, *J* = 22.1 Hz), 21.22.

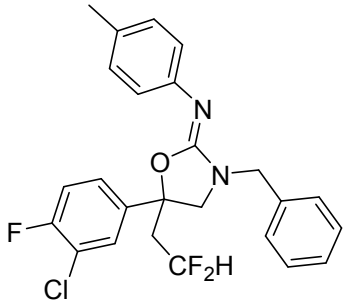
^{19}F NMR (376 MHz, $CDCl_3$) δ -113.13(s), -113.60 (dt, *J* = 55.6, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{25}H_{24}F_3N_2O$ $[M+H]^+$ 425.1835, found: 425.1830.

3-benzyl-5-(3-chlorophenyl)-5-(2,2-difluoroethyl)-N-(p-tolyl)oxazolidin-2-imine (4ca)



Light yellow solid, 75% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.34 – 7.32 (m, 1H), 7.30 – 7.29 (m, 3H), 7.28 – 7.26 (m, 2H), 7.25 – 7.24 (m, 2H), 7.16 – 7.11 (m, 3H), 7.10 – 7.07 (m, 2H), 5.84 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.64 (d, *J* = 15.0 Hz, 1H), 4.52 (d, *J* = 15.0 Hz, 1H), 3.61 (d, *J* = 9.0 Hz, 1H), 3.45 (d, *J* = 9.0 Hz, 1H), 2.58 – 2.43 (m, 2H), 2.33 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.47, 144.07, 143.14, 136.11, 135.00, 131.78, 130.28, 129.33, 128.77, 128.67, 128.25, 127.84, 124.67, 123.21, 122.52, 116.26 (t, *J* = 240.7 Hz), 81.03 (t, *J* = 5.0 Hz), 56.20, 49.20, 44.66 (t, *J* = 21.4 Hz), 20.91. ^{19}F NMR (376 MHz, $CDCl_3$) δ -114.00 – -114.26 (m). HRMS (ESI): m/z calcd. for $C_{25}H_{24}ClF_2N_2O$ $[M+H]^+$ 441.1540, found: 441.1542.

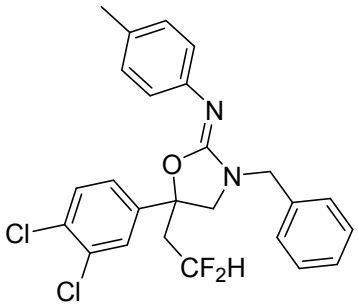
3-benzyl-5-(3-chloro-4-fluorophenyl)-5-(2,2-difluoroethyl)-N-(p-tolyl)oxazolidin-2-imine (4da).



Light yellow oil, 80% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.35 – 7.33 (m, 1H), 7.32 – 7.26 (m, 5H), 7.14 – 7.12 (m, 4H), 7.09 (d, *J* = 8.0 Hz, 2H), 5.85 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.66 (d, *J* = 14.5 Hz, 1H), 4.58 (d, *J* = 14.5 Hz, 1H), 3.63 (d, *J* = 9.0 Hz, 1H),

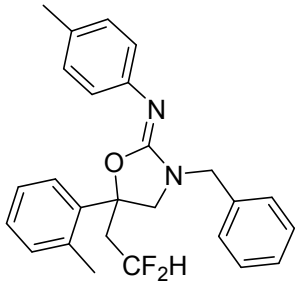
3.46 (d, *J* = 9.0 Hz, 1H), 2.60 – 2.44 (m, 2H), 2.34(s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 158.83 (d, *J* = 251.2 Hz), 150.31, 144.09, 138.29 (d, *J* = 3.8 Hz), 136.08, 131.87, 129.41, 128.82, 128.26, 127.92, 126.98, 124.41 (d, *J* = 7.4 Hz), 123.20, 121.82 (d, *J* = 18.1 Hz), 117.20 (d, *J* = 21.4 Hz), 116.22 (t, *J* = 240.4 Hz), 80.70 (t, *J* = 5.9 Hz), 56.30, 49.18, 44.60 (t, *J* = 21.9 Hz), 20.94. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.57 – -113.85 (m), -115.04 (s). HRMS (ESI): m/z calcd. for $C_{25}H_{23}ClF_3N_2O$ $[M+H]^+$ 459.1446, found: 459.1463.

3-benzyl-5-(3,4-dichlorophenyl)-5-(2,2-difluoroethyl)-N-(p-tolyl)oxazolidin-2-imine (4ea)



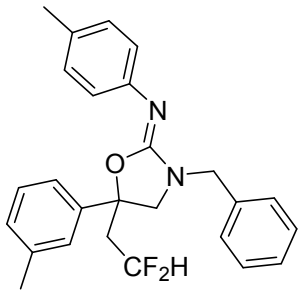
Light yellow solid, 65% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.45 (d, *J* = 8.5 Hz, 1H), 7.35 – 7.27 (m, 6H), 7.14 – 7.06 (m, 5H), 5.85 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.64 (d, *J* = 15.0 Hz, 1H), 4.56 (d, *J* = 15.0 Hz, 1H), 3.62 (d, *J* = 9.0 Hz, 1H), 3.45 (d, *J* = 9.0 Hz, 1H), 2.59 – 2.43 (m, 2H), 2.34 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.23, 144.19, 141.45, 136.11, 133.32, 132.80, 131.90, 131.01, 129.45, 128.86, 128.31, 127.97, 126.68, 123.90, 123.23, 116.21 (t, *J* = 240.7 Hz), 80.65 (t, *J* = 5.8 Hz), 56.24, 49.24, 44.51 (t, *J* = 22.1 Hz), 20.98. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.52 – -113.83 (m). HRMS (ESI): m/z calcd. for $C_{25}H_{23}Cl_2F_2N_2O$ $[M+H]^+$ 475.1150, found: 475.1148.

3-benzyl-5-(2,2-difluoroethyl)-5-(o-tolyl)-N-(p-tolyl)oxazolidin-2-imine (4fa)



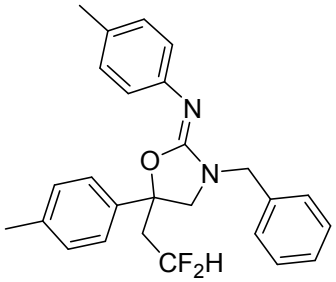
Light yellow oil, 48% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.40 – 7.33 (m, 5H), 7.33 – 7.29 (m, 1H), 7.25 – 7.20 (m, 2H), 7.19 – 7.11 (m, 5H), 5.89 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.77 (d, *J* = 15.0 Hz, 1H), 4.50 (d, *J* = 15.0 Hz, 1H), 3.79 (d, *J* = 9.0 Hz, 1H), 3.56 (d, *J* = 9.0 Hz, 1H),2.67 – 2.48 (m, 2H), 2.36 (s, 3H), 2.26 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.53, 144.51, 138.92, 136.36, 133.12, 132.37, 131.48, 129.25, 128.77, 128.45, 128.24, 127.77, 126.40, 125.20, 123.29, 116.61 (t, *J* = 239.4 Hz), 82.19 (t, *J* = 6.3 Hz), 55.88, 49.18, 43.70 (t, *J* = 21.4 Hz), 21.02, 20.92. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.36 (dt, *J* = 55.6, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{26}H_{27}F_2N_2O$ $[M+H]^+$ 421.2086, found: 421.2082.

3-benzyl-5-(2,2-difluoroethyl)-5-(m-tolyl)-N-(p-tolyl)oxazolidin-2-imine (4ga)



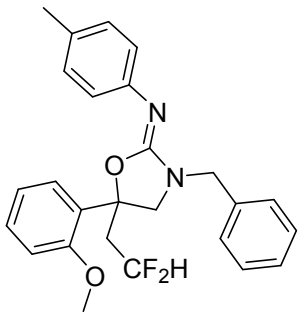
Light yellow solid, 85% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.34 – 7.32 (m, 1H), 7.31 – 7.30 (m, 1H), 7.29 – 7.27 (m, 3H), 7.25 (d, *J* = 7.5 Hz, 1H), 7.14 – 7.11 (m, 5H), 7.08 – 7.05 (m, 2H), 5.81 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.67 (d, *J* = 15.0 Hz, 1H), 4.52 (d, *J* = 15.0 Hz, 1H), 3.62 (d, *J* = 8.5 Hz, 1H), 3.50 (d, *J* = 9.0 Hz, 1H), 2.60 – 2.45 (m, 2H). 2.34 (s, 6H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 151.15, 144.37, 138.28, 138.02, 136.39, 131.55, 129.59, 129.29, 128.74, 128.27, 127.74, 124.26, 123.41, 116.69 (t, *J* = 240.0 Hz), 81.71 (t, *J* = 6.0 Hz), 56.35, 49.21, 44.95 (t, *J* = 21.8 Hz), 21.10, 20.95. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.53 (dt, *J* = 55.6, 15.4 Hz). HRMS (ESI): m/z calcd. for $C_{26}H_{27}F_2N_2O$ $[M+H]^+$ 421.2086, found: 421.2103.

3-benzyl-5-(2,2-difluoroethyl)-N,5-di-p-tolyloxazolidin-2-imine (4ha)



White solid, 62% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.32 – 7.27 (m, 5H), 7.18 – 7.14 (m, 4H), 7.11 (s, 4H), 5.80 (tt, *J* = 56.0, 5.0 Hz, 1H), 4.66 (d, *J* = 15.0 Hz, 1H), 4.53 (d, *J* = 15.0 Hz, 1H), 3.61 (d, *J* = 9.0 Hz, 1H), 3.50 (d, *J* = 9.0 Hz, 1H), 2.56 – 2.48 (m, 2H), 2.34 (s, 3H), 2.34 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 151.05, 144.45, 141.02, 138.70, 136.40, 131.52, 129.29, 129.17, 128.84, 128.73, 128.27, 127.74, 124.91, 123.37, 121.40, 116.65 (t, *J* = 240.0 Hz), 81.65 (t, *J* = 6.0 Hz), 56.25, 49.20, 44.94 (t, *J* = 21.8 Hz), 21.61, 20.94. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.59 (dt, *J* = 55.3, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{26}H_{27}F_2N_2O$ $[M+H]^+$ 421.2086, found: 421.2096.

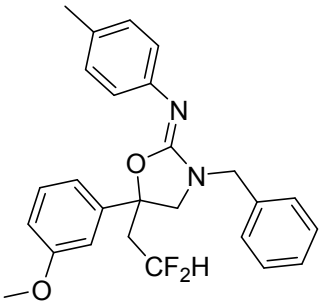
3-benzyl-5-(2,2-difluoroethyl)-5-(2-methoxyphenyl)-N-(p-tolyl)oxazolidin-2-imine (4ia)



Light yellow oil, 40% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.46 (dd, *J* = 7.5, 1.5 Hz, 1H), 7.35 – 7.27 (m, 6H), 7.16 – 7.12 (m, 4H), 6.99 (td, *J* = 7.5, 1.0 Hz, 1H), 6.88 (dd, *J* = 8.0, 1.0 Hz, 1H), 5.89 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.76 (d, *J* = 15.0 Hz, 1H), 4.45 (d, *J* = 15.0 Hz, 1H), 3.78 (s, 3H), 3.74 (d, *J* = 9.5 Hz, 1H), 3.46 (d, *J* = 9.5 Hz, 1H), 2.73 – 2.56 (m, 2H), 2.35 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 154.64, 150.79, 144.61, 136.70, 131.31, 129.62, 129.24, 129.10, 128.65, 128.08, 127.55, 125.74, 123.34, 120.98, 116.94 (t, *J* = 239.5 Hz), 110.89, 80.84 (t, *J* = 6.2 Hz), 56.27, 55.28, 48.97, 42.79 (t, *J* = 21.8 Hz), 20.91. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.32 (dt, *J* = 55.6,

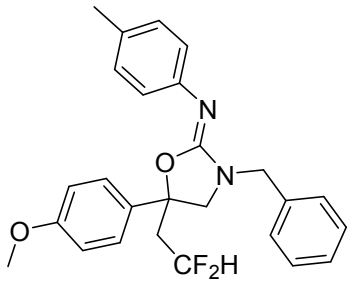
15.4 Hz). HRMS (ESI): m/z calcd. for $C_{26}H_{27}F_2N_2O_2$ $[M+H]^+$ 437.2035, found: 437.2024.

3-benzyl-5-(2,2-difluoroethyl)-5-(3-methoxyphenyl)-N-(p-tolyl)oxazolidin-2-imine (4ja)



Light yellow oil, 69% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.34 – 7.30 (m, 2H), 7.30 – 7.27 (m, 4H), 7.14 – 7.10 (m, 4H), 6.87 – 6.80 (m, 3H), 5.82 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.69 (d, *J* = 15.0 Hz, 1H), 4.55 (d, *J* = 15.0 Hz, 1H), 3.78 (s, 3H), 3.63 (d, *J* = 9.0 Hz, 1H), 3.52 (d, *J* = 9.0 Hz, 1H), 2.56 – 2.48 (m, 2H), 2.33 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 159.95, 150.92, 144.53, 142.76, 136.38, 131.52, 130.11, 129.55, 129.28, 128.74, 128.24, 127.74, 123.34, 116.60 (t, *J* = 240.0 Hz), 116.47, 113.51, 110.45, 81.44 (t, *J* = 6.0 Hz), 56.28, 55.29, 49.16, 44.84 (t, *J* = 21.9 Hz), 20.95. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.63 (dt, *J* = 55.6, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{26}H_{27}F_2N_2O_2$ $[M+H]^+$ 437.2035, found: 437.2064.

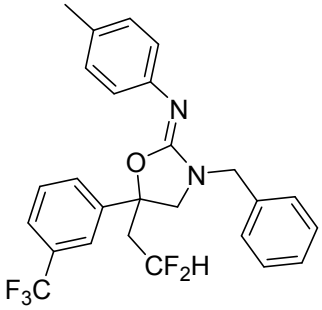
3-benzyl-5-(2,2-difluoroethyl)-5-(4-methoxyphenyl)-N-(p-tolyl)oxazolidin-2-imine (4ka)



Light yellow oil, 66% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.34 – 7.30 (m, 2H), 7.30 – 7.27 (m, 3H), 7.20 – 7.17 (m, 2H), 7.12 – 7.08 (m, 4H), 6.90 – 6.87 (m, 2H), 5.79 (tt, *J* = 56.0, 5.0 Hz, 1H), 4.65 (d, *J* = 15.0 Hz, 1H), 4.54 (d, *J* = 15.0 Hz, 1H), 3.80 (s, 3H), 3.60 (d, *J* = 9.0 Hz, 1H), 3.49 (d, *J* = 9.0 Hz, 1H), 2.56 – 2.47 (m, 2H), 2.33 (s,

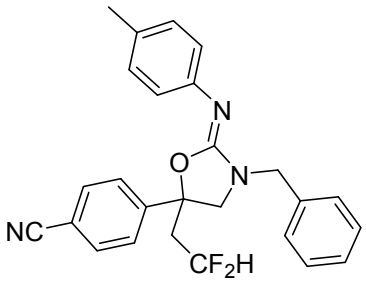
3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 159.49, 151.05, 144.48, 136.42, 132.92, 131.47, 129.27, 128.72, 128.22, 127.72, 125.67, 123.36, 116.70 (t, *J* = 240.0 Hz), 114.22, 81.47 (t, *J* = 5.9 Hz), 56.32, 55.35, 49.17, 44.97 (t, *J* = 21.9 Hz), 20.94. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.69 (dt, *J* = 55.3, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{26}H_{27}F_2N_2O_2$ $[M+H]^+$ 437.2035, found: 437.2054.

3-benzyl-5-(2,2-difluoroethyl)-N-(p-tolyl)-5-(3-(trifluoromethyl)phenyl)oxazolidin-2-imine (4la)



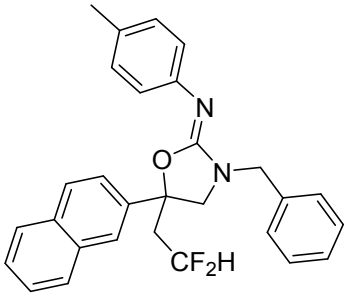
Light yellow oil, 55% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.61 – 7.59 (m, 1H), 7.52 – 7.47 (m, 3H), 7.33 – 7.26 (m, 4H), 7.25 – 7.24 (m, 1H), 7.14 – 7.06 (m, 4H), 5.86 (tt, *J* = 55.0, 4.5 Hz, 1H), 4.63 (d, *J* = 15.0 Hz, 1H), 4.54 (d, *J* = 15.0 Hz, 1H), 3.67 (d, *J* = 9.0 Hz, 1H), 3.49 (d, *J* = 9.0 Hz, 1H), 2.61 – 2.49 (m, 2H), 2.34 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.32, 144.33, 142.42, 136.13, 131.81, 131.50 (d, *J* = 32.8 Hz), 129.60, 129.39, 128.79, 128.21, 127.87, 127.85, 125.42 (q, *J* = 3.7 Hz), 124.87 (d, *J* = 273.0 Hz), 123.15, 121.29 (q, *J* = 4.0 Hz), 116.21 (t, *J* = 240.4 Hz), 81.01 (t, *J* = 5.8 Hz), 56.18, 49.15, 44.58 (t, *J* = 22.1 Hz), 20.92. ^{19}F NMR (376 MHz, $CDCl_3$) δ -62.68(s) , -113.62 – -113.91 (m). HRMS (ESI): m/z calcd. for $C_{26}H_{24}F_5N_2O$ $[M+H]^+$ 475.1803, found: 475.1809.

4-(3-benzyl-5-(2,2-difluoroethyl)-2-(p-tolylimino)oxazolidin-5-yl)benzonitrile (4ma)



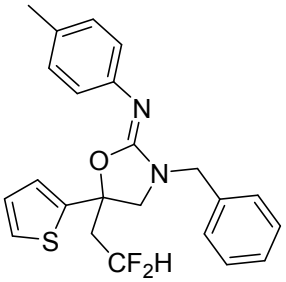
Light yellow oil, 61% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.38 – 7.30 (m, 8H), 7.24 – 7.13 (m, 4H), 6.99 (t, *J* = 7.5 Hz, 1H), 5.81 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.69 (d, *J* = 14.5 Hz, 1H), 4.57 (d, *J* = 14.5 Hz, 1H), 3.70 (d, *J* = 9.0 Hz, 1H), 3.56 (d, *J* = 8.5 Hz, 1H), 2.56 (tt, *J* = 16.0, 5.0 Hz, 2H), 2.28 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.11, 146.26, 143.93, 135.96, 132.75, 131.96, 129.40, 128.81, 128.22, 127.94, 125.26, 123.17, 118.14, 116.04 (t, *J* = 240.7 Hz), 112.52, 80.99 (t, *J* = 5.0 Hz), 56.28, 49.19, 44.40 (t, *J* = 21.4 Hz), 20.92. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.88 – -114.26 (m). HRMS (ESI): m/z calcd. for $C_{26}H_{24}F_2N_3O$ $[M+H]^+$ 432.1882, found: 475.1876.

3-benzyl-5-(2,2-difluoroethyl)-5-(naphthalen-2-yl)-N-(p-tolyl)oxazolidin-2-imine (4na)



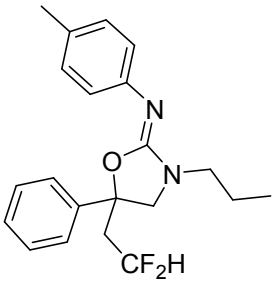
Light yellow oil, 62% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.85 – 7.79 (m, 3H), 7.75 (d, *J* = 2.0 Hz, 1H), 7.53 – 7.49 (m, 2H), 7.33 – 7.30 (m, 1H), 7.29 – 7.27 (m, 4H), 7.26 – 7.23 (m, 1H), 7.15 (s, 4H), 5.84 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.65 (d, *J* = 15.0 Hz, 1H), 4.53 (d, *J* = 15.0 Hz, 1H), 3.69 (d, *J* = 8.5 Hz, 1H), 3.60 (d, *J* = 8.5 Hz, 1H), 2.67 – 2.58 (m, 2H), 2.36 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.92, 144.53, 138.15, 136.34, 132.91 (d, *J* = 3.6 Hz), 131.57, 129.52, 129.33, 129.08, 128.72, 128.30, 128.23, 127.73, 127.69, 126.83, 126.76, 123.46, 123.36, 122.03, 116.59 (t, *J* = 240.1 Hz), 81.67 (t, *J* = 6.0 Hz), 56.19, 49.21, 44.80 (t, *J* = 21.9 Hz), 20.96 . ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.94 (dt, *J* = 55.6, 15.4 Hz). HRMS (ESI): m/z calcd. for $C_{29}H_{27}F_2N_2O$ $[M+H]^+$ 457.2086, found: 457.2069.

3-benzyl-5-(2,2-difluoroethyl)-5-(thiophen-2-yl)-N-(p-tolyl)oxazolidin-2-imine (4oa)



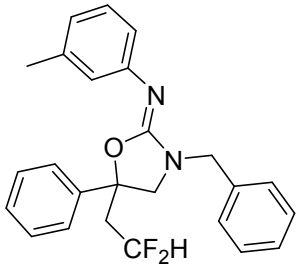
White solid, 42% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.35 – 7.29 (m, 6H), 7.09 (s, 4H), 6.99 (dd, *J* = 5.0, 3.5 Hz, 1H), 6.94 (dd, *J* = 3.5, 1.0 Hz, 1H), 5.85 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.68 (d, *J* = 30.5 Hz, 2H), 3.63 (s, 2H), 2.67 – 2.59 (m, 2H), 2.32 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.37, 144.53, 144.20, 136.26, 131.59, 129.23, 128.74, 128.26, 127.78, 127.20, 125.96, 124.23, 123.34, 116.51 (t, *J* = 240.0 Hz), 79.92 (t, *J* = 6.3 Hz), 56.74, 49.21, 44.83 (t, *J* = 22.4 Hz), 20.93. ^{19}F NMR (376 MHz, $CDCl_3$) δ -114.15 (tt, *J* = 55.6, 14.7 Hz). HRMS (ESI): m/z calcd. for $C_{23}H_{23}F_2N_2OS$ $[M+H]^+$ 413.1494, found: 413.1486.

5-(2,2-difluoroethyl)-5-phenyl-3-propyl-N-(p-tolyl)oxazolidin-2-imine (4pa)



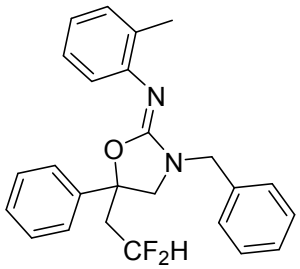
Light yellow oil, 56% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.41 – 7.38 (m, 2H), 7.36 – 7.33 (m, 1H), 7.32 – 7.30 (m, 2H), 7.10 – 7.05 (m, 4H), 5.85 (tt, *J* = 55.5, 5.0 Hz, 1H), 3.85 (d, *J* = 8.5 Hz, 1H), 3.67 (d, *J* = 9.0 Hz, 1H), 3.43 – 3.32 (m, 2H), 2.62 – 2.54 (m, 2H), 2.32 (s, 3H), 1.63 (q, *J* = 7.0 Hz, 2H), 0.94 (t, *J* = 7.5 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 151.02, 144.72, 141.40, 131.27, 129.18, 128.93, 128.36, 124.24, 123.27, 116.64 (t, *J* =240.0 Hz), 81.19 (t, *J* = 5.9 Hz), 56.86, 46.72, 45.02 (t, *J* = 21.8 Hz), 20.89, 20.49, 11.23. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.49 (dt, *J* = 55.6, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{21}H_{25}F_2N_2O$ $[M+H]^+$ 359.1929, found: 359.1918.

3-benzyl-5-(2,2-difluoroethyl)-5-phenyl-N-(m-tolyl)oxazolidin-2-imine (4ab)



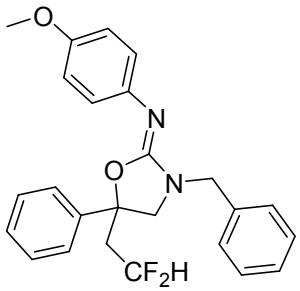
Light yellow oil, 72% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.40 – 7.37 (m, 2H), 7.36 – 7.32 (m, 3H), 7.31 – 7.28 (m, 5H), 7.24 (t, *J* = 7.5 Hz, 1H), 7.07 – 7.04 (m, 2H), 6.89 (d, *J* = 7.5 Hz, 1H), 5.83 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.67 (d, *J* = 15.0 Hz, 1H), 4.54 (d, *J* = 15.0 Hz, 1H), 3.65 (d, *J* = 8.5 Hz, 1H), 3.53 (d, *J* = 9.0 Hz, 1H), 2.62 – 2.48 (m, 2H), 2.38 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 151.01, 146.98, 141.00, 138.26, 136.30, 128.94, 128.74, 128.44, 128.22, 127.75, 124.50, 124.30, 123.13, 120.39, 116.57 (t, *J* = 240.2 Hz), 81.59 (t, *J* = 6.0 Hz), 56.30, 49.14, 44.94 (t, *J* = 21.8 Hz), 21.55. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.56 (dt, *J* = 55.6, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{25}H_{25}F_2N_2O$ $[M+H]^+$ 407.1929, found: 407.1936.

3-benzyl-5-(2,2-difluoroethyl)-5-phenyl-N-(o-tolyl)oxazolidin-2-imine (4ac)



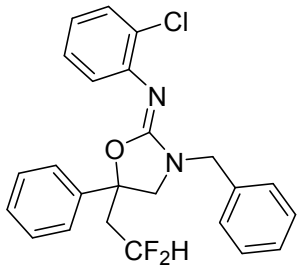
Light yellow oil, 30% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.39 – 7.30 (m, 8H), 7.24 – 7.13 (m, 5H), 6.99 (t, *J* = 7.5 Hz, 1H), 5.81 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.69 (d, *J* = 15.0 Hz, 1H), 4.57 (d, *J* = 15.0 Hz, 1H), 3.70 (d, *J* = 9.0 Hz, 1H), 3.56 (d, *J* = 9.0 Hz, 1H), 2.56 – 2.48 (m, 2H), 2.28 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.06, 146.22, 143.89, 135.92, 132.71, 131.92, 129.36, 128.77, 128.18, 127.90, 125.22, 123.13, 118.09, 116.00 (t, *J* = 240.7 Hz), 112.49, 80.95 (t, *J* = 5.0 Hz), 56.24, 49.15, 44.37 (t, *J* = 22.7 Hz), 20.87. ^{19}F NMR (376 MHz, $CDCl_3$) δ -114.03 (dt, *J* = 53.8, 13.9 Hz). HRMS (ESI): m/z calcd. for $C_{25}H_{25}F_2N_2O$ $[M+H]^+$ 407.1929, found: 407.1932.

3-benzyl-5-(2,2-difluoroethyl)-N-(4-methoxyphenyl)-5-phenyloxazolidin-2-imine (4ad)



Light yellow oil, 61% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.39 – 7.36 (m, 2H), 7.35 – 7.29 (m, 4H), 7.28 – 7.26 (m, 4H), 7.19 – 7.16 (m, 2H), 6.89 – 6.86 (m, 2H), 5.82 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.66 (d, *J* = 15.0 Hz, 1H), 4.51 (d, *J* = 15.0 Hz, 1H), 3.82 (s, 3H), 3.63 (d, *J* = 8.5 Hz, 1H), 3.50 (d, *J* = 9.0 Hz, 1H), 2.59 – 2.50 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 153.96, 149.69, 139.96, 139.23, 135.33, 127.85, 127.63, 127.32, 127.11, 126.62, 123.24, 123.19, 115.51 (t, *J* = 240.2 Hz), 112.87, 80.43 (t, *J* = 5.9 Hz), 55.27, 54.37, 48.08, 43.82 (t, *J* = 21.8 Hz). ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.48 (dt, *J* = 55.6, 15.4 Hz). HRMS (ESI): m/z calcd. for $C_{25}H_{25}F_2N_2O_2$ $[M+H]^+$ 423.1879, found: 423.1896.

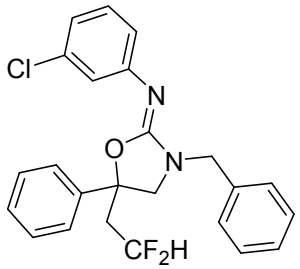
3-benzyl-N-(2-chlorophenyl)-5-(2,2-difluoroethyl)-5-phenyloxazolidin-2-imine (4ae)



Light yellow oil, 25% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.42 (dd, *J* = 8.0, 1.5 Hz, 1H), 7.38 – 7.29 (m, 8H), 7.24 – 7.18 (m, 4H), 7.00 (td, *J* = 7.5, 1.5 Hz, 1H), 5.86 (tt, *J* = 55.5, 4.5 Hz, 1H), 4.72 (d, *J* = 14.5 Hz, 1H), 4.56 (d, *J* = 15.0 Hz, 1H), 3.71 (d, *J* = 9.0 Hz, 1H), 3.55 (d, *J* = 8.5 Hz, 1H), 2.61 – 2.45 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 151.40, 145.10, 140.98, 136.02, 129.49, 128.88, 128.76, 128.41, 128.33, 127.92, 127.84, 127.02, 124.49, 124.16, 123.24, 116.50 (t, *J* = 240.66 Hz), 81.75 (t, *J*

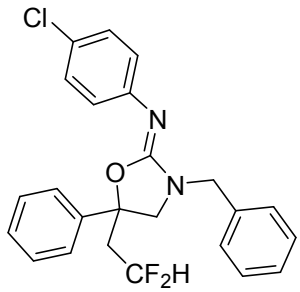
= 6.3 Hz), 56.50, 49.03, 44.87 (t, *J* = 21.4 Hz). ^{19}F NMR (376 MHz, $CDCl_3$) δ -114.10 – -114.36 (m). HRMS (ESI): m/z calcd. for $C_{24}H_{22}ClF_2N_2O$ $[M+H]^+$ 427.1383, found: 427.1378.

3-benzyl-N-(3-chlorophenyl)-5-(2,2-difluoroethyl)-5-phenyloxazolidin-2-imine (4af)



Light yellow oil, 50% yield ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.41 – 7.37 (m, 2H), 7.36 – 7.29 (m, 4H), 7.28 – 7.26 (m, 2H), 7.26 – 7.24 (m, 2H), 7.23 – 7.20 (m, 2H), 7.10 – 6.99 (m, 2H), 5.79 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.65 (d, *J* = 15.0 Hz , 1H), 4.52 (d, *J* = 15.0 Hz , 1H), 3.67 (d, *J* = 9.0 Hz, 1H), 3.56 (d, *J* = 9.0 Hz, 1H), 2.63 – 2.48 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 151.53, 148.77, 140.71, 136.08, 134.00, 129.60, 129.08, 128.85, 128.62, 128.21, 127.91, 124.26, 123.93, 122.23, 121.99, 116.52 (t, *J* = 240.2 Hz), 82.00 (t, *J* = 6.2 Hz), 56.27, 49.03, 44.94 (t, *J* = 22.2 Hz). ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.61 (dt, *J* = 55.3, 15.4 Hz). HRMS (ESI): m/z calcd. for $C_{24}H_{22}ClF_2N_2O$ $[M+H]^+$ 427.1383, found: 427.1394.

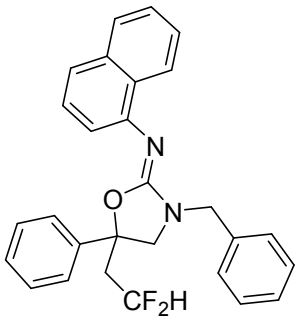
3-benzyl-N-(4-chlorophenyl)-5-(2,2-difluoroethyl)-5-phenyloxazolidin-2-imine (4ag)



Light yellow solid, 71% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.40 – 7.36 (m, 2H), 7.36 – 7.32 (m, 2H), 7.31 – 7.29 (m, 2H), 7.28 –7 .27 (m, 2H), 7.26 – 7.24 (m, 3H), 7.24 – 7.23 (m, 1H) 7.16 – 7.13 (m, 2H), 5.78 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.66 (d, *J* =

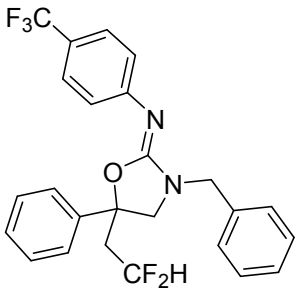
15.0 Hz, 1H), 4.52 (d, *J* = 15.0 Hz, 1H), 3.66 (d, *J* = 9.0 Hz, 1H), 3.54 (d, *J* = 8.5 Hz, 1H), 2.62 – 2.47 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 156.72, 151.27, 145.79, 140.67, 136.03, 128.99, 128.75, 128.57, 128.53, 128.13, 127.81, 127.19, 124.82, 124.16, 116.42 (t, *J* = 240.2 Hz), 81.80 (t, *J* = 5.8 Hz), 56.24, 49.03, 44.91 (t, *J* = 21.8 Hz). ^{19}F NMR (376 MHz, $CDCl_3$) δ -114.06 (dt, *J* = 55.6, 15.4 Hz). HRMS (ESI): m/z calcd. for $C_{24}H_{22}ClF_2N_2O$ $[M+H]^+$ 427.1383, found: 427.1392

3-benzyl-5-(2,2-difluoroethyl)-N-(naphthalen-1-yl)-5-phenyloxazolidin-2-imine (4ah)



Light yellow oil, 45% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.22 – 8.20 (m, 1H), 7.76 – 7.74 (m, 1H), 7.49 – 7.47 (m, 1H), 7.40 – 7.34 (m, 3H), 7.28 – 7.27 (m, 4H), 7.26 – 7.24 (m, 2H), 7.23 – 7.16 (m, 3H), 7.13 – 7.11(m, 2H), 5.69 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.73 (d, *J* = 15.0 Hz, 1H), 4.61 (d, *J* = 14.5 Hz, 1H), 3.51 (d, *J* = 9.0 Hz, 1H), 3.64 (d, *J* = 9.0 Hz, 1H), 2.51 – 2.35 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 150.01, 142.58, 140.01, 135.27, 133.32, 128.55, 127.81, 127.74, 127.32, 127.11, 126.73, 126.68, 125.00, 124.58, 123.77, 123.24, 123.16, 121.13, 116.52, 115.44 (t, *J* = 240.0 Hz), 80.53 (t, *J* = 5.8 Hz), 55.41, 48.17, 43.79 (t, *J* = 21.8 Hz). ^{19}F NMR (376 MHz, $CDCl_3$) δ -114.26 – -114.51 (m). HRMS (ESI): m/z calcd. for $C_{28}H_{25}F_2N_2O$ $[M+H]^+$ 443.1929, found: 443.1932.

3-benzyl-5-(2,2-difluoroethyl)-5-phenyl-N-(4-(trifluoromethyl)phenyl)oxazolidin-2-imine (4ai)



Light yellow solid, 58% yield. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.56 (d, *J* = 8.0 Hz, 2H), 7.41 – 7.37 (m, 2H), 7.37 – 7.34 (m, 1H), 7.34 – 7.30 (m, 3H), 7.29 – 7.26 (m, 4H), 7.25 – 7.23 (m, 2H), 5.78 (tt, *J* = 55.5, 5.0 Hz, 1H), 4.69 (d, *J* = 14.5 Hz, 1H), 4.56 (d, *J* = 15.0 Hz, 1H), 3.69 (d, *J* = 9.0 Hz, 1H), 3.59 (d, *J* = 9.0 Hz, 1H), 2.63 – 2.48 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$) δ 151.63, 150.73 (d, *J* = 1.8 Hz), 140.59, 135.94, 129.08, 128.84, 128.65, 128.18, 127.93, 125.86 (q, *J* = 4.0 Hz), 124.19, 123.66, 116.42 (t, *J* = 240.2 Hz), 82.08 (t, *J* = 6.3 Hz), 56.24, 49.04, 44.96 (t, *J* = 22.3 Hz). ^{19}F NMR (376 MHz, $CDCl_3$) δ -61.50 (s), -113.61 (dt, *J* = 55.6, 15.8 Hz). HRMS (ESI): m/z calcd. for $C_{25}H_{22}F_5N_2O$ $[M+H]^+$ 461.1647, found: 461.1655.

6. Luminescence Quenching Experiments

Instrument

Model: Agilent Cary Eclipse FL Spectrophotometer

Instrument parameters

Measurement type: Wavelength scan

Scan mode: Emission Data mode: Fluorescence

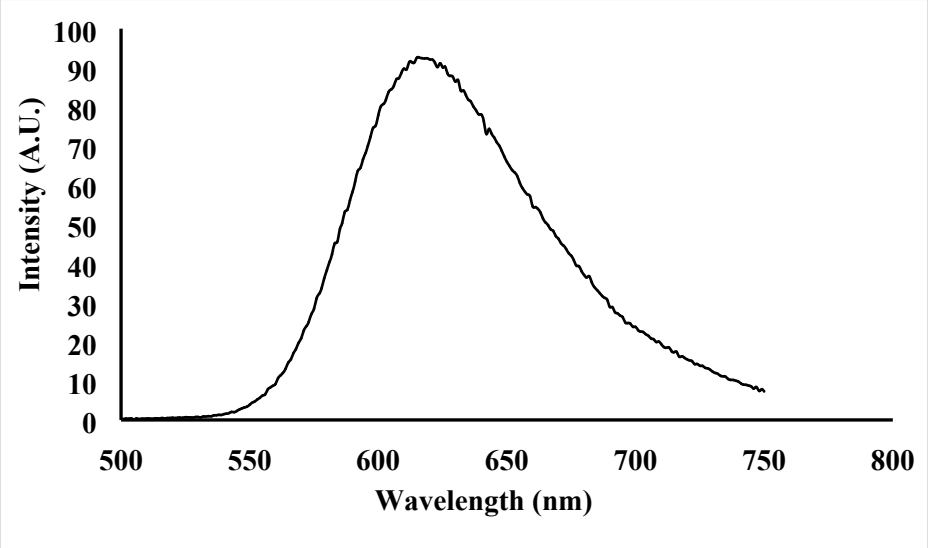
EX WL: 455.0 nm

EM Start WL: 500.0 nm

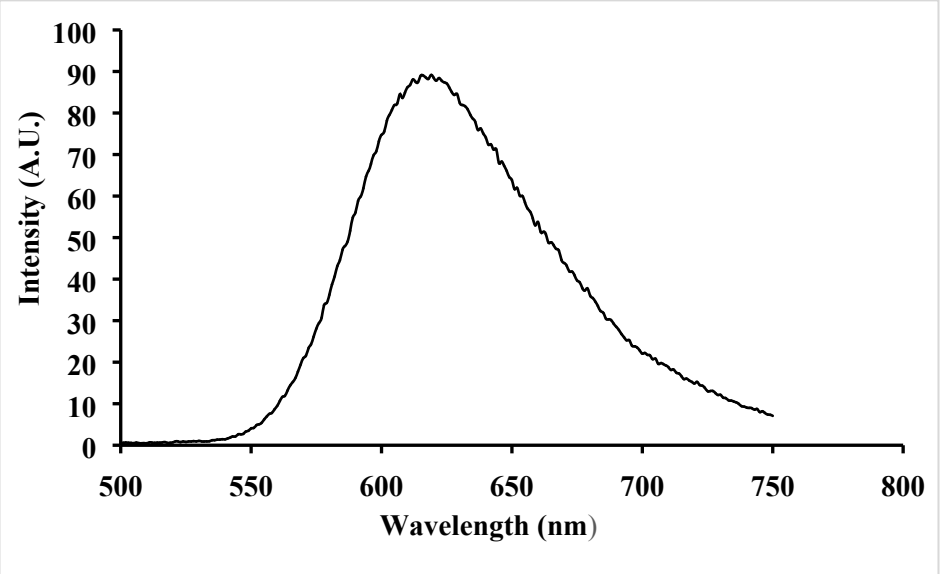
EM End WL: 750.0 nm

I_0 is the luminescence intensity without the quencher, I is the intensity with the quencher.

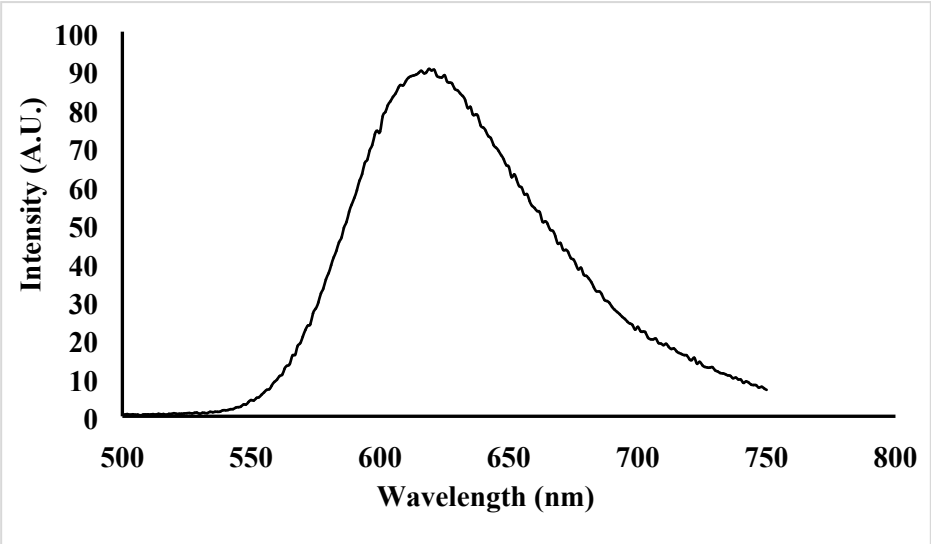
According to our group's previous work, we choose 5.0×10^{-5} mol/L catalyst to perform all the fluorescence quenching experiment.[7]



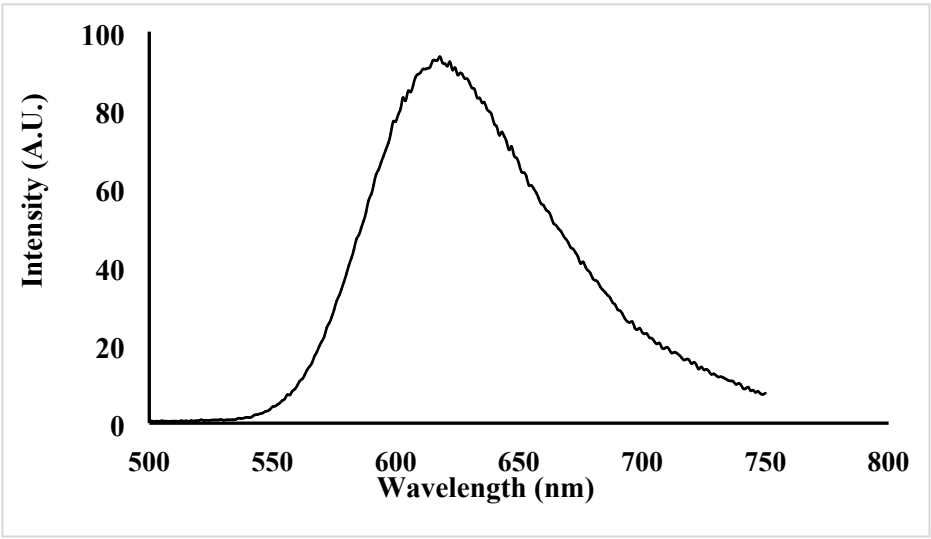
Fluorescence-emission of a 5.0×10^{-5} M solution of $Ru(bpy)_3Cl_2\bullet6H_2O$ (without the quencher) in DMF, I_0 =92.6



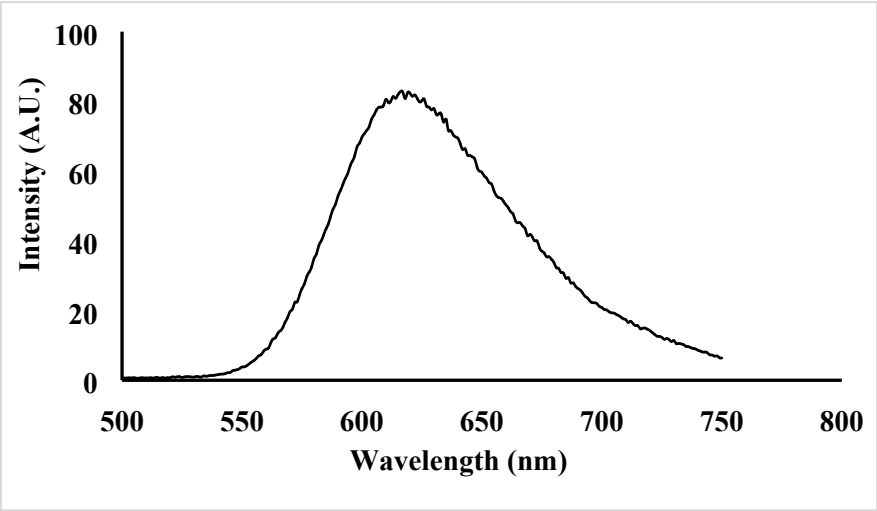
Fluorescence-emission of a solution of $Ru(bpy)_3Cl_2\bullet6H_2O$ (5.0×10^{-5} M) with **1a** (1.0×10^{-3} M) in DMF, I = 89.0



Fluorescence-emission of a solution of $Ru(bpy)_3Cl_2 \cdot 6H_2O$ (5.0×10^{-5} M) with difluoromethyl sulfone **2** (1.2×10^{-3} M) in DMF, I = 90.3



Fluorescence-emission of a solution of $Ru(bpy)_3Cl_2 \cdot 6H_2O$ (5.0×10^{-5} M) with 1-isocyanato-4-methylbenzene **3a** (2.5×10^{-3} M) in DMF, I = 93.6



Fluorescence-emission of a solution of $Ru(bpy)_3Cl_2•6H_2O$ (5.0×10^{-5} M) with DABCO (2.0×10^{-3} M) in DMF, I = 82.8

Table S1. Luminescence Quenching Experiment Results

Entry	Sample	Relative luminescence intensity
1	$Ru(bpy)_3Cl_2•6H_2O$ (5×10^{-5} M)	I_0=1
2	$Ru(bpy)_3Cl_2•6H_2O$ (5×10^{-5} M)+ **1a** (1×10^{-3} M)	I_0/I = 1.04
3	$Ru(bpy)_3Cl_2•6H_2O$ (5×10^{-5} M) + **2** (1.2×10^{-3}M)	I_0/I = 1.03
4	$Ru(bpy)_3Cl_2•6H_2O$ (5×10^{-5} M) + **3a** (2.5×10^{-3} M)	I_0/I = 1.00
5	$Ru(bpy)_3Cl_2•6H_2O$ (5×10^{-5} M) + DABCO (2×10^{-3} M)	I_0/I = 1.12

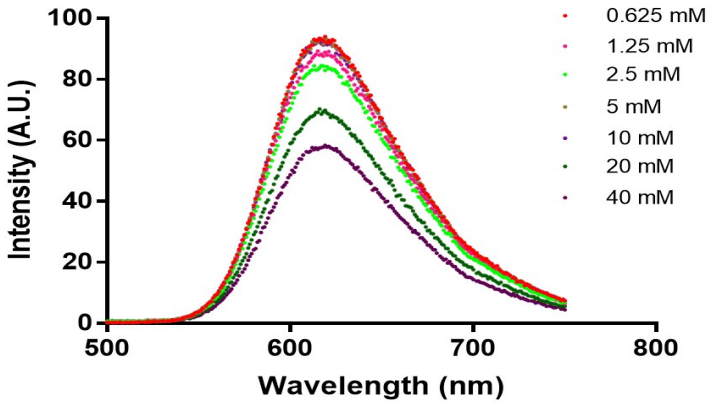


Figure S1 Quenching effect of DABCO with different concentration on photocatalysts

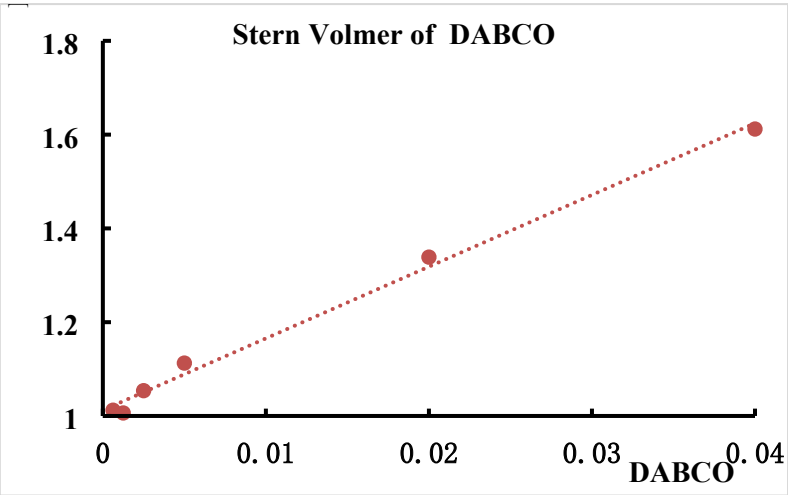


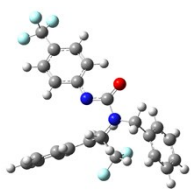
Figure S2 Stern Volmer of DABCO

As shown in Table S1, there was no obvious change in luminescence intensity when N-benzyl-2-phenylprop-2-en-1-amine **1a**, difluoromethyl sulfone **2** and 1-isocyanato-4-methylbenzene **3a** was used as a quencher to [Ru]* (Table S1, entries 2–4). And emission quenching of $Ru(bpy)_3Cl_2{\cdot}6H_2O$ should proceed with DBACO (entry 5) prior to substrate **1a**. In addition, fluorescence quenching effect is positively correlated with the concentration of DABCO (Figure S1 and Figure S2). Thus, we preferred that the single-electron transfer between $[Ru(bpy)_3Cl_2{\cdot}6H_2O]$* and DABCO was the key initial step.

7. The energy level gaps coordinate data of intermediates B_{ai} and C_{ai}

Table S2 the energy level gaps of intermediate of $\mathbf{B_{ai}}$ and $\mathbf{C_{ai}}$

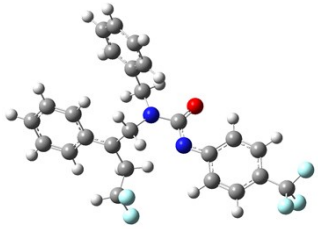
intermediate	Energy level gaps(eV)		
	HOMO-LUMO	HOMO-LUMO+1	HOMO-LUMO+2
$\mathbf{B_{ai}}$	4.079	4.109	4.197
$\mathbf{C_{ai}}$	4.235	4.279	4.415



B_{ai}

atom	x	y	z
C	-2.23018	-1.58702	-0.21844
C	-2.15166	-2.98008	-0.08776
C	-3.31693	-3.75626	-0.14787
C	-4.5607	-3.13938	-0.33875
C	-4.63921	-1.7463	-0.46954
C	-3.47394	-0.97012	-0.40933
H	-1.202	-3.45107	0.0579
H	-3.25701	-4.8199	-0.04803
H	-5.58883	-1.27529	-0.61536
H	-3.53386	0.09355	-0.50907
C	-5.84122	-3.99234	-0.40477
N	-1.00795	-0.77274	-0.15526
C	0.14031	-1.34161	0.02187
O	0.22121	-2.76306	0.15566
N	1.362	-0.52655	0.08573
C	2.50004	-1.30849	-0.41849
H	2.35082	-1.89103	0.46655
H	2.86144	-0.33449	-0.67464
C	4.0015	-1.52646	-0.15476
C	4.50315	-1.43911	1.15084
C	4.86611	-1.81206	-1.22002
C	5.86941	-1.63741	1.39127
H	3.84295	-1.22099	1.96414
C	6.23244	-2.01028	-0.97958
H	4.48308	-1.87877	-2.21689
C	6.73408	-1.92294	0.32607
H	6.25238	-1.57079	2.38816
H	6.89267	-2.2283	-1.79288

H	7.77729	-2.07428	0.50965
C	1.19109	0.67789	-0.73948
H	2.08022	1.27136	-0.69282
H	1.00595	0.39201	-1.75382
C	-0.00122	1.49697	-0.21123
C	-1.1809	0.78431	0.47583
H	-0.82877	-0.10245	0.96018
H	-1.91529	0.52274	-0.25708
C	-1.81043	1.7244	1.52059
H	-1.07606	1.98591	2.25353
F	-2.84468	1.09973	2.12278
F	-2.2546	2.84324	0.90951
C	-0.01402	3.02868	-0.37
C	0.53527	3.84149	0.63078
C	-0.57498	3.6097	-1.51525
C	0.52347	5.23535	0.48636
H	0.96364	3.39782	1.50515
C	-0.58673	5.00358	-1.65972
H	-0.99433	2.98905	-2.27935
C	-0.03754	5.81639	-0.65888
H	0.94282	5.85596	1.25051
H	-1.015	5.44723	-2.53418
H	-0.04656	6.88064	-0.76912
F	-5.68425	-5.09906	0.35222
F	-6.88517	-3.27357	0.06002
F	-6.07676	-4.35212	-1.68445



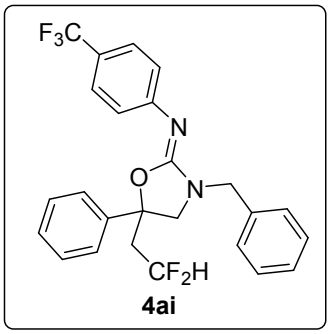
C_{ai}

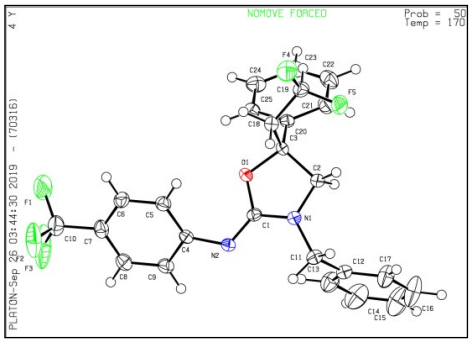
atom	x	y	z
C	-2.45624	-1.32227	-0.28423
C	-3.84251	-1.29888	-0.08186
C	-4.56718	-2.48843	0.02617
C	-3.9167	-3.71748	-0.0903
C	-2.5162	-3.75813	-0.22209
C	-1.77851	-2.55643	-0.30636
H	-4.35127	-0.36099	-0.01113
H	-5.62348	-2.45755	0.19377
H	-2.01174	-4.70195	-0.2627
H	-0.7128	-2.58723	-0.39735
C	-4.75479	-5.01249	-0.07839
N	-1.77129	-0.02629	-0.48526
C	-1.62776	0.96795	0.59813
O	-2.65435	1.60571	0.94429
N	-0.36197	1.27842	1.28805
C	-0.49314	2.69642	1.70366
C	0.80927	1.00639	0.42193
C	1.79835	-0.1768	0.24234
C	1.21763	-1.59855	0.19194
C	2.1662	-2.52083	-0.59597
F	2.01796	-3.47212	0.35016
F	2.99713	-3.32858	-1.28754

H	2.94552	-1.77072	-0.52457
H	1.11207	-1.97597	1.18305
H	0.25619	-1.57272	-0.28482
H	1.40102	1.26145	1.27901
H	0.14961	0.24859	0.06232
H	-1.22429	2.74592	2.48256
H	0.44677	3.05643	2.0655
C	3.33764	-0.04725	0.13636
C	3.95395	0.16409	-1.10425
C	4.12914	-0.17286	1.29379
C	5.35527	0.18402	-1.19994
H	3.35719	0.30481	-1.97902
C	5.52917	-0.16052	1.19565
H	3.66396	-0.28697	2.25049
C	6.14144	0.00553	-0.05354
H	5.82398	0.33349	-2.15049
H	6.12914	-0.28067	2.0732
H	7.20856	-0.0034	-0.13154
C	-0.99757	3.58958	0.54035
C	-2.38636	3.66051	0.33053
C	-0.13462	4.32939	-0.28382
C	-2.91671	4.48416	-0.66836
H	-3.04482	3.07966	0.94202
C	-0.67186	5.17018	-1.27946
H	0.9239	4.26236	-0.15376
C	-2.06142	5.24901	-1.46652
H	-3.976	4.52918	-0.81983
H	-0.02088	5.75395	-1.89617
H	-2.46796	5.89368	-2.21966

F	-4.14883	-5.94947	-0.83824
F	-4.87345	-5.46628	1.18751
F	-5.9812	-4.75316	-0.57955

8. X-ray crystal structure analysis of 4ai:





Crystal data and structure refinement for 190925_bk_4_94a_0m.

Bond precision: C-C = 0.0040 A Wavelength=0.71073

Cell: α=8.6898(10) β=11.1725(11) γ=12.0639(13)

alpha=76.082(4) beta=73.273(4) gamma=77.314(4)

Temperature: 170 K

Table S3 Datablock for 190925_bk_4_94a_0m

	Calculated	Reported
Volume	1074.4(2)	1074.4(2)
Space group	P -1	P -1
Hall group	-P 1	-P 1
Moiety formula	C25 H21 F5 N2 O	C25 H21 F5 N2 O
Sum formula	C25 H21 F5 N2 O	C25 H21 F5 N2 O
Mr	460.44	460.44
Dx,g cm^{-3}	1.423	1.423
Z	2	2
Mu (mm^{-1})	0.117	0.117
F000	476.0	476.0
F000’	476.31	
h,k,lmax	10,13,15	10,13,15
Nref	4403	4333
Tmin, Tmax	0.966, 0.973	0.570, 0.745
Tmin’	0.966	

9. Reference

[1] N. Scalacci, G. W. Black, G. Mattedi, N. L. Brown, N. J. Turner and D. Castagnolo, *ACS. Catal.*, 2017, **7**, 1295-1300.

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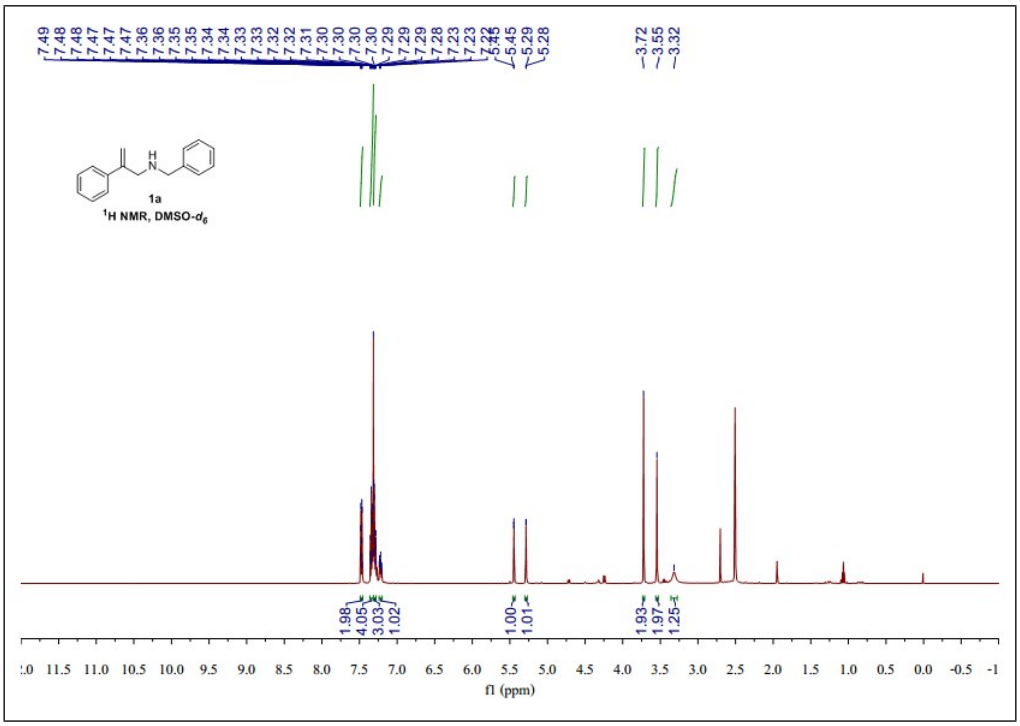
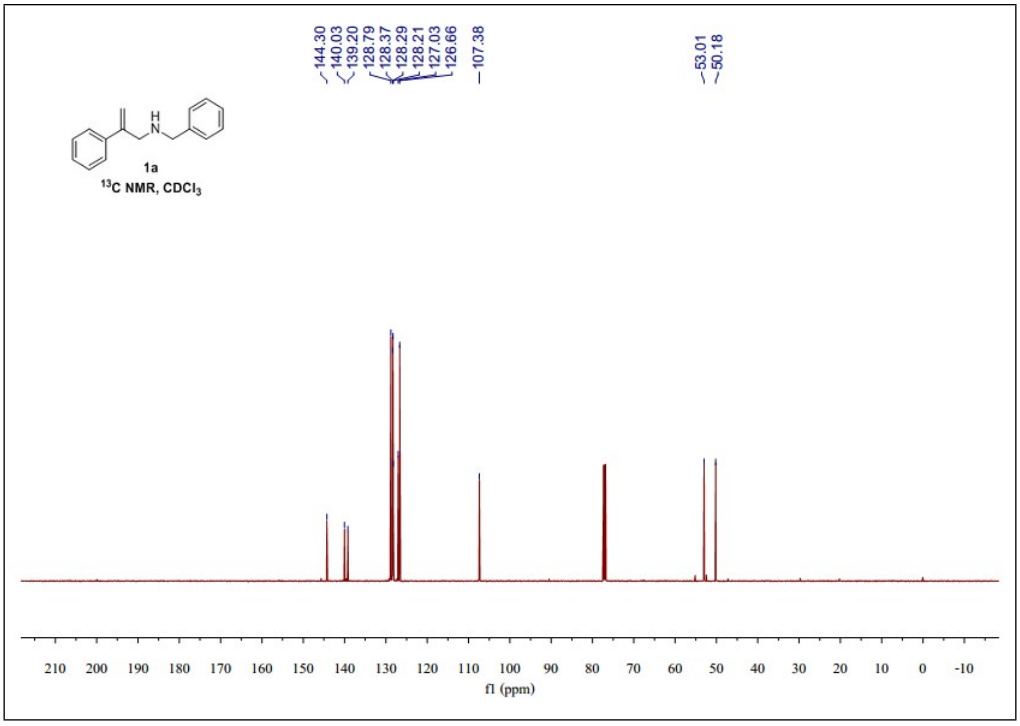
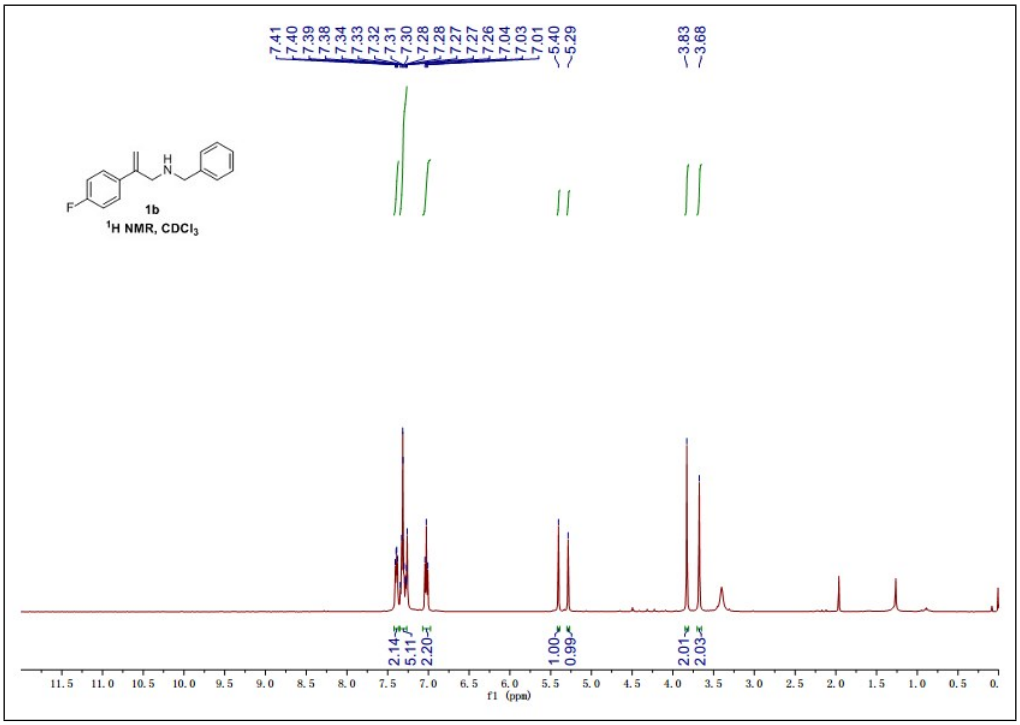
[7] J. Wei, D. Gu, S. Wang, J. Hu, X. Dong and R. Sheng, *Org. Chem. Front.,* 2018, **5**, 2568-2572.

10. Copies of NMR spectra.



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7.27
7.26
7.04
7.03
7.01
5.40
5.29
3.83
3.68
1b
1H NMR, CDCl3
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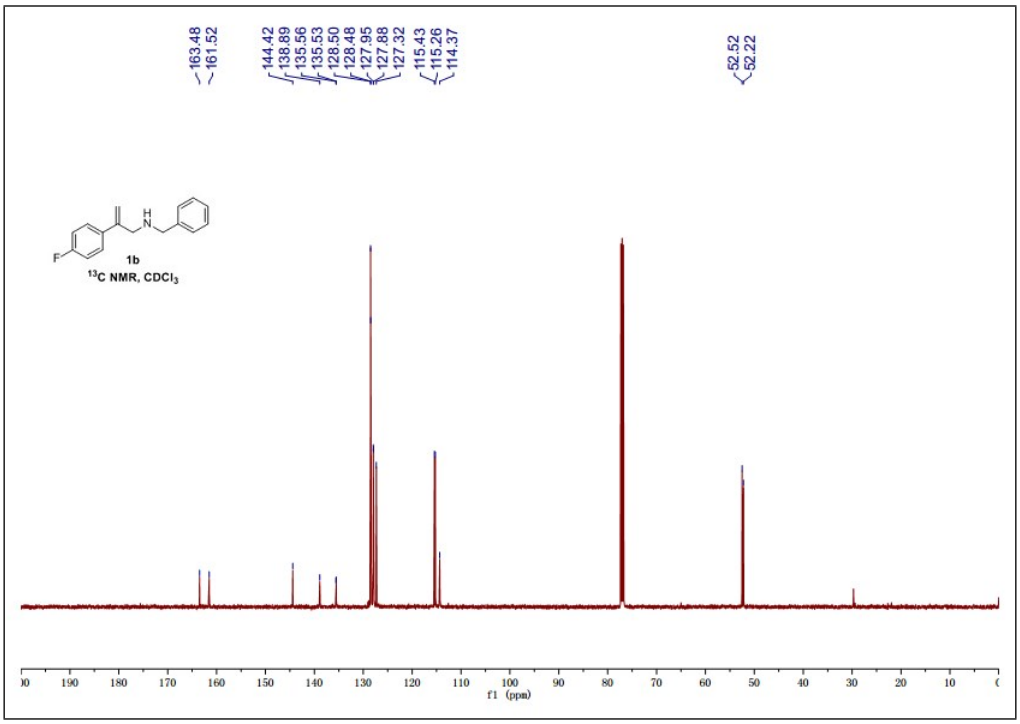
5.11
2.20
1.00
0.99
2.01
2.03
f1 (ppm)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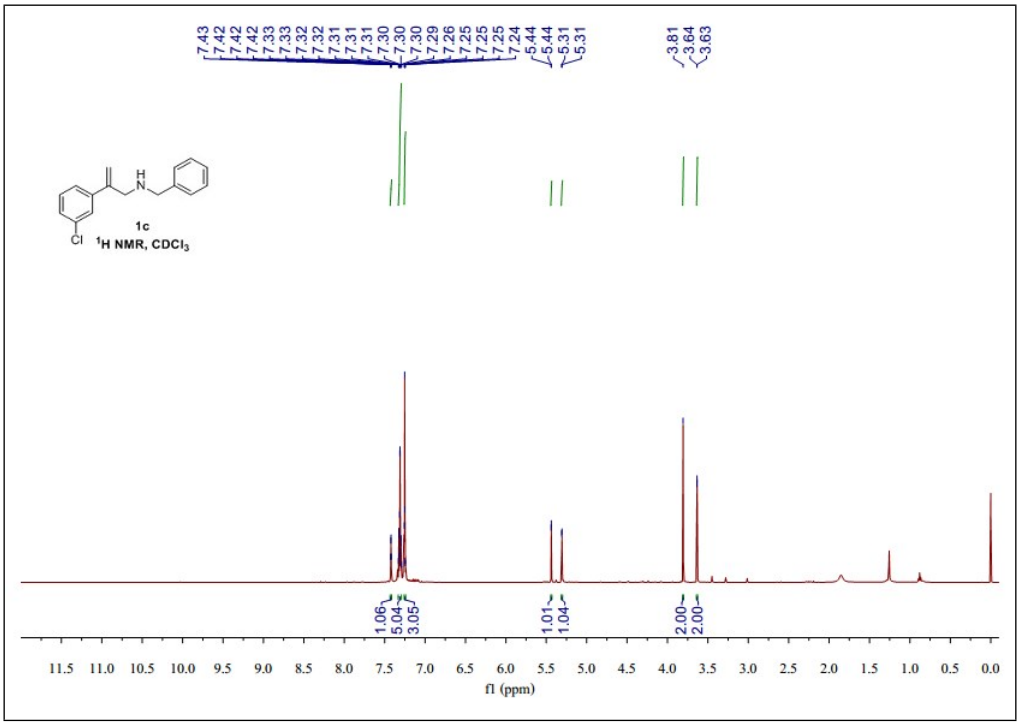
52.22
1b
13C NMR, CDCl3
f1 (ppm)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7.24
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5.31
5.31
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3.64
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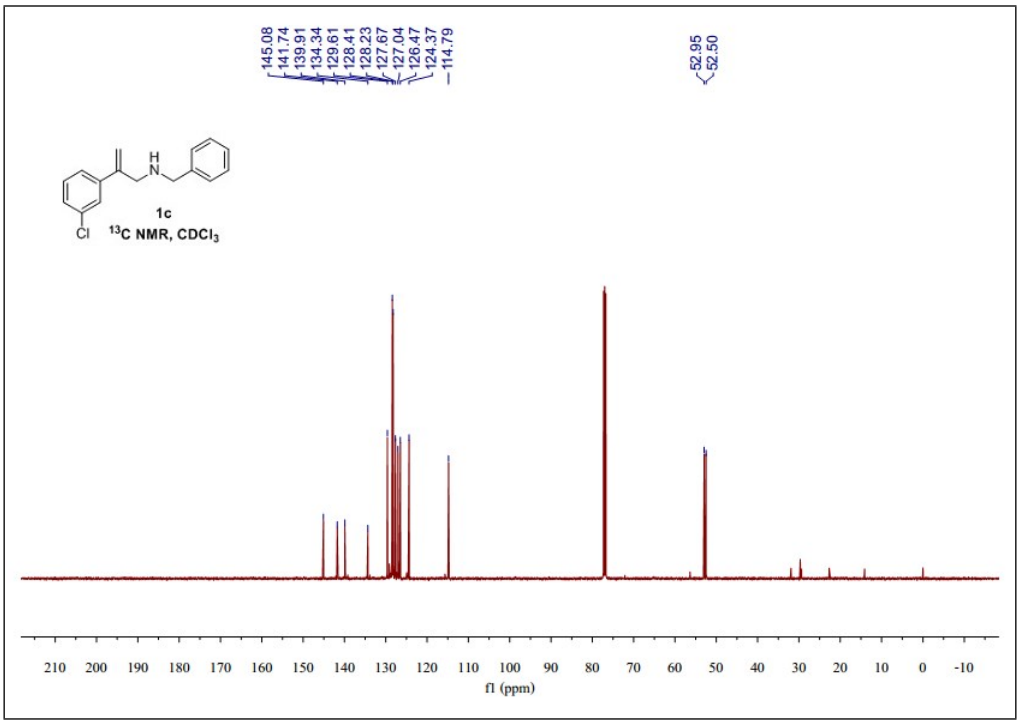
2.00
fl (ppm)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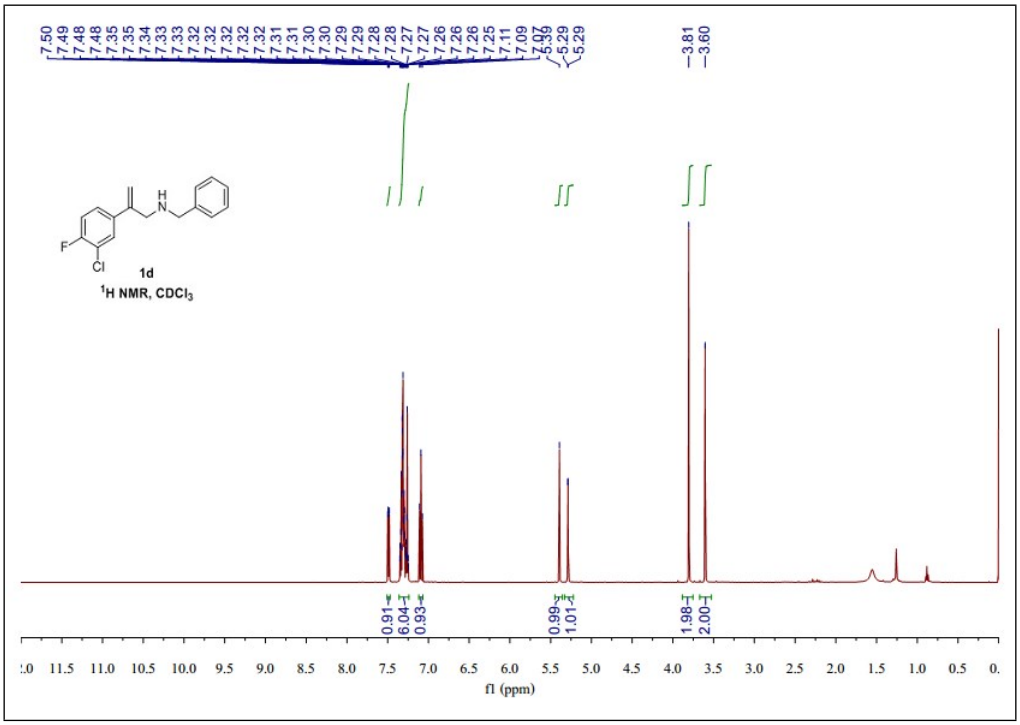
52.50
1c
13C NMR, CDCl3
fl (ppm)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5.29
3.81
3.60
F
Cl
H
N
1d
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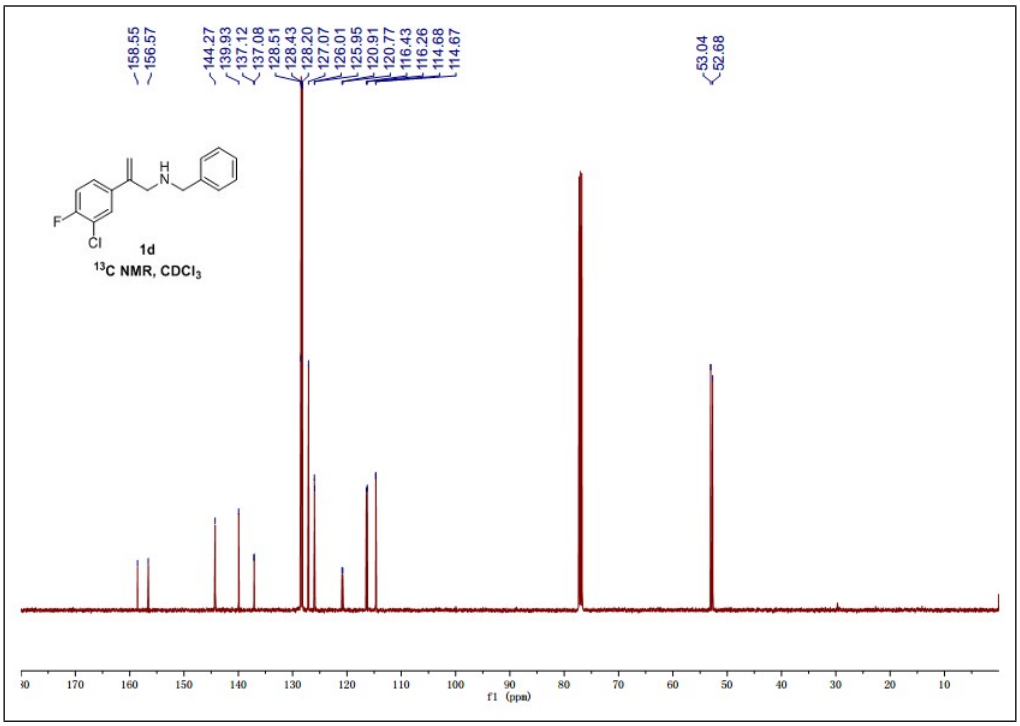
2.00
f1 (ppm)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120.77
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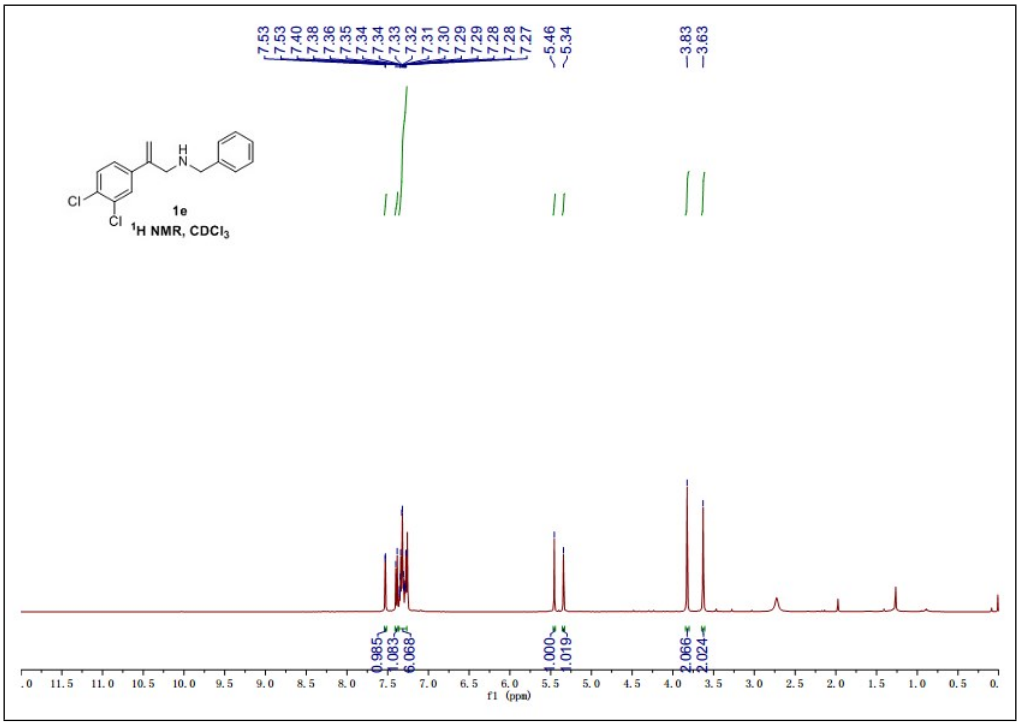
F
Cl
H
N
1d
^{13}C NMR, CDCl$_3$
f1 (ppm)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7.28
7.28
7.27
5.46
5.34
3.83
3.63
Cl
Cl
H
N
1e
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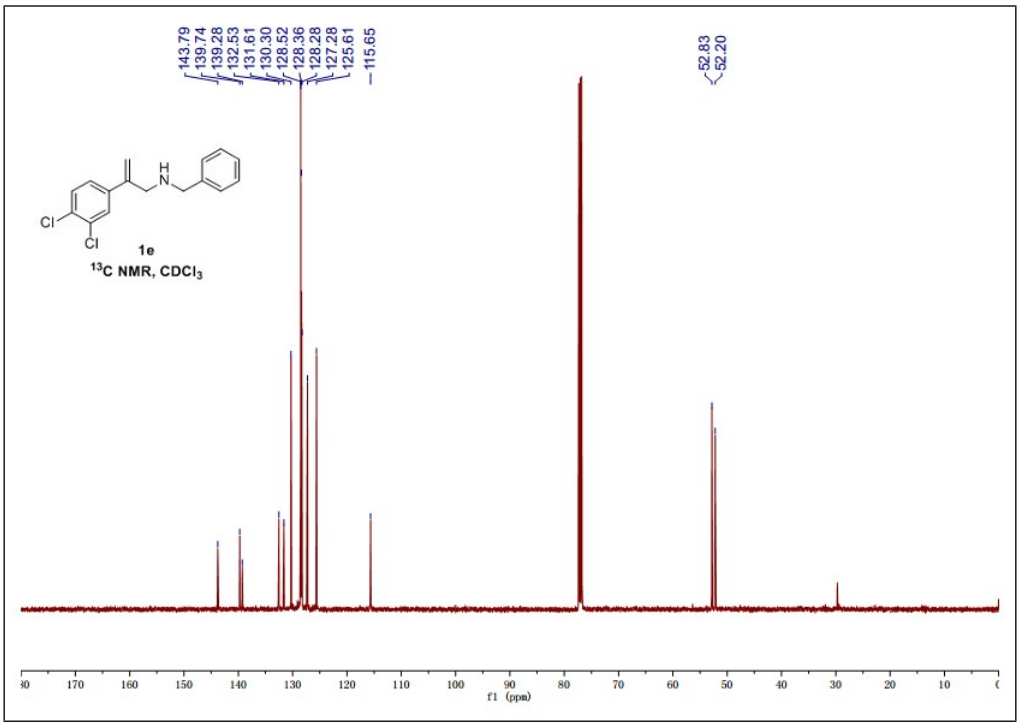
1.019
2.066
2.024
f1 (ppm)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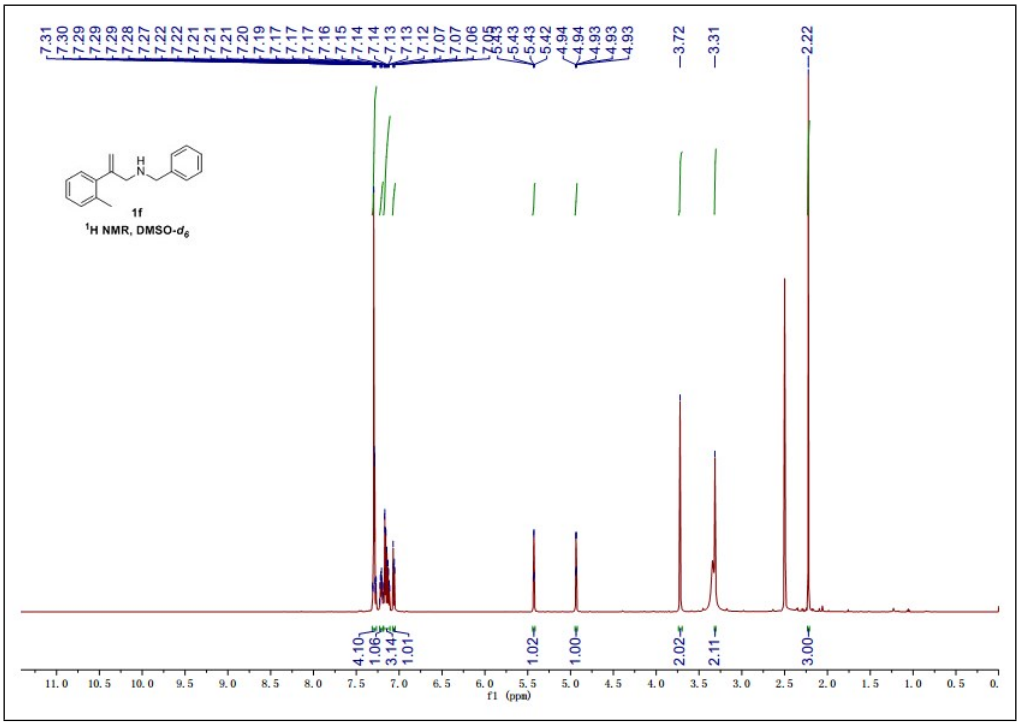
Cl
Cl
H
N
1e
^{13}C NMR, CDCl$_3$
f1 (ppm)


1f
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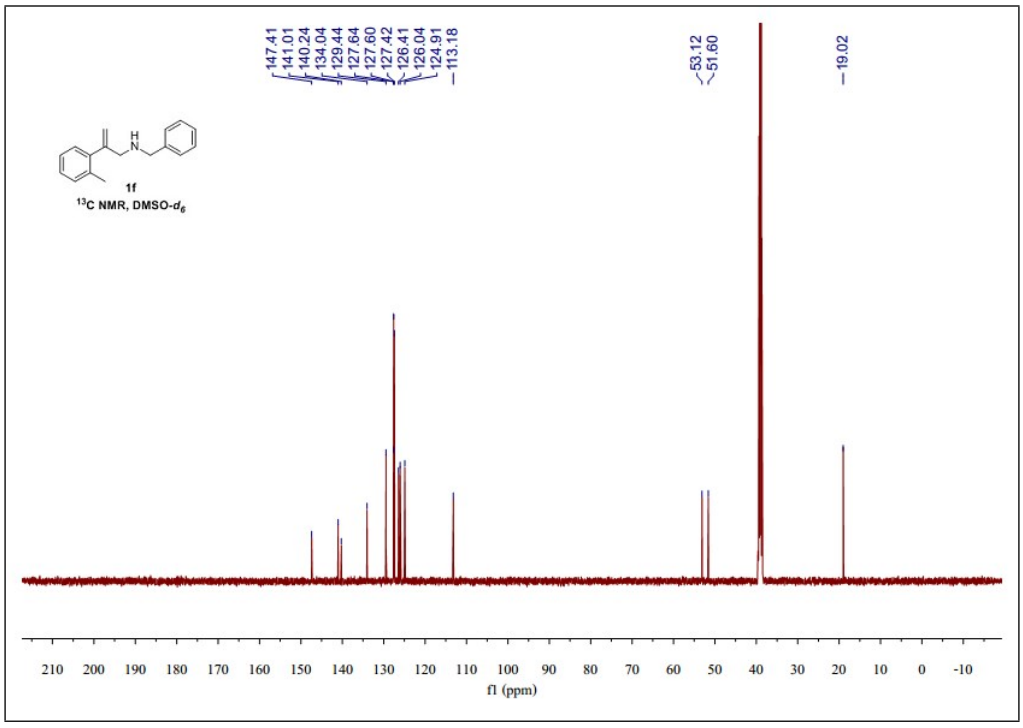
f1 (ppm)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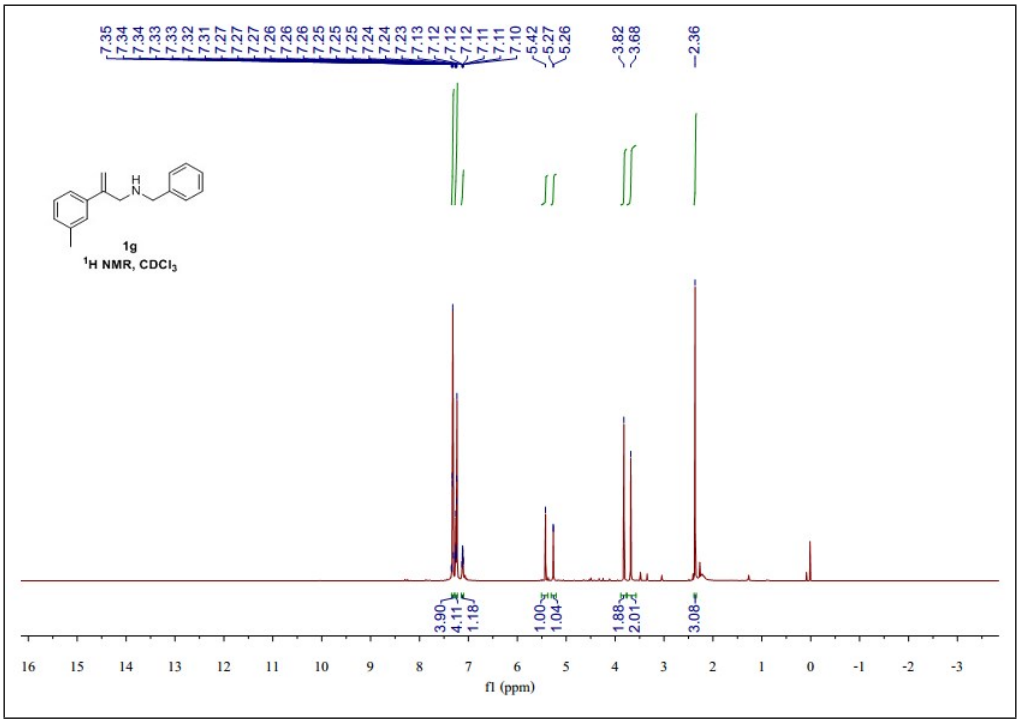
^{13}C NMR, DMSO-d_6
f1 (ppm)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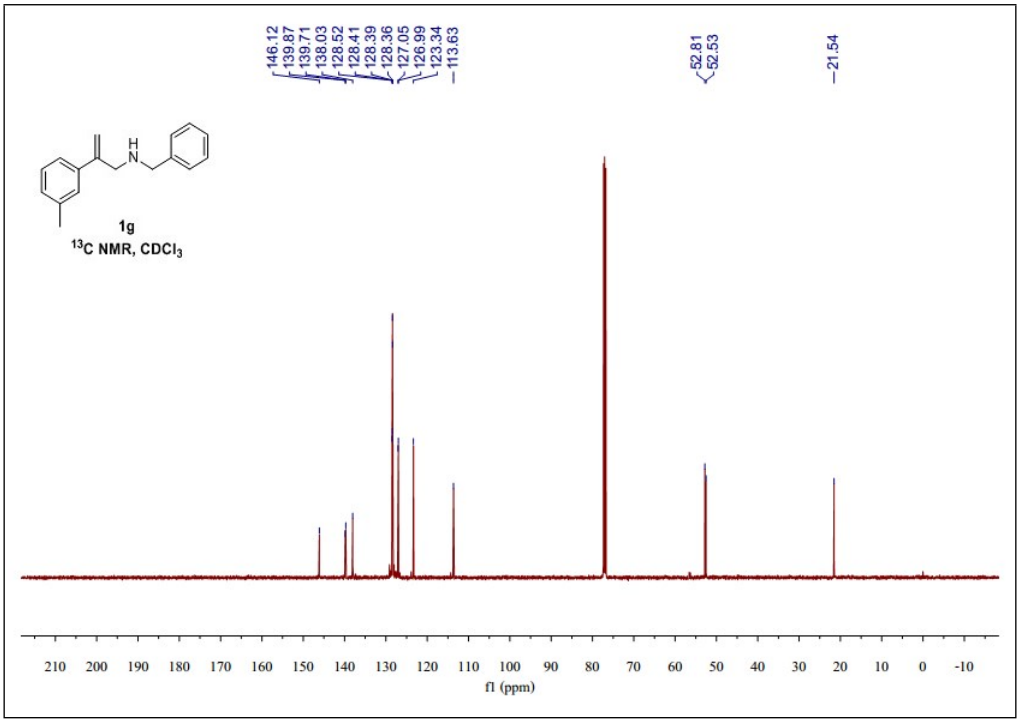
7.26
7.25
7.25
7.25
7.24
7.24
7.23
7.13
7.12
7.12
7.12
7.11
7.11
7.10
5.42
5.27
5.26
3.82
3.68
2.36
1g
1H NMR, CDCl3
3.90
4.11
1.18
1.00
1.04
1.88
2.01
3.08
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1 -2 -3
f1 (ppm)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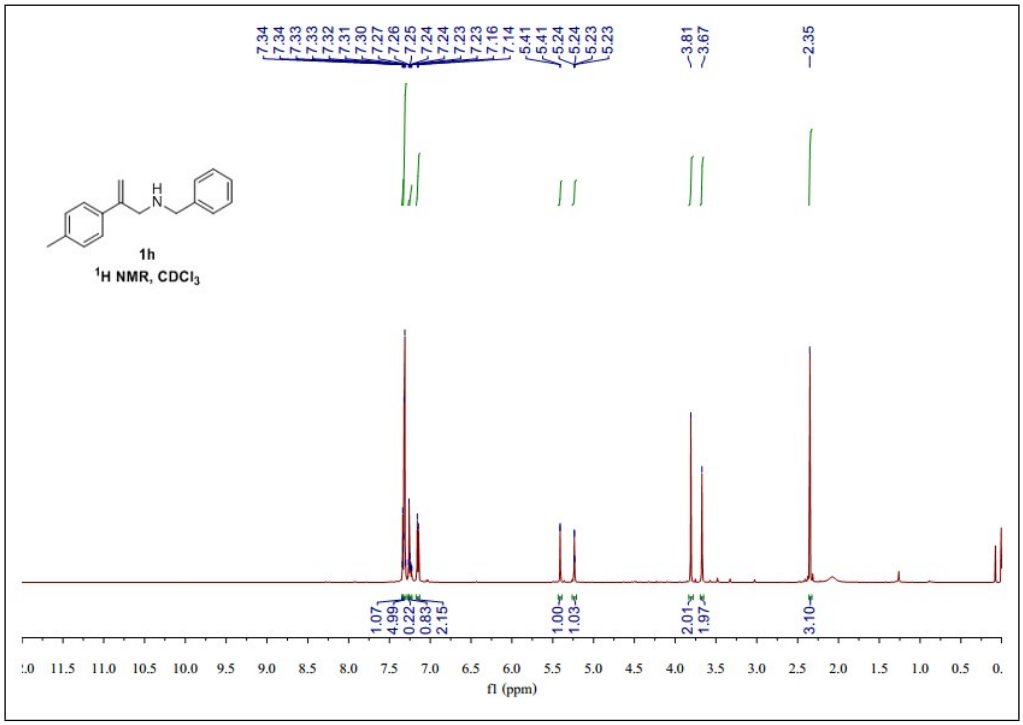
126.99
123.34
113.63
52.81
52.53
21.54
1g
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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7.23
7.23
7.16
7.14
5.41
5.41
5.24
5.24
5.23
5.23
3.81
3.67
2.35
1h
1H NMR, CDCl3
1.07
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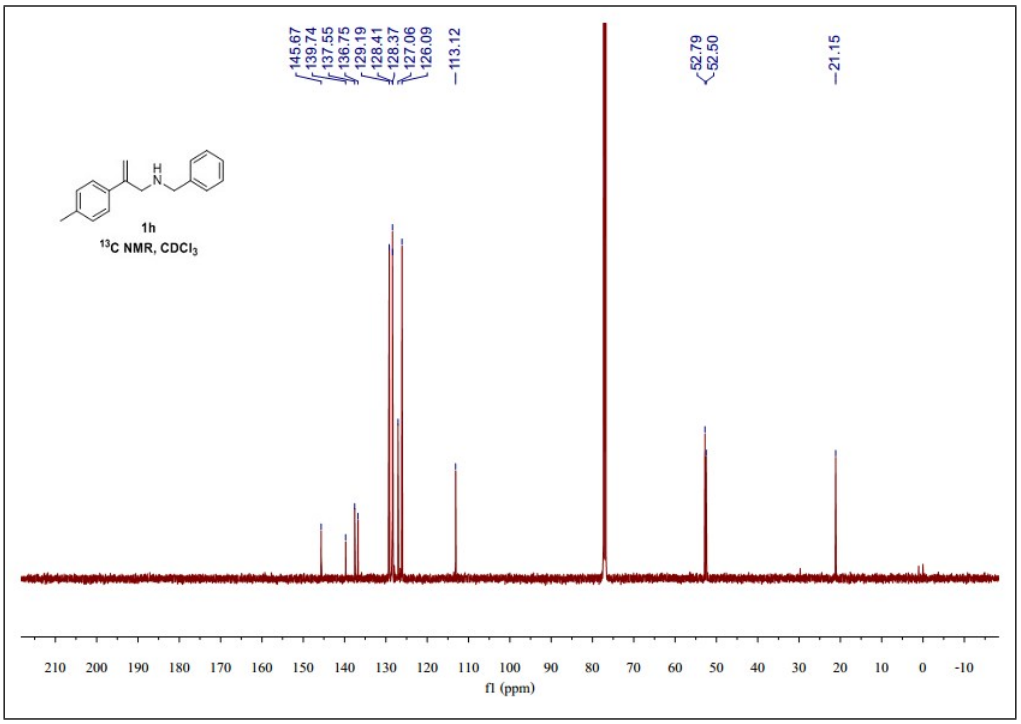
0.22
0.83
2.15
1.00
1.03
2.01
1.97
3.10
f1 (ppm)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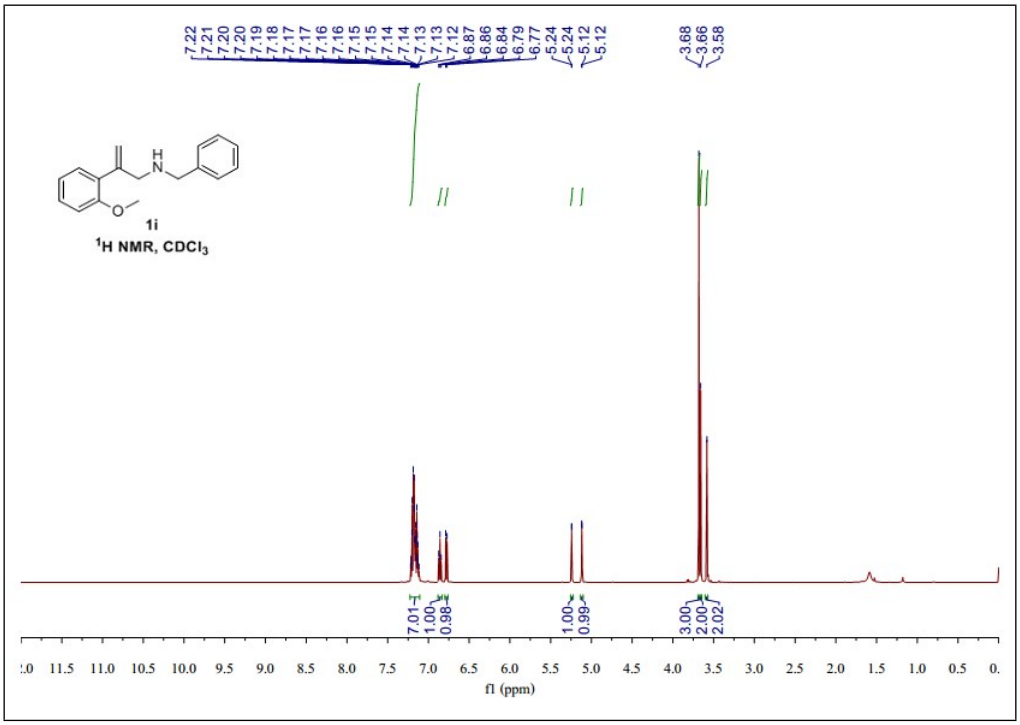
21.15
1h
13C NMR, CDCl3
f1 (ppm)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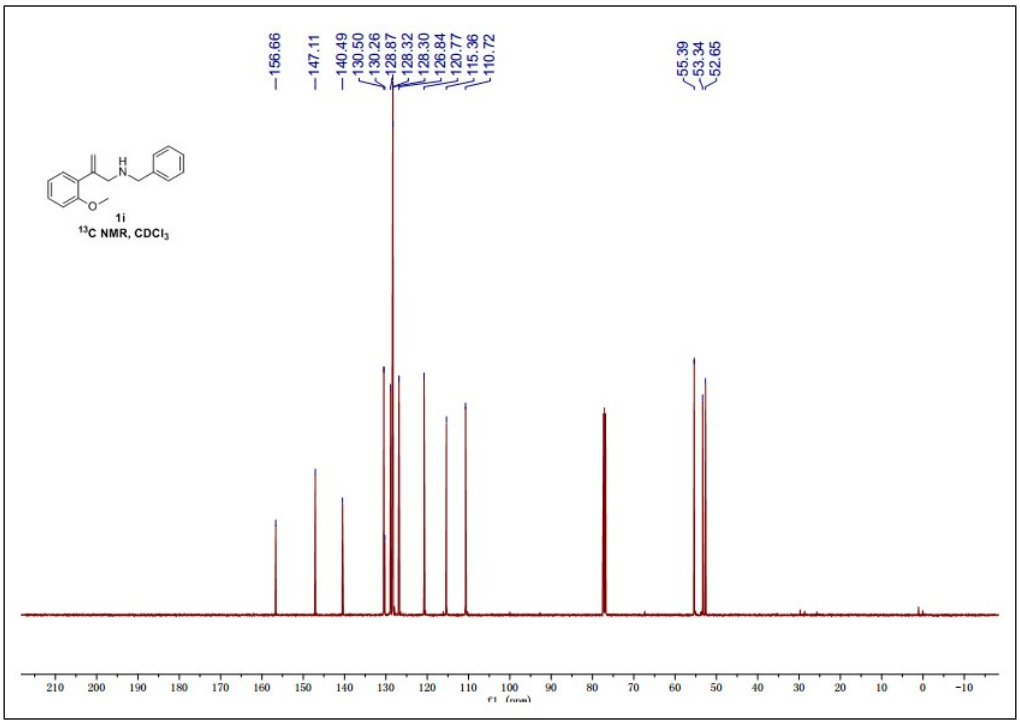
^{1}H NMR, CDCl$_3$
f1 (ppm)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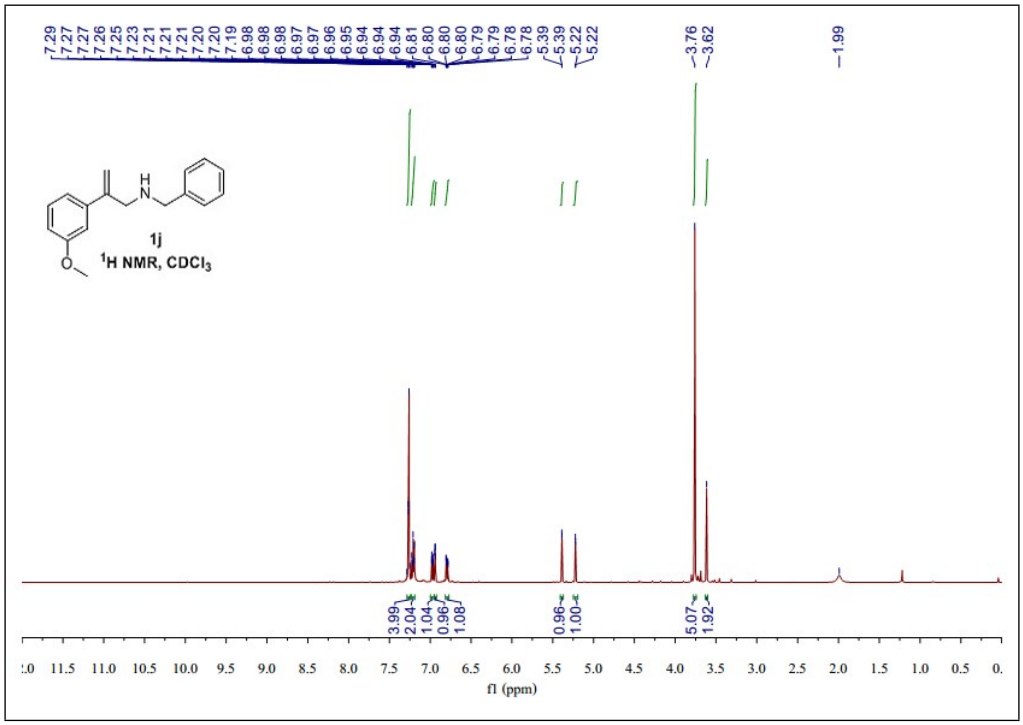
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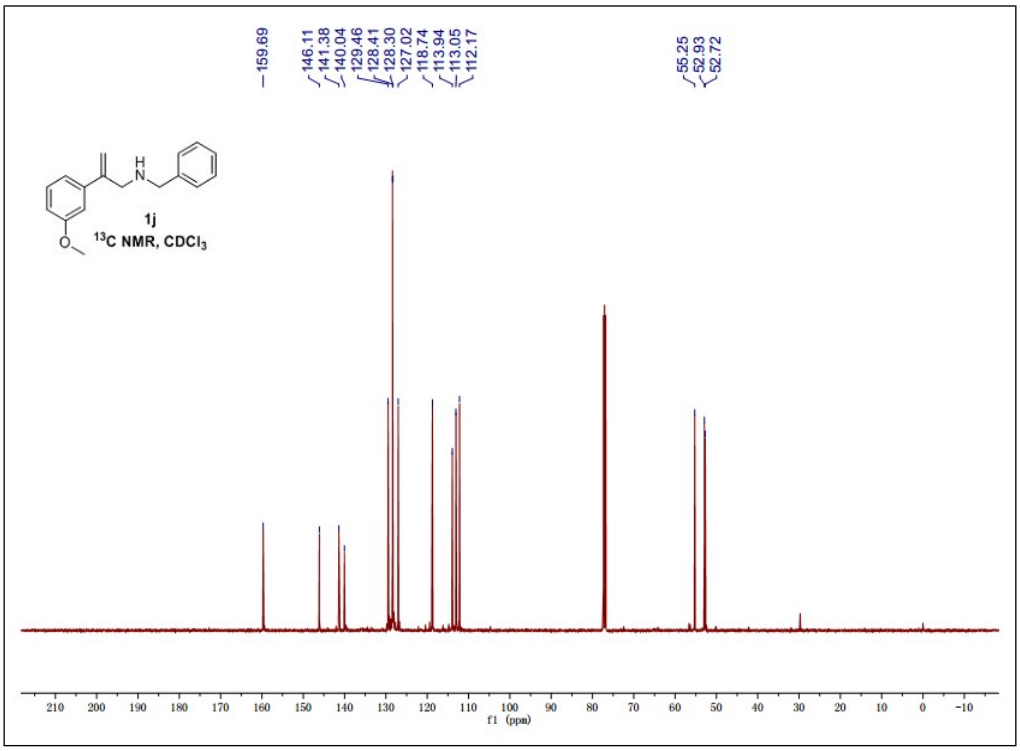
^{1}H NMR, CDCl$_3$
f1 (ppm)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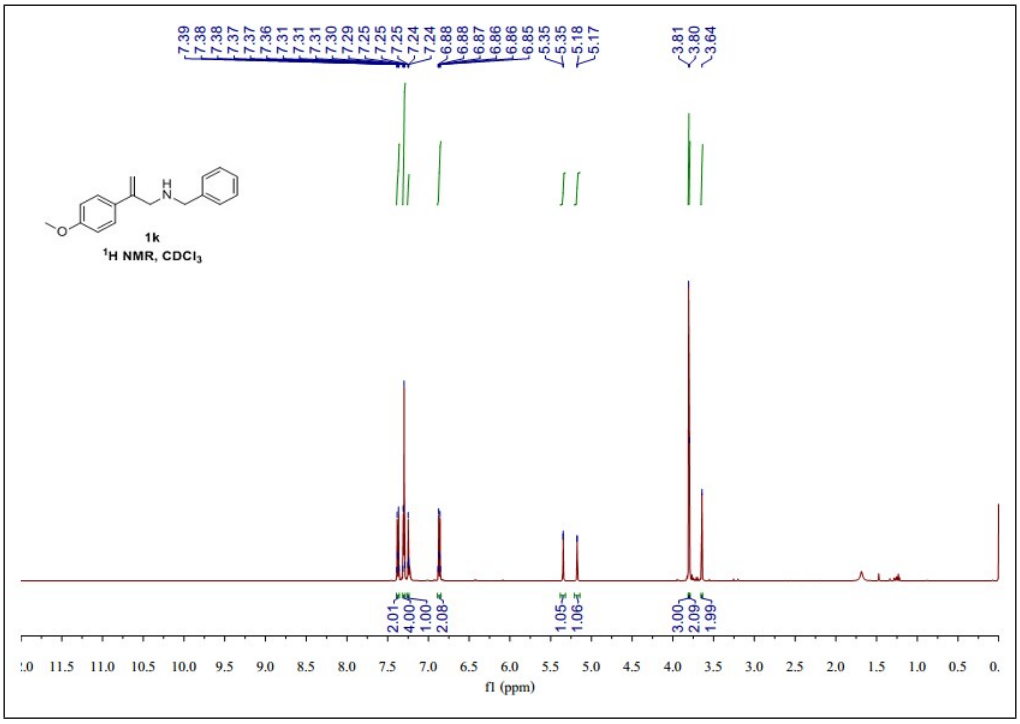
^{13}C NMR, CDCl$_3$
f1 (ppm)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7.24
7.24
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6.87
6.86
6.86
6.86
6.85
5.35
5.35
5.18
5.17
3.81
3.80
3.64
1k
1H NMR, CDCl3
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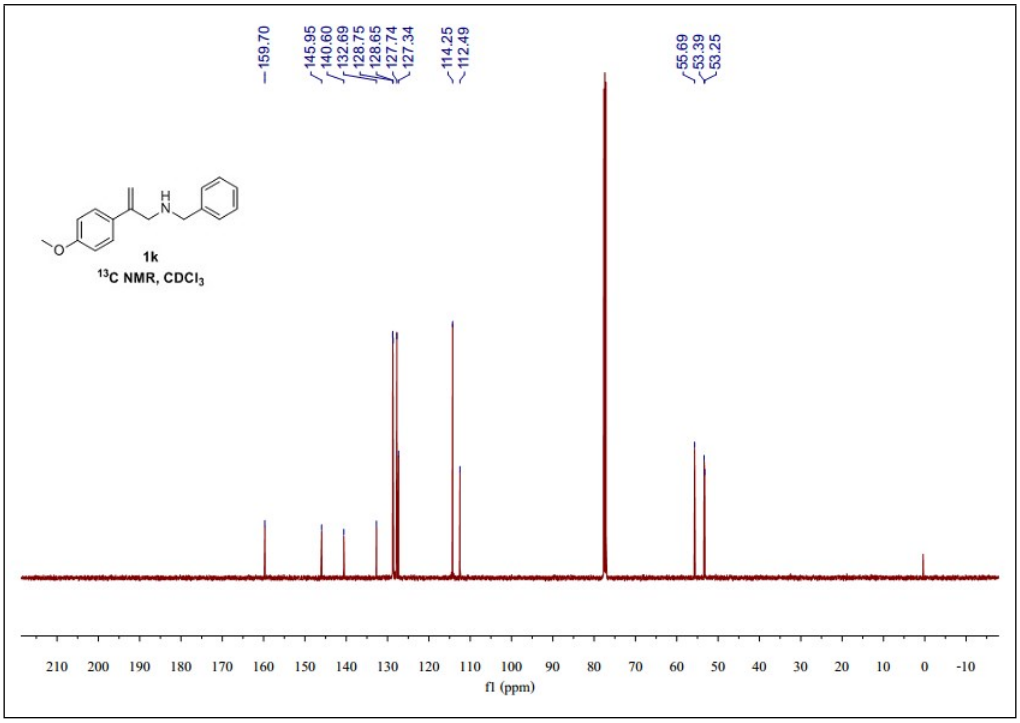
4.00
1.00
2.08
1.05
1.06
3.00
2.09
1.99
f1 (ppm)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127.34
114.25
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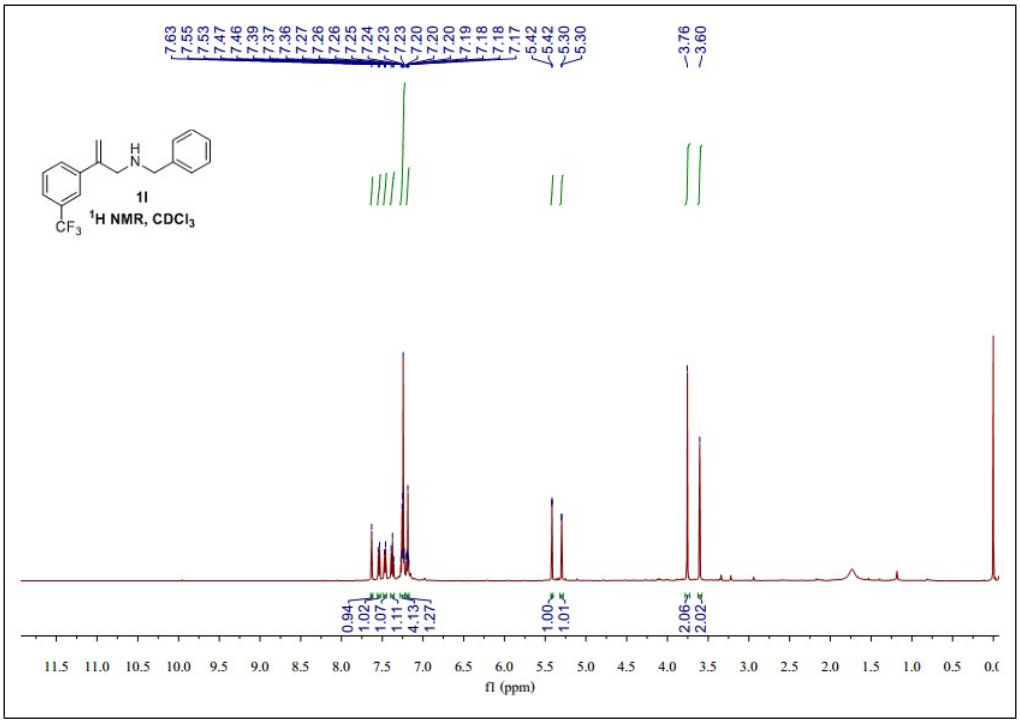
53.39
53.25
1k
13C NMR, CDCl3
f1 (ppm)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7.20
7.20
7.20
7.19
7.18
7.18
7.17
5.42
5.42
5.30
5.30
3.76
3.60
1l
^{1}H NMR, CDCl$_3$
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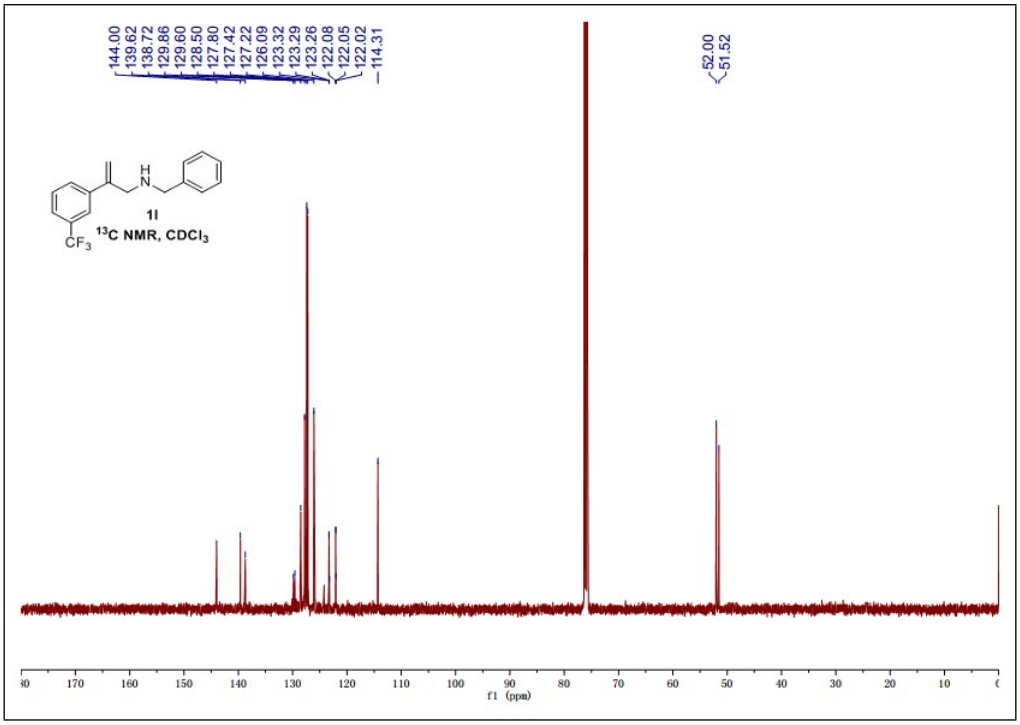
1.07
1.11
4.13
1.27
1.00
1.01
2.06
2.02
f1 (ppm)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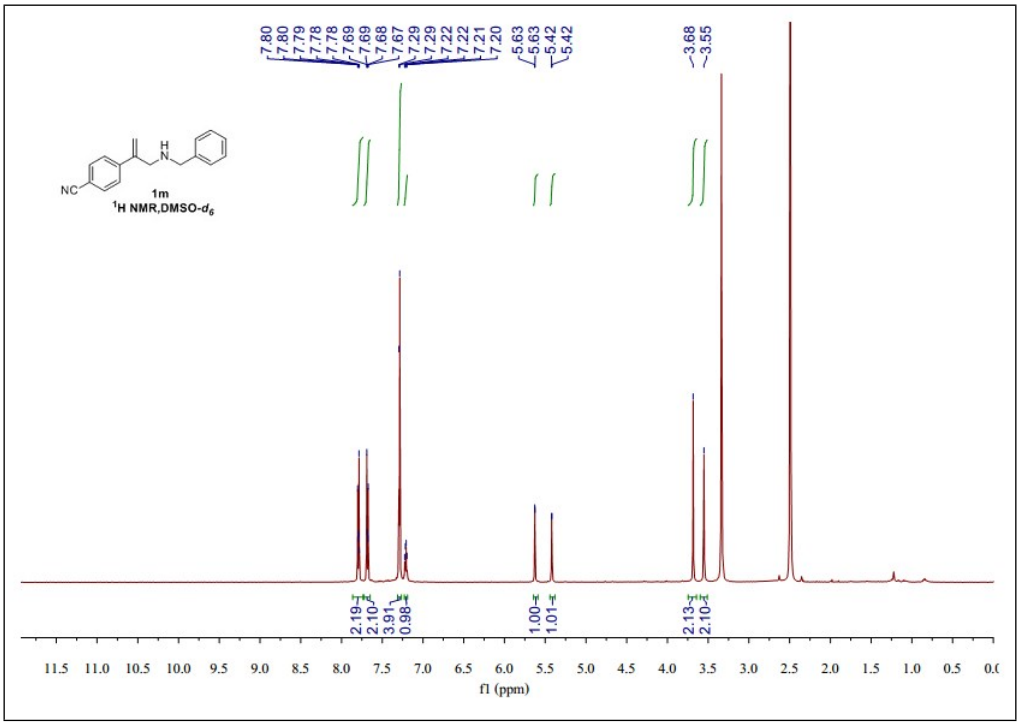
123.29
123.26
122.08
122.05
122.02
114.31
52.00
51.52
1l
^{13}C NMR, CDCl$_3$
f1 (ppm)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7.68
7.67
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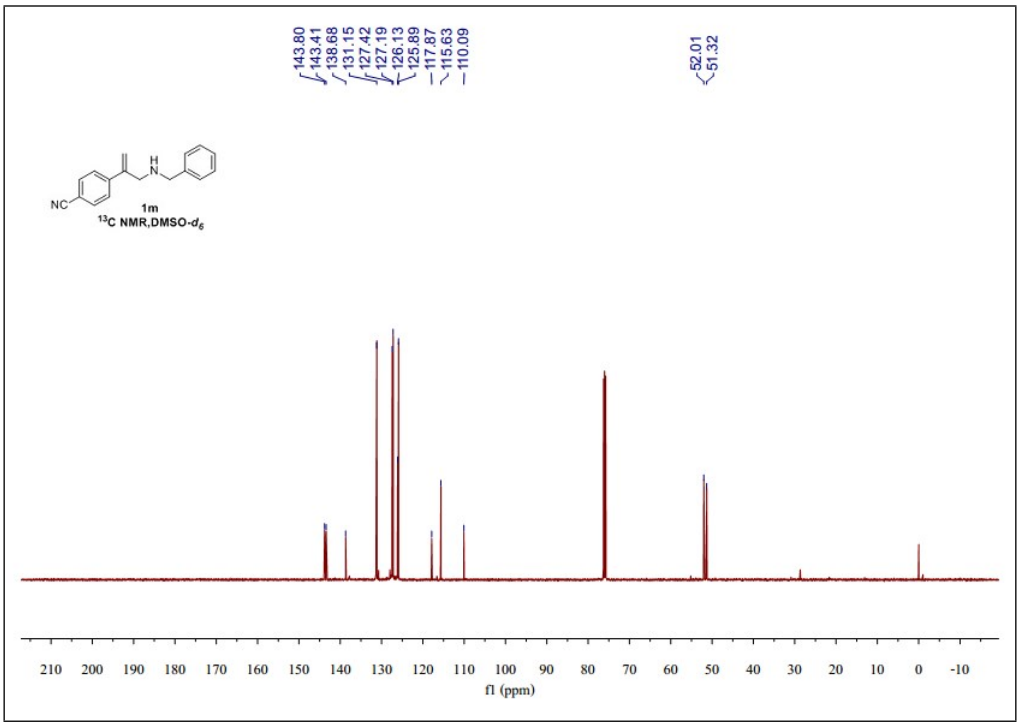
7.29
7.22
7.22
7.21
7.20
5.63
5.63
5.42
5.42
3.68
3.55
NC
1m
1H NMR,DMSO-d6
2.19
2.10
3.91
0.98
1.00
1.01
2.13
2.10
11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5
f1 (ppm)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127.42
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125.89
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115.63
110.09
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51.32
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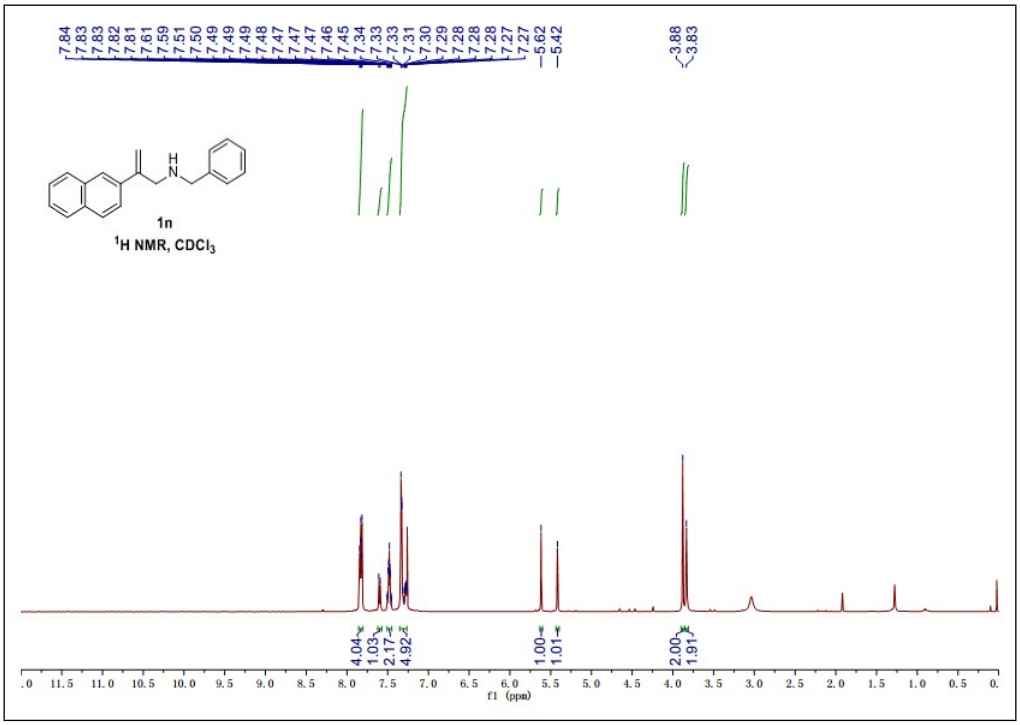
1m
13C NMR,DMSO-d6
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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7.27
5.62
5.42
3.88
3.83
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2.17
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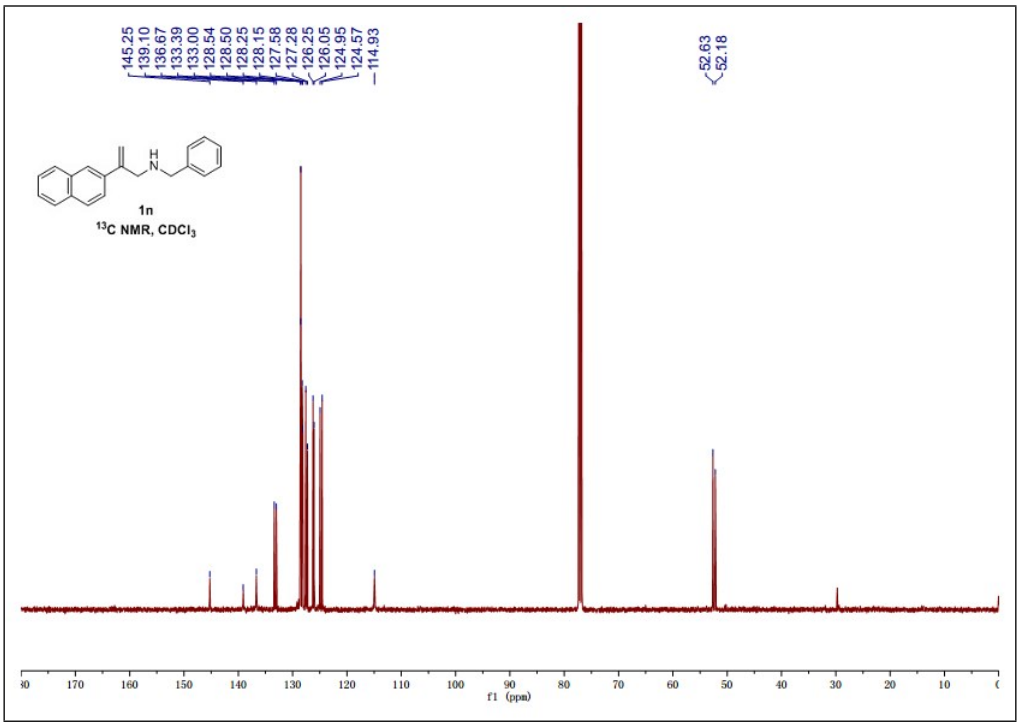
1.01
2.00
1.91
f1 (ppm)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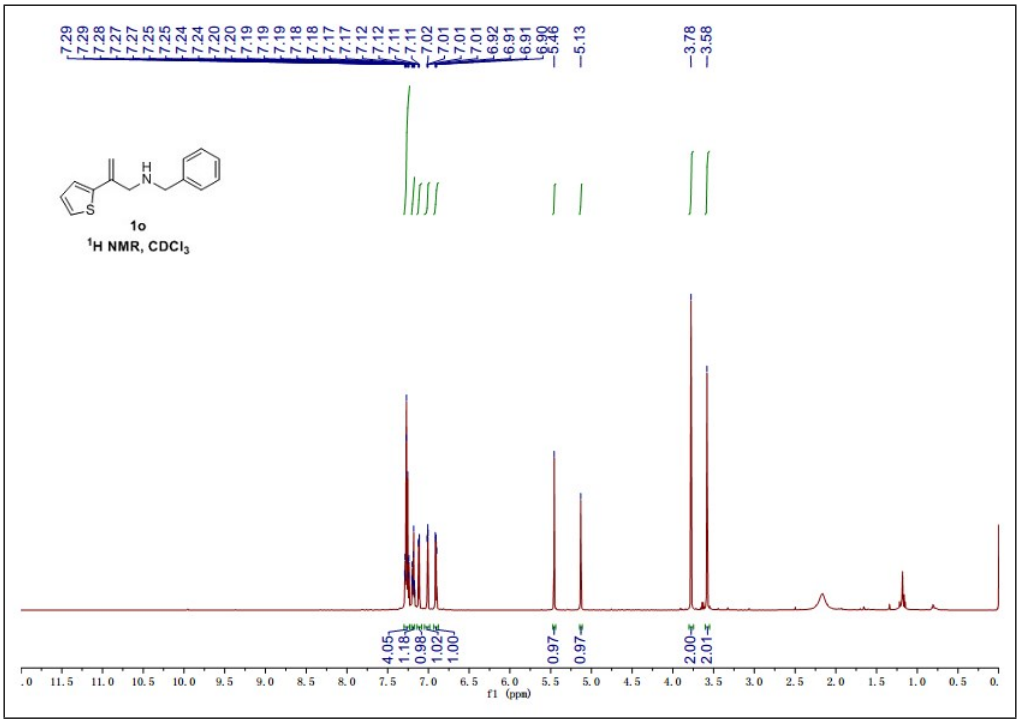
124.95
124.57
114.93
52.63
52.18
1n
13C NMR, CDCl3
f1 (ppm)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7.01
7.01
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5.48
5.13
3.78
3.58
1o
1H NMR, CDCl3
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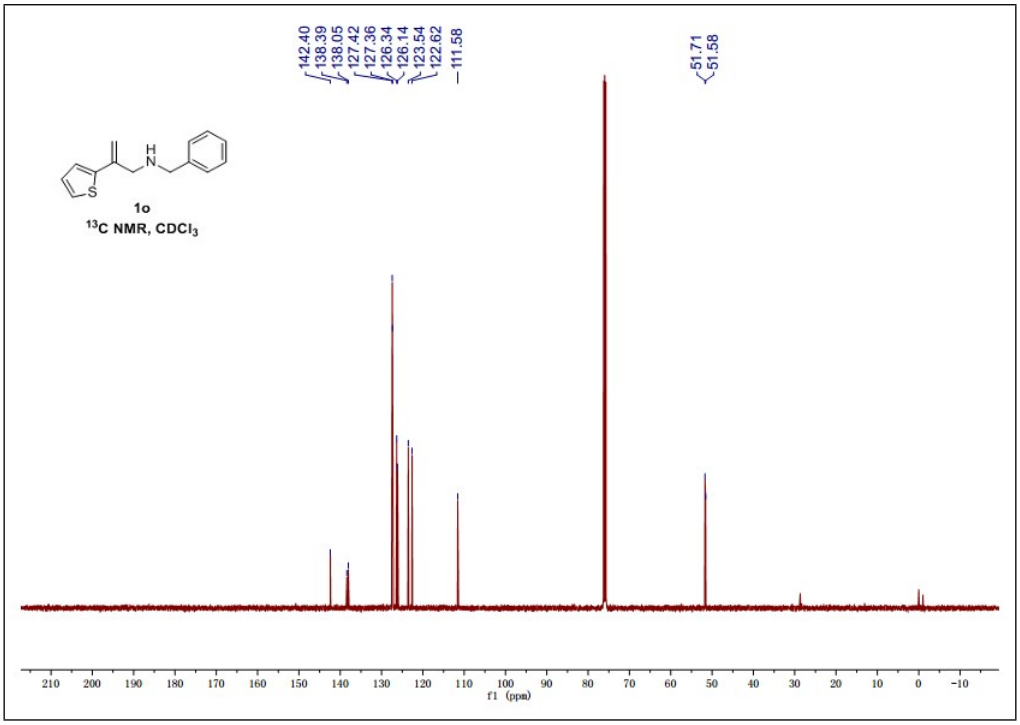
1.18
0.98
1.02
1.00
0.97
0.97
2.00
2.01
f1 (ppm)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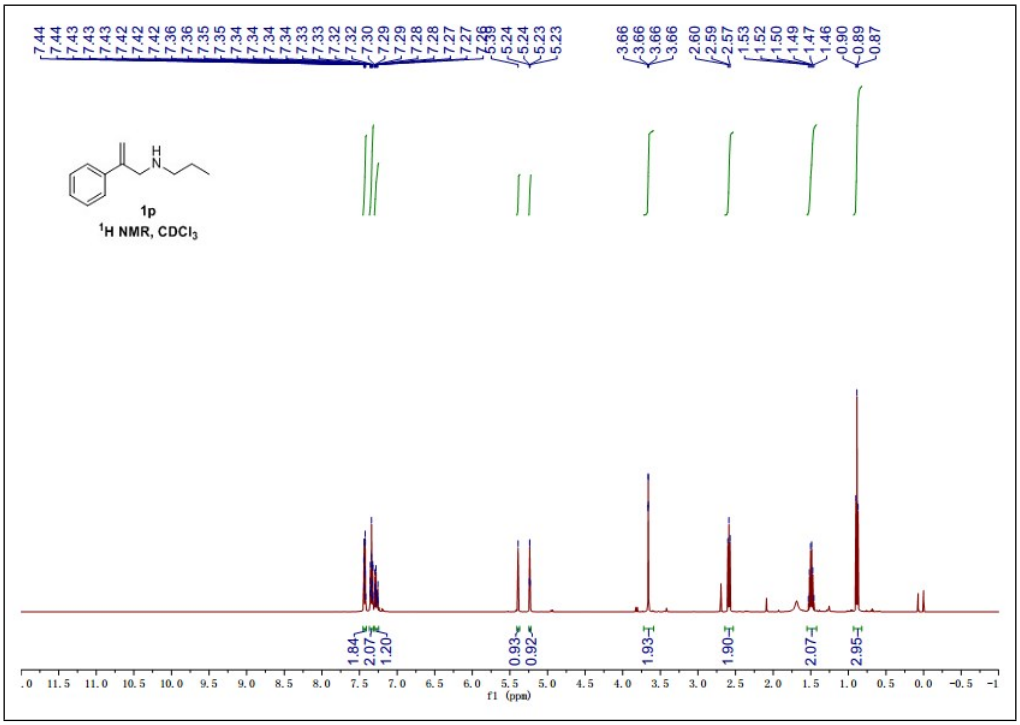
51.58
1o
13C NMR, CDCl3
f1 (ppm)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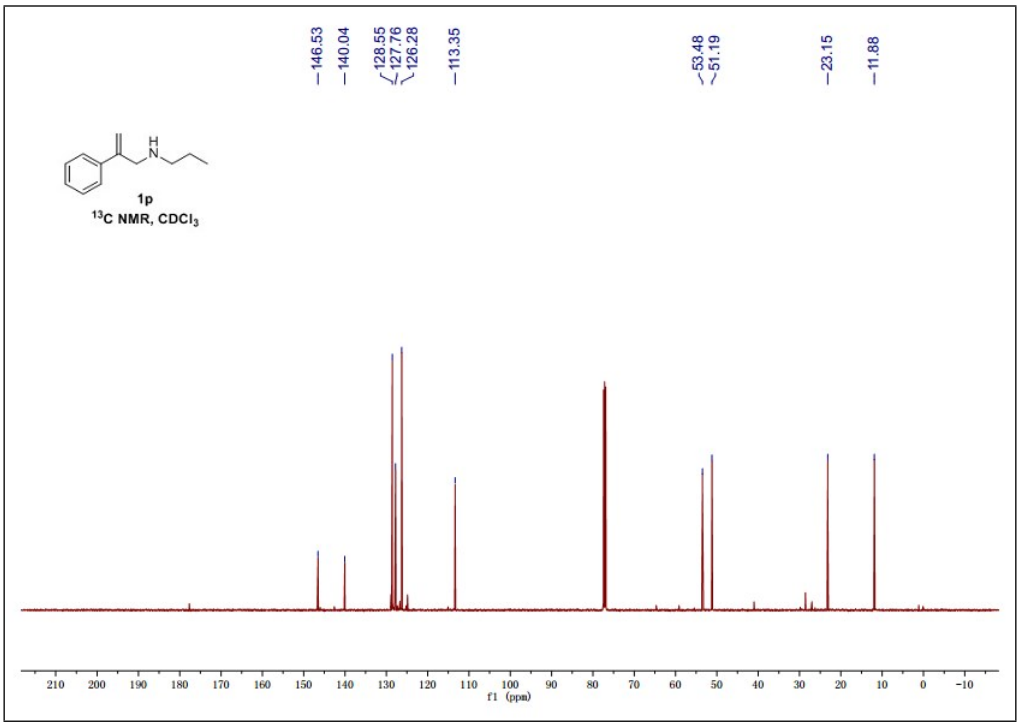
f1 (ppm)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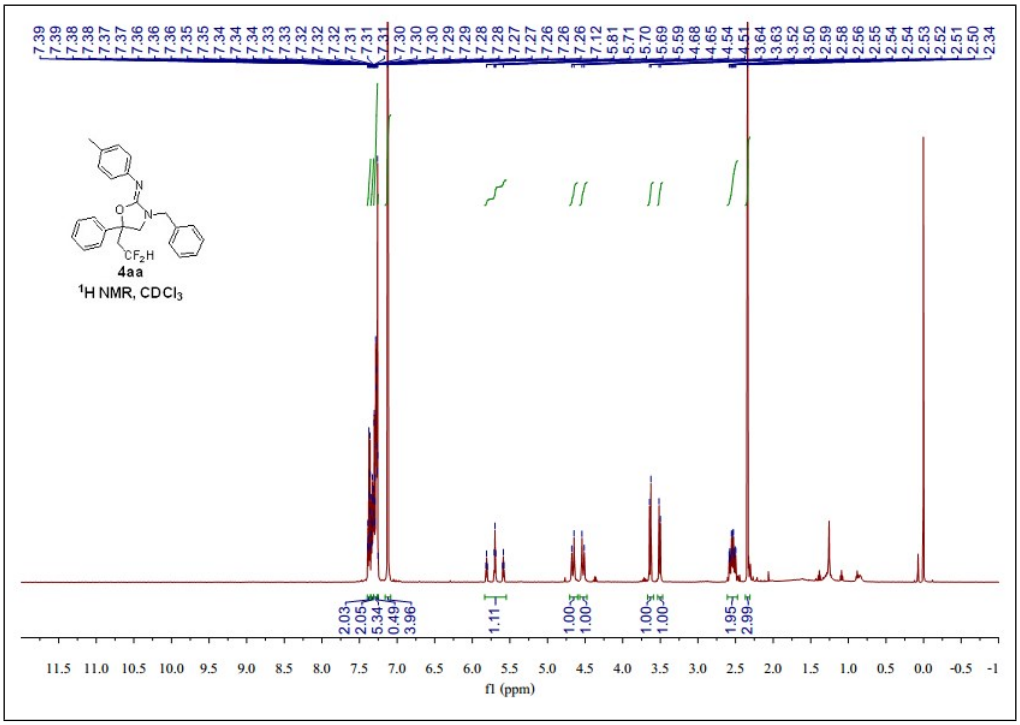
f1 (ppm)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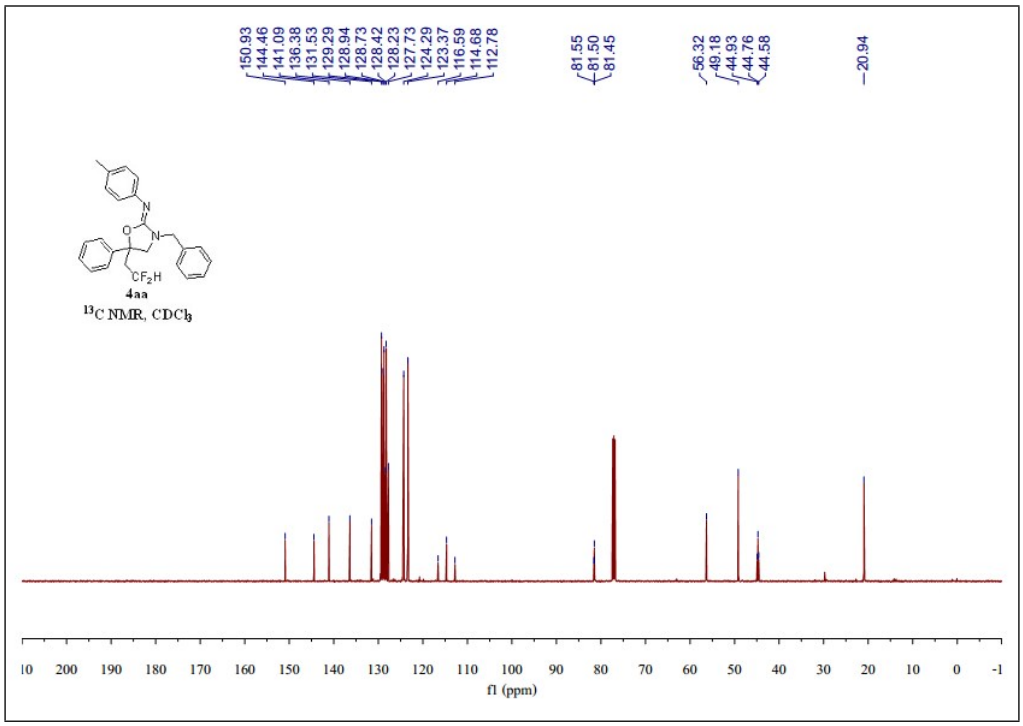
^{1}H NMR, CDCl$_3$
fl (ppm)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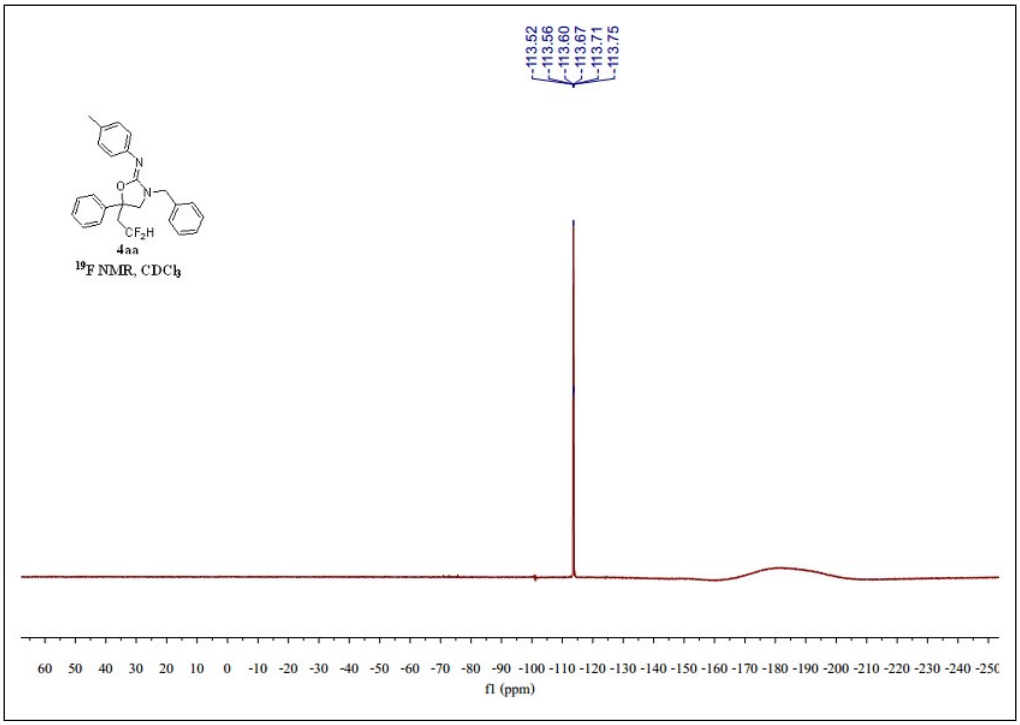
^{13}C NMR, CDCl$_3$
fl (ppm)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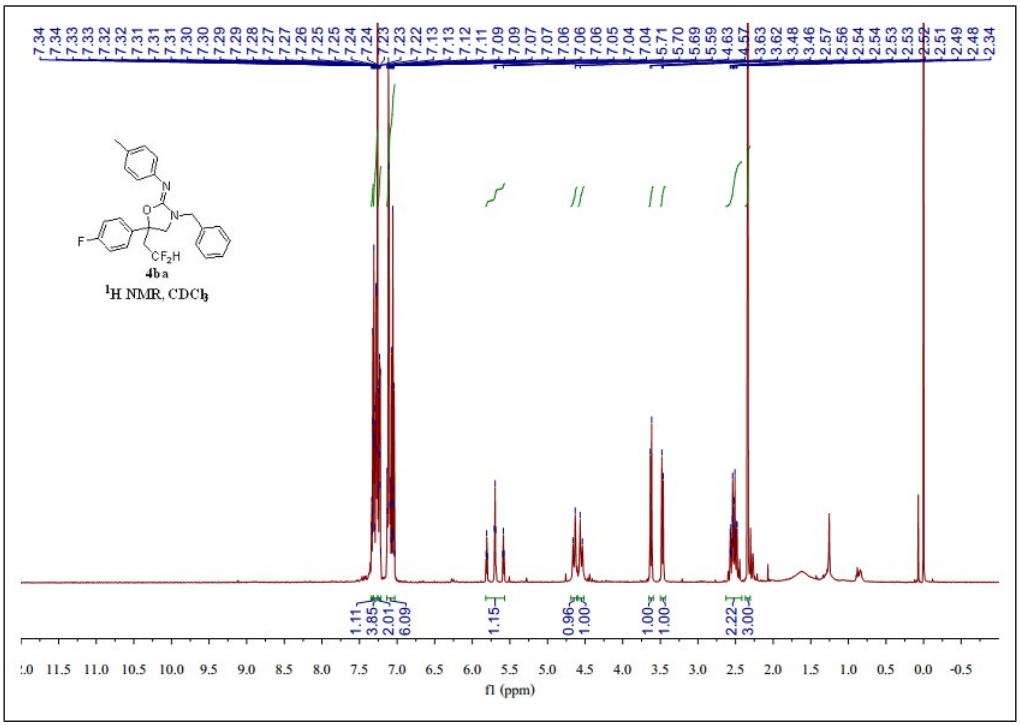
-113.60
-113.67
-113.71
-113.75
4aa
^{19}F NMR, $CDCl_3$
f1 (ppm)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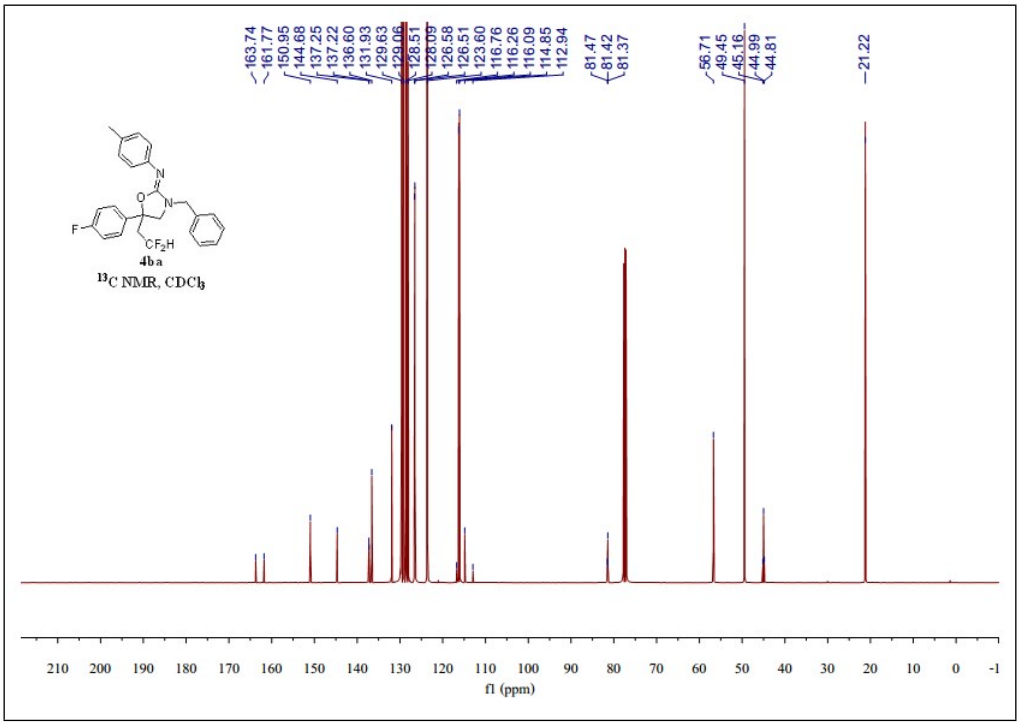
^{1}H NMR, $CDCl_3$
f1 (ppm)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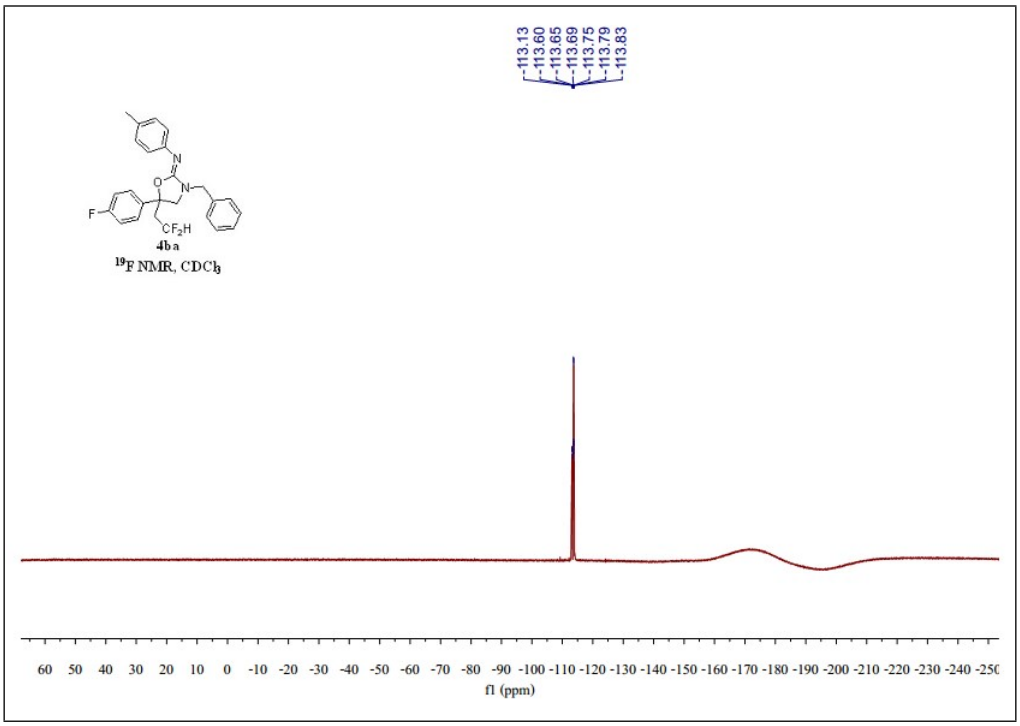
114.85
112.94
81.47
81.42
81.37
56.71
49.45
45.16
44.99
44.81
21.22
F
CF2H
4ba
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)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113.83
F
CF2H
4ba
19F NMR, CDCl3
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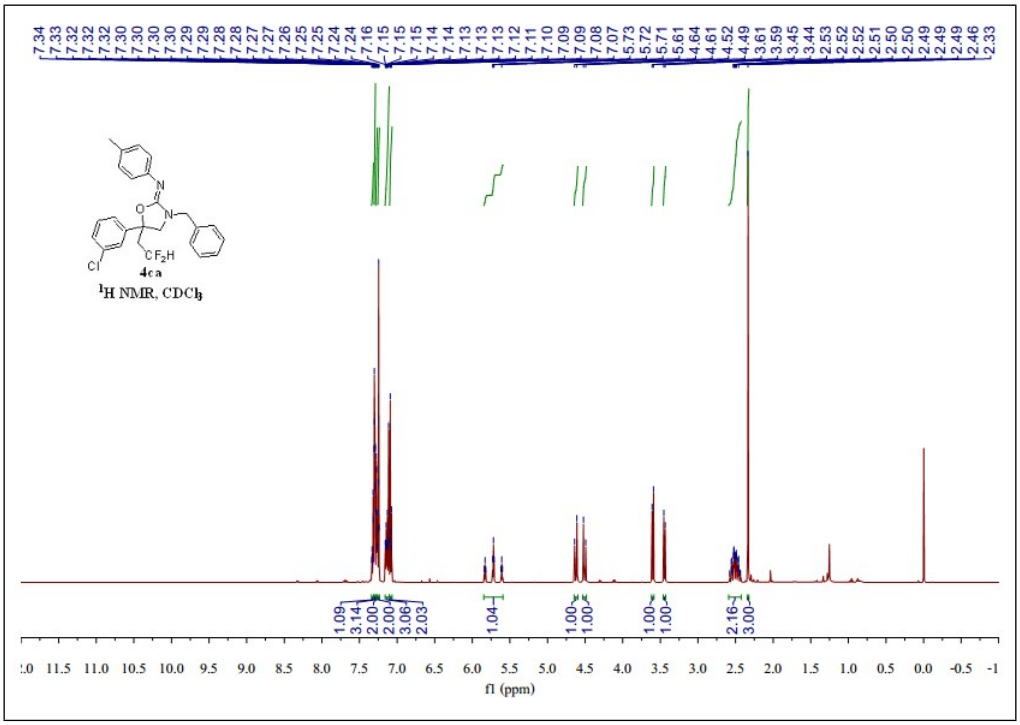
f1 (ppm)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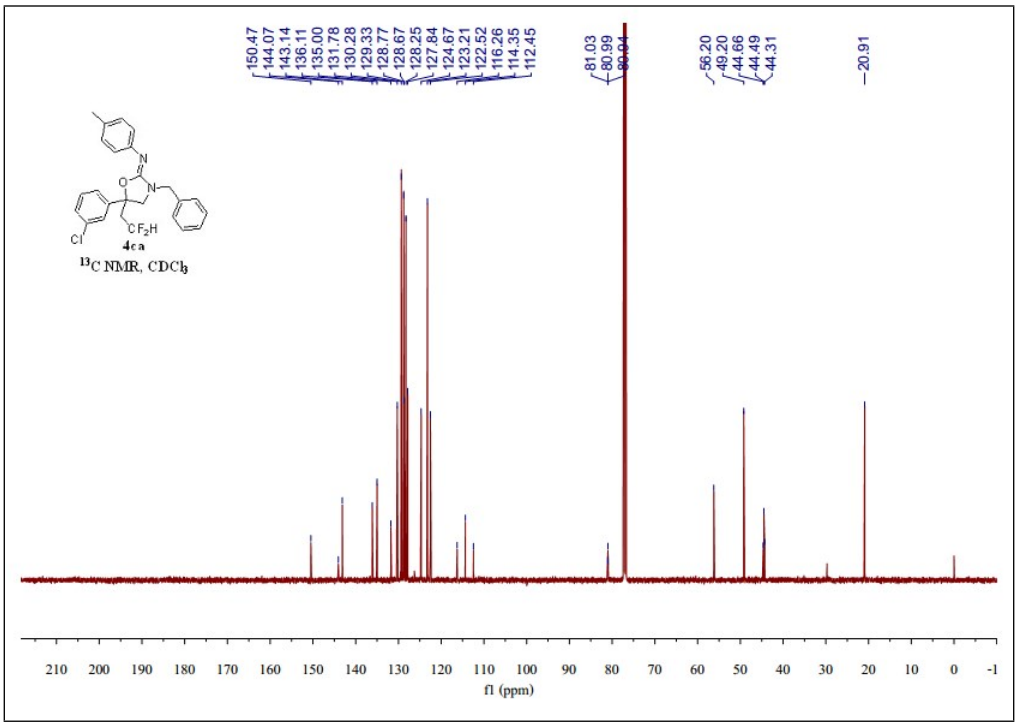
^{1}H NMR, CDCl$_3$
fl (ppm)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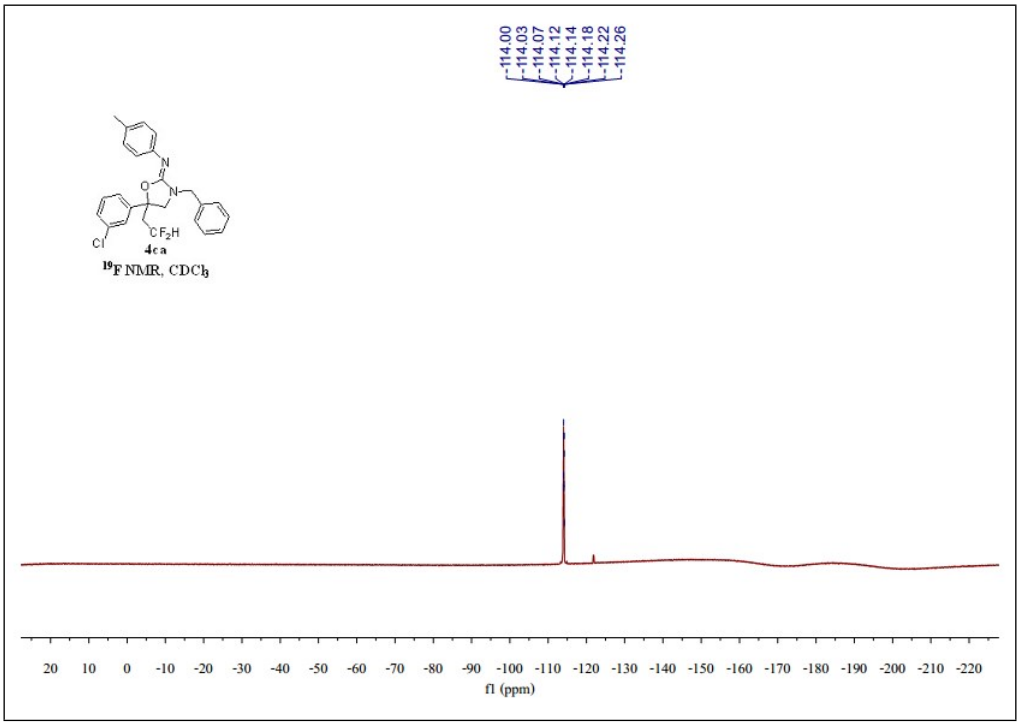
^{13}C NMR, CDCl$_3$
fl (ppm)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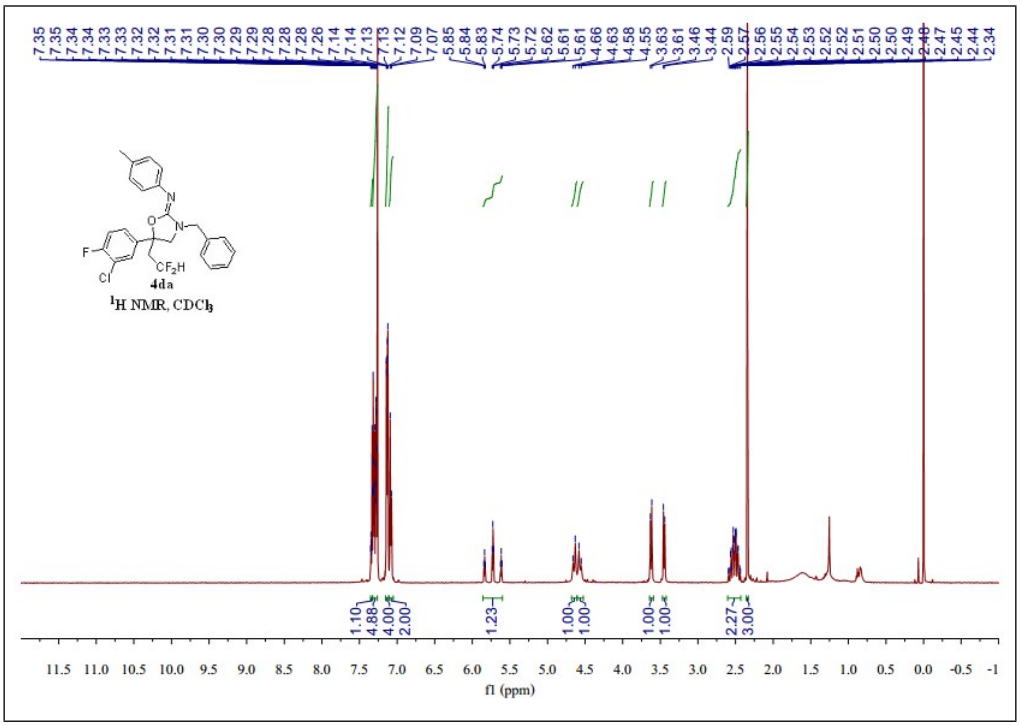
-114.07
-114.12
-114.14
-114.18
-114.22
-114.26
4ca
19F NMR, CDCl3
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)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2.00
1.23
1.00
1.00
1.00
1.00
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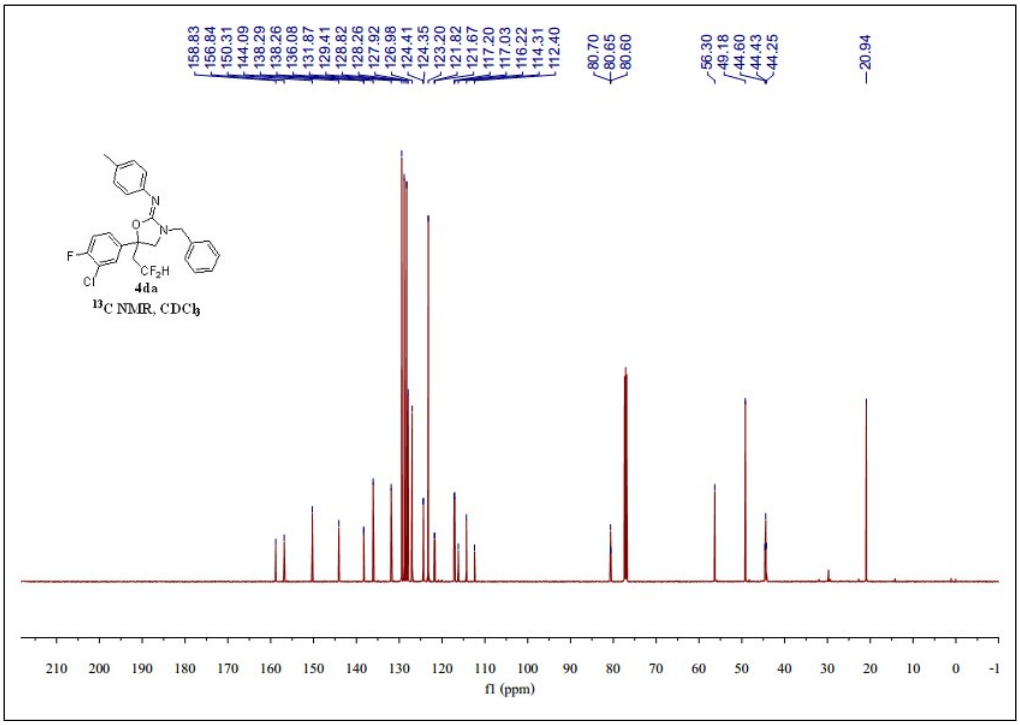
3.00
11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1
f1 (ppm)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80.60
56.30
49.18
44.60
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4da
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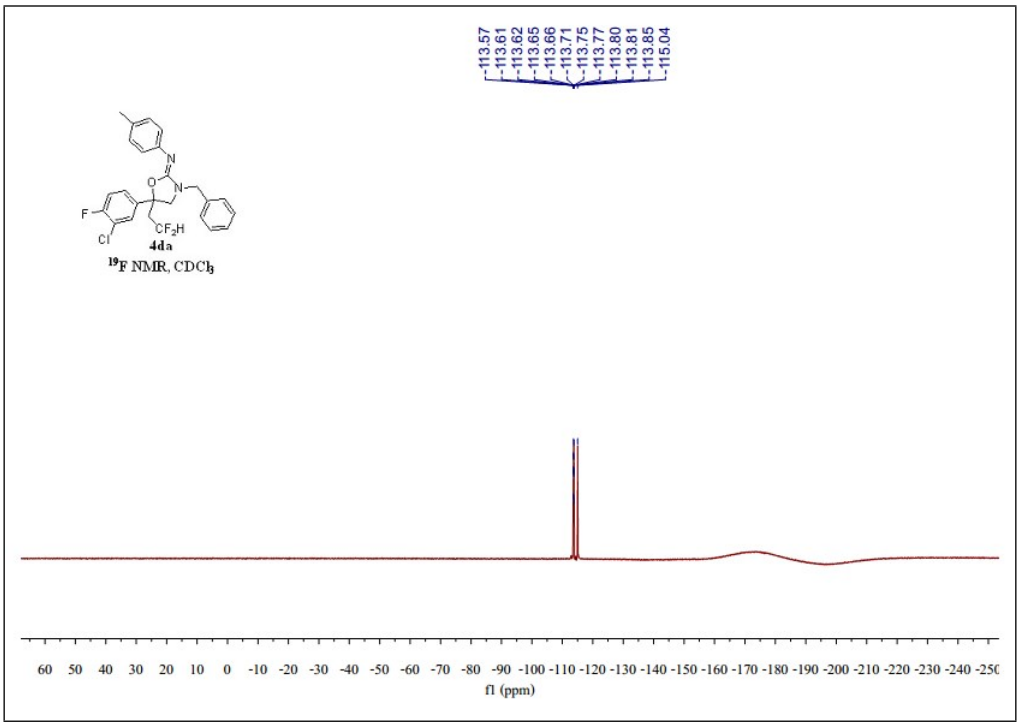
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -1
f1 (ppm)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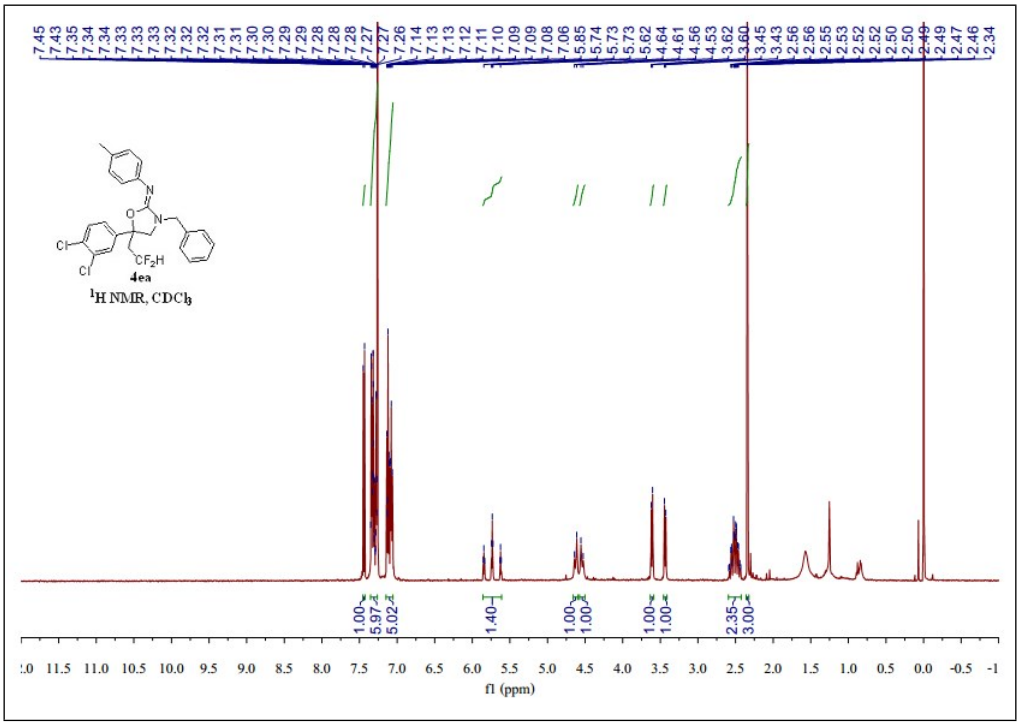
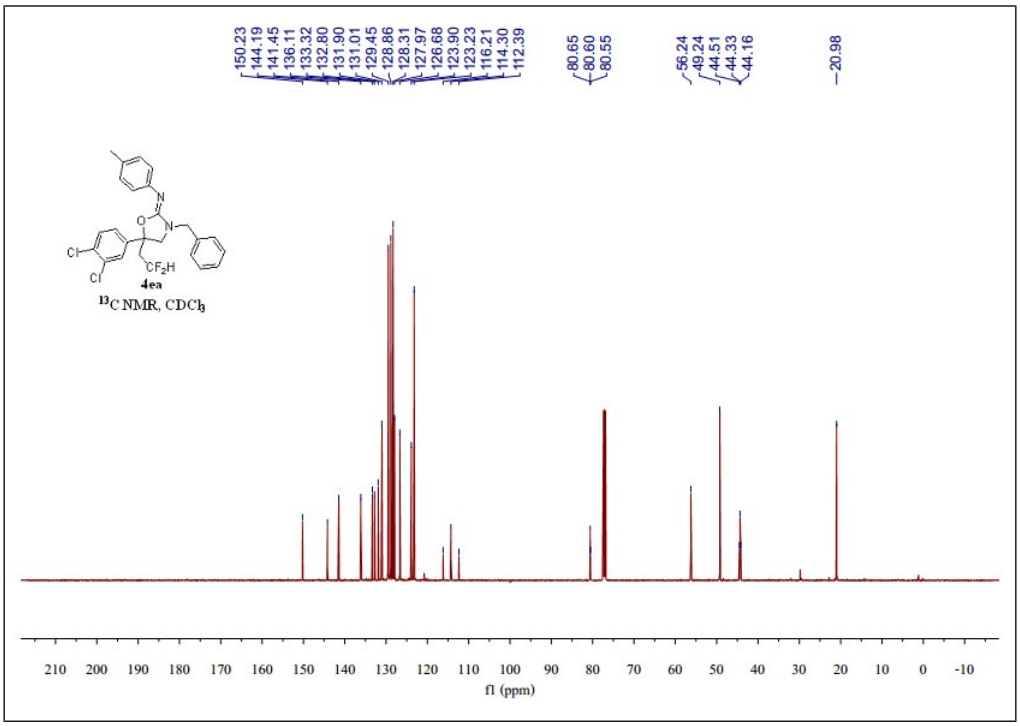
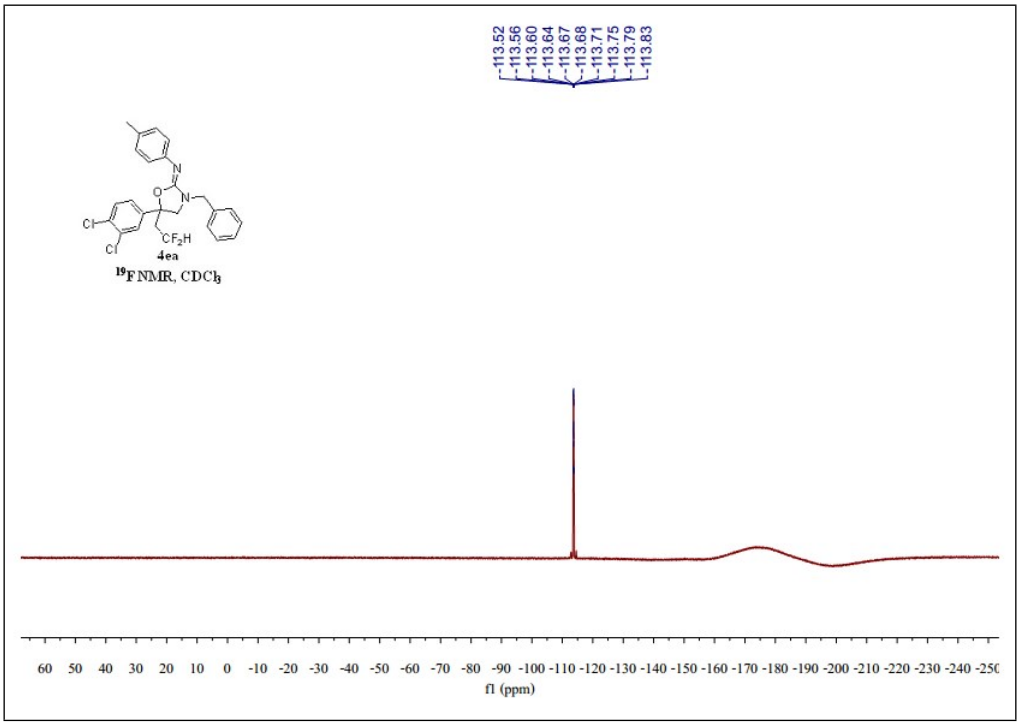
113.85
115.04
4da
19F NMR, CDCl3
60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250
f1 (ppm)


4ea
^{1}H NMR, CDCl$_3$
fl (ppm)


4ea
^{13}C NMR, CDCl$_3$
fl (ppm)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-113.60
-113.64
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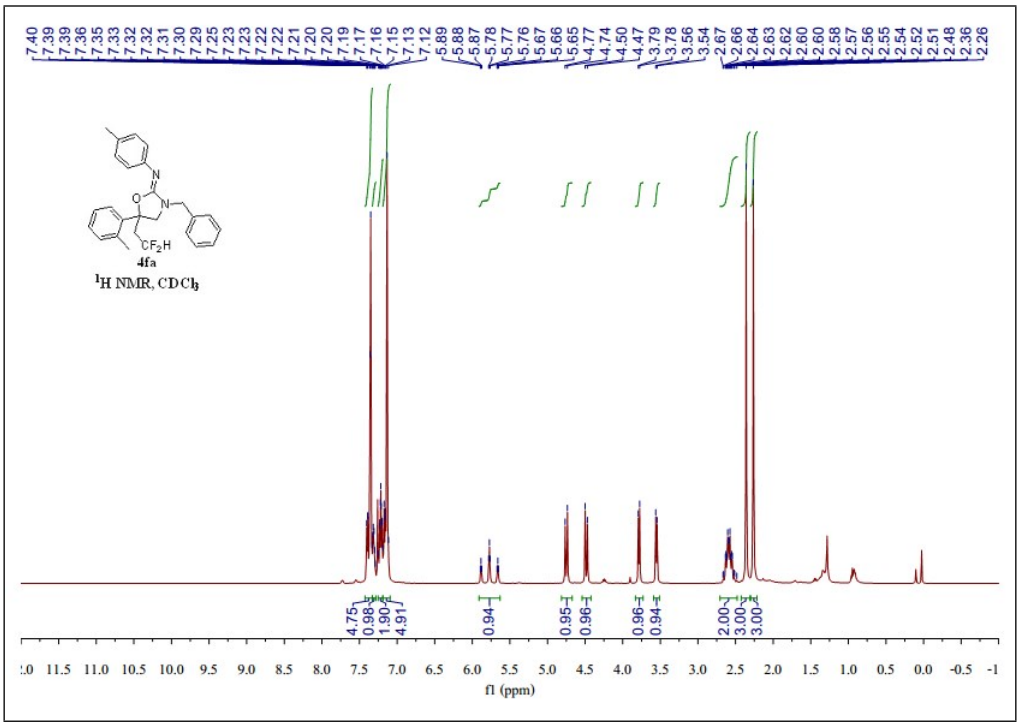
-113.68
-113.71
-113.75
-113.79
-113.83
4ea
19F NMR, CDCl3
60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250
f1 (ppm)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5.89 5.88 5.87 5.78 5.77 5.76 5.67 5.66 5.65 4.77 4.74 4.50 4.47 3.79 3.78 3.56 3.54
2.67 2.66 2.64 2.63 2.62 2.60 2.60 2.58 2.57 2.56 2.55 2.54 2.52 2.51 2.48 2.36 2.26
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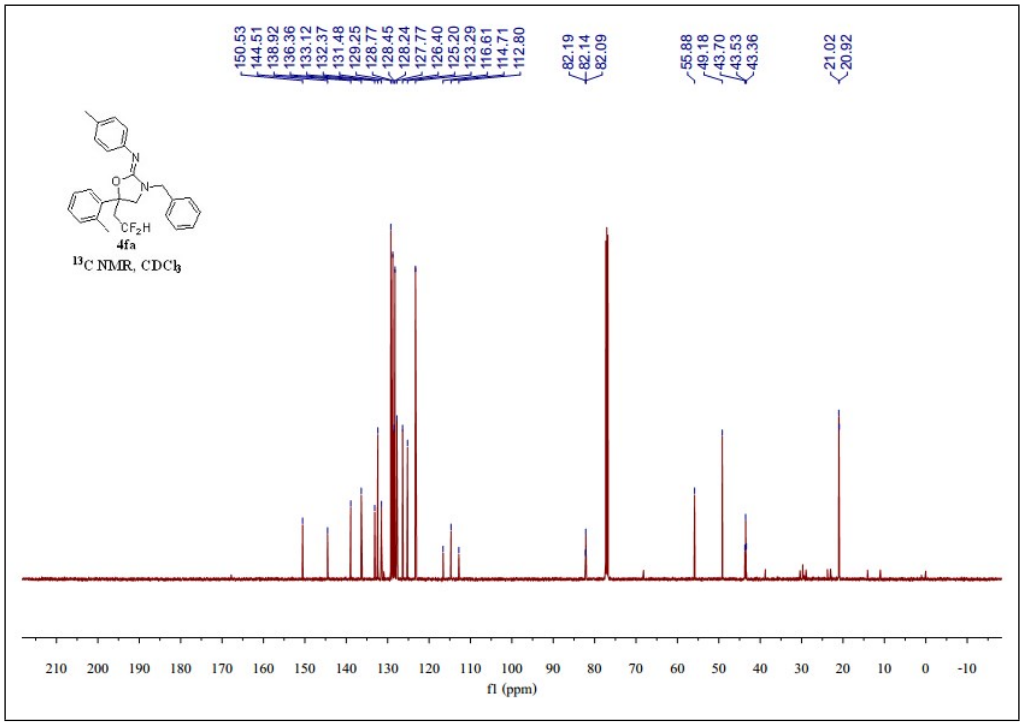
4.75 0.98 1.90 4.91 0.94 0.95 0.96 0.96 0.94 2.00 3.00 3.00
f1 (ppm)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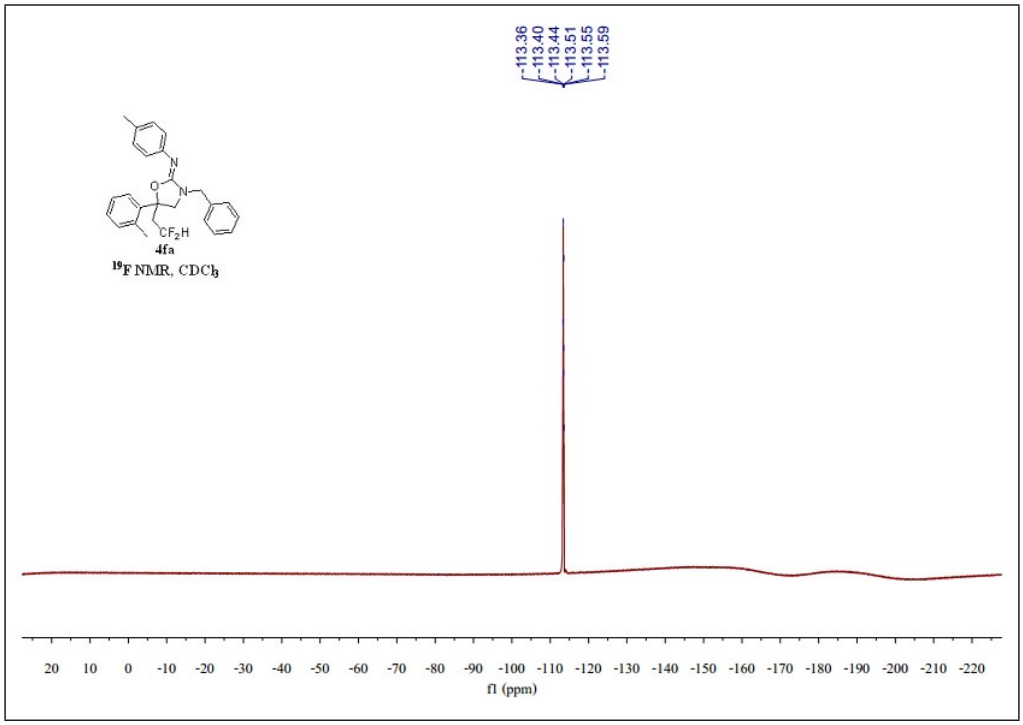
123.29
116.61
114.71
112.80
82.19
82.14
82.09
55.88
49.18
43.70
43.53
43.36
21.02
20.92
4fa
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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4fa
19F NMR, CDCl3
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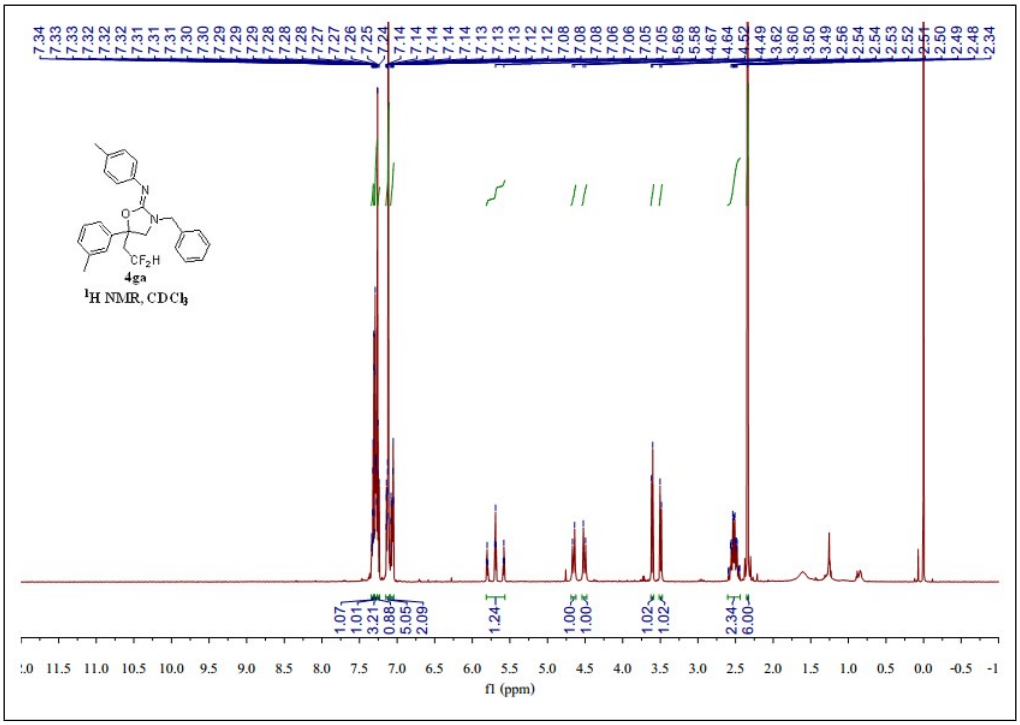
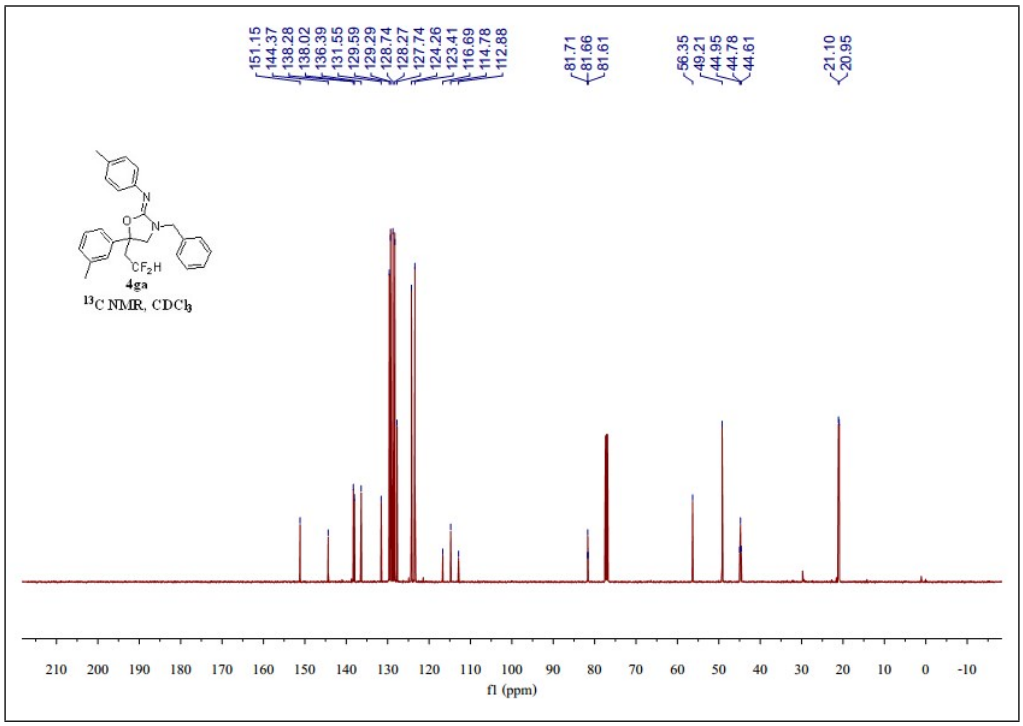
f1 (ppm)


4ga
^{1}H NMR, CDCl$_3$
fl (ppm)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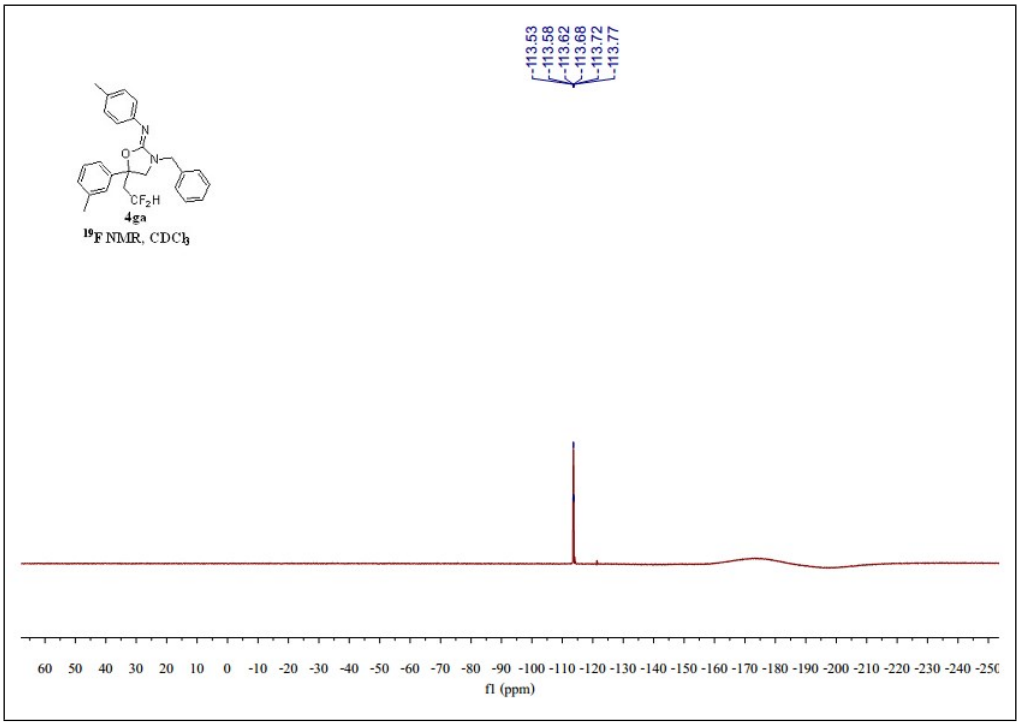
^{13}C NMR, CDCl$_3$
fl (ppm)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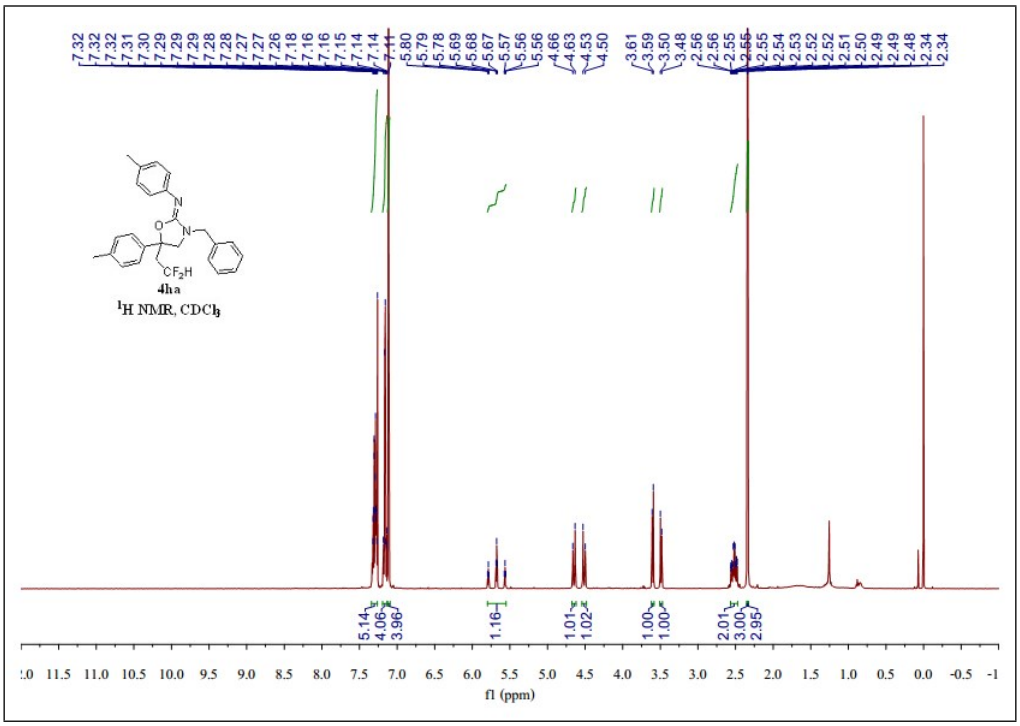
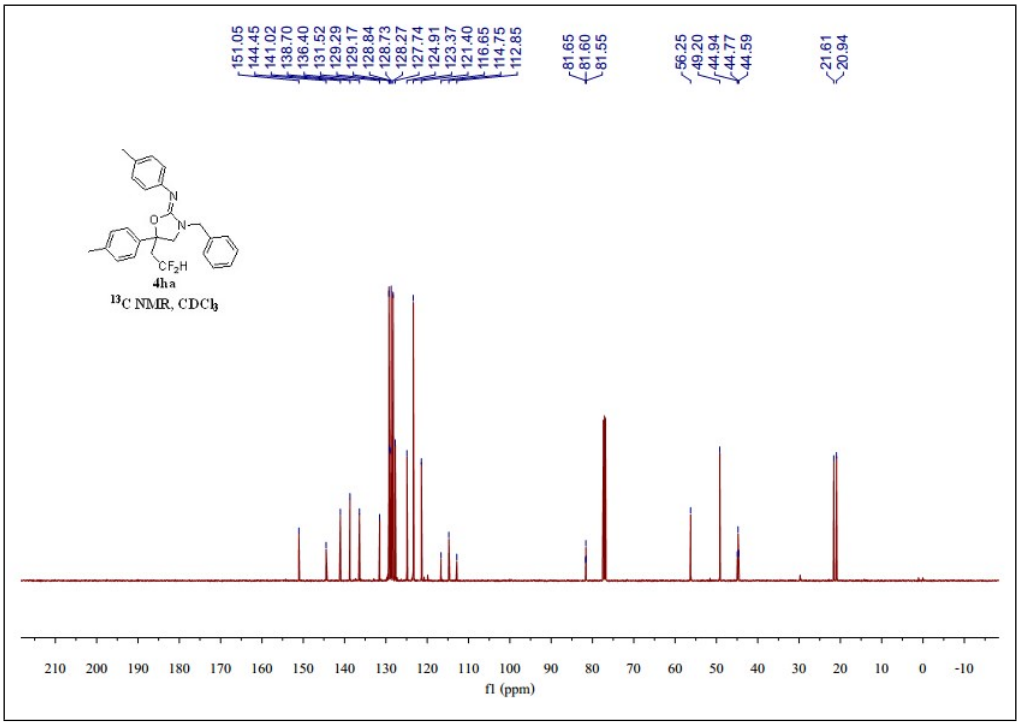
-113.77
4ga
^{19}F NMR, CDCl$_3$
f1 (ppm)


4ha
^{1}H NMR, CDCl$_3$
f1 (ppm)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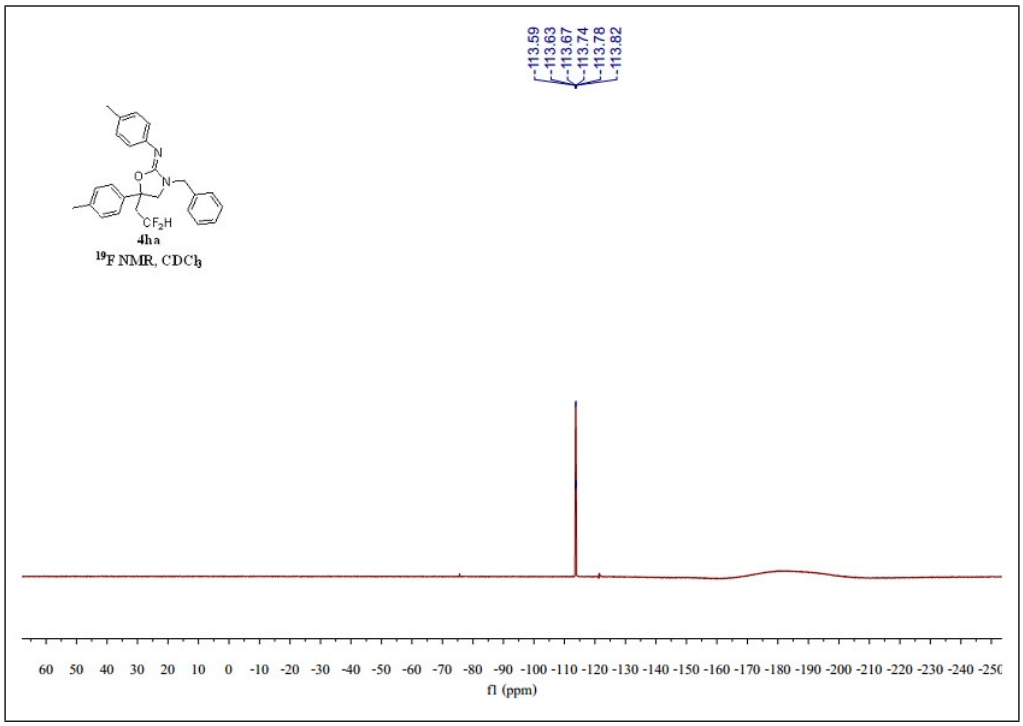
121.40
116.65
114.75
112.85
81.65
81.60
81.55
56.25
49.20
44.94
44.77
44.59
21.61
20.94
CF2H
4ha
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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113.67
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113.82
CF2H
4ha
19F NMR, CDCl3
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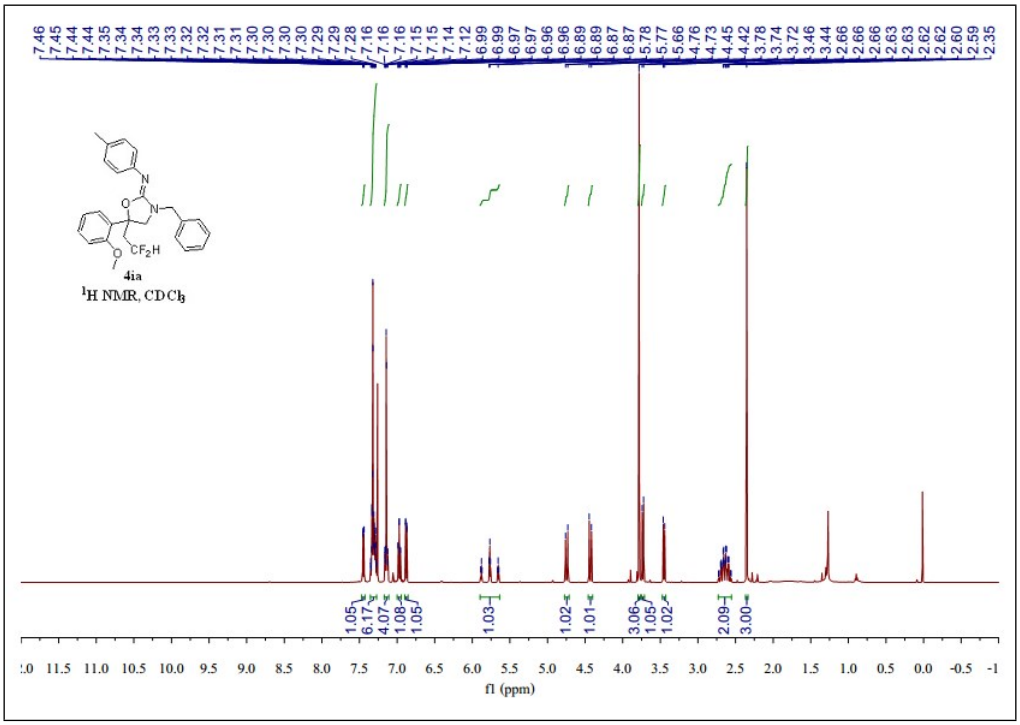
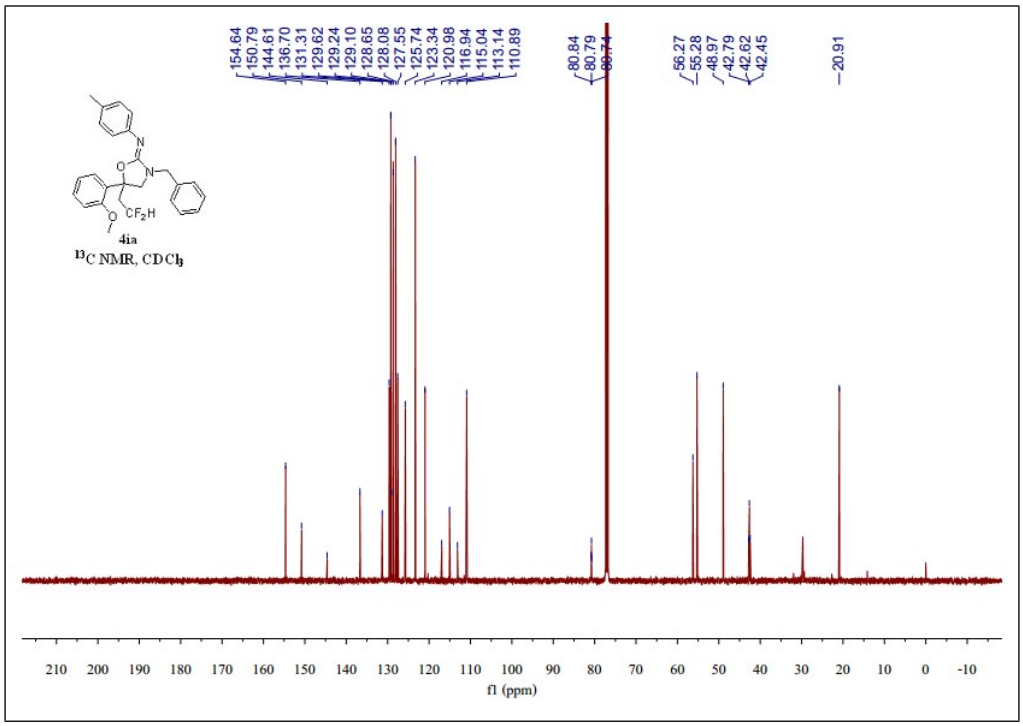
f1 (ppm)


4ia
^{1}H NMR, CDCl$_3$
fl (ppm)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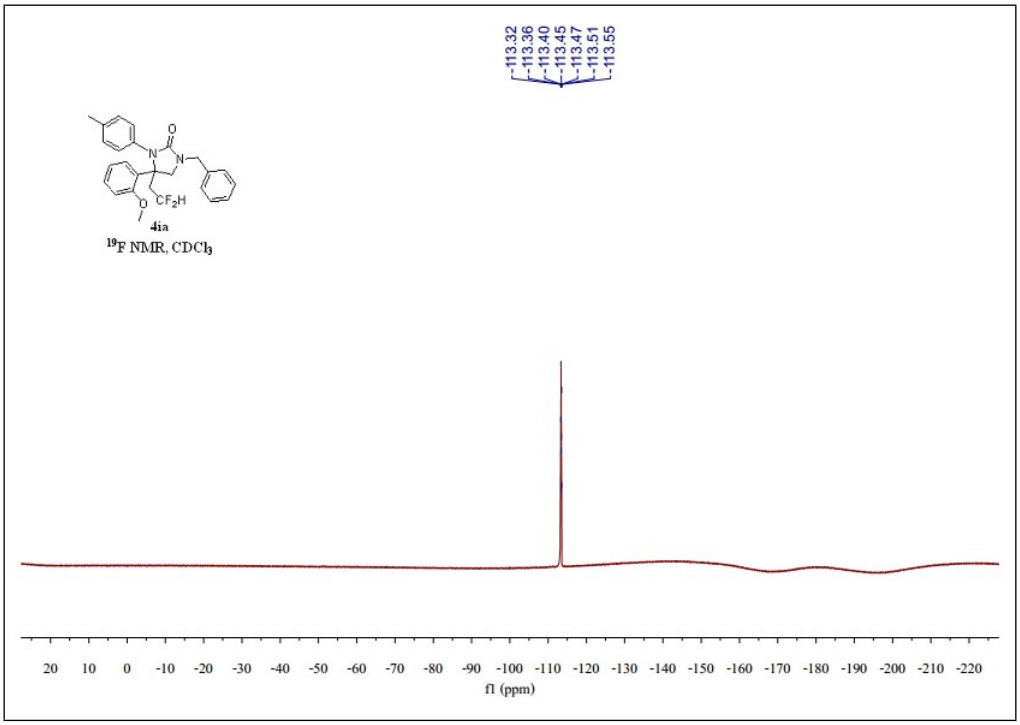
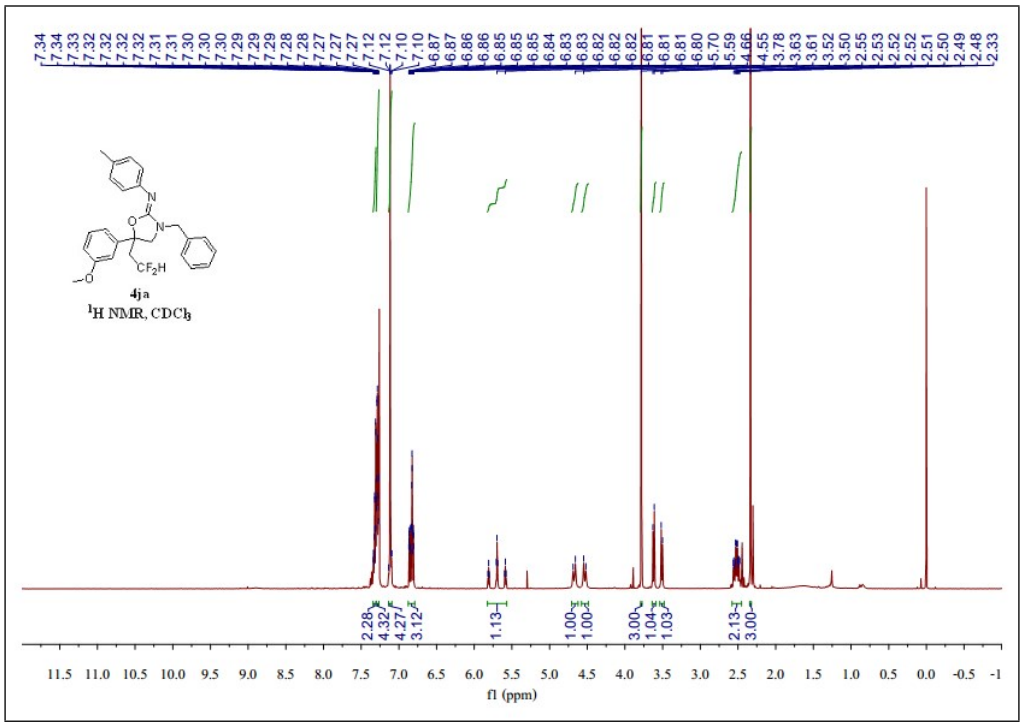
^{13}C NMR, CDCl$_3$
fl (ppm)


-113.32
-113.36
-113.40
-113.45
-113.47
-113.51
-113.55
4ia
^{19}F NMR, $CDCl_3$
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)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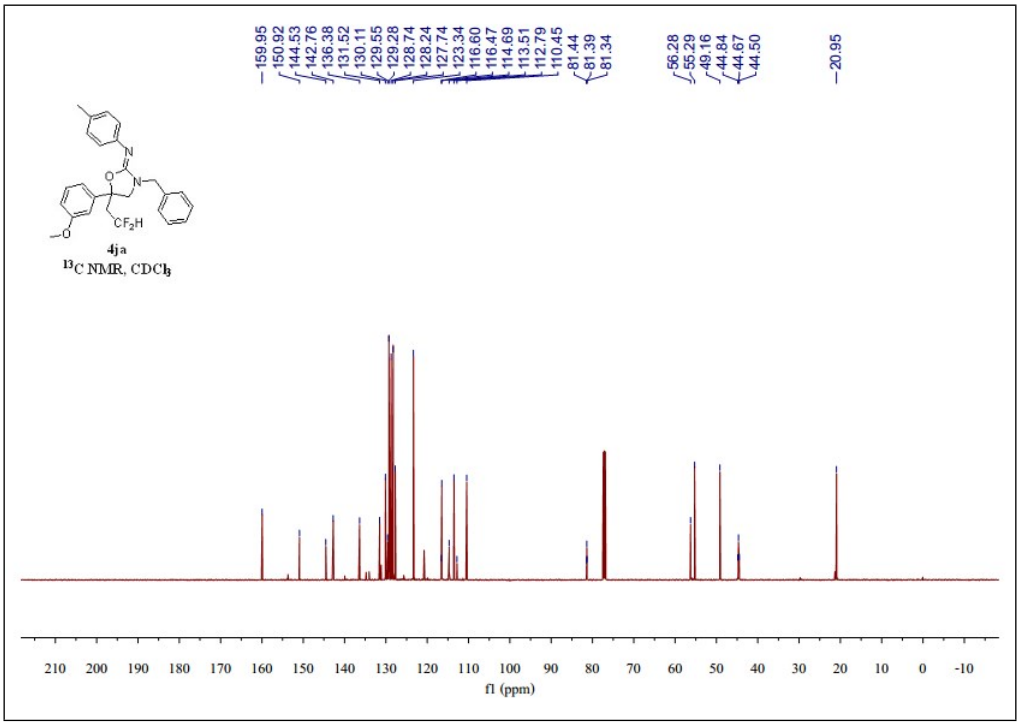
4ja
^{1}H NMR, $CDCl_3$
2.28 4.32 4.27 3.12 1.13 1.00 1.00 3.00 1.04 1.03 2.13 3.00
11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1
f1 (ppm)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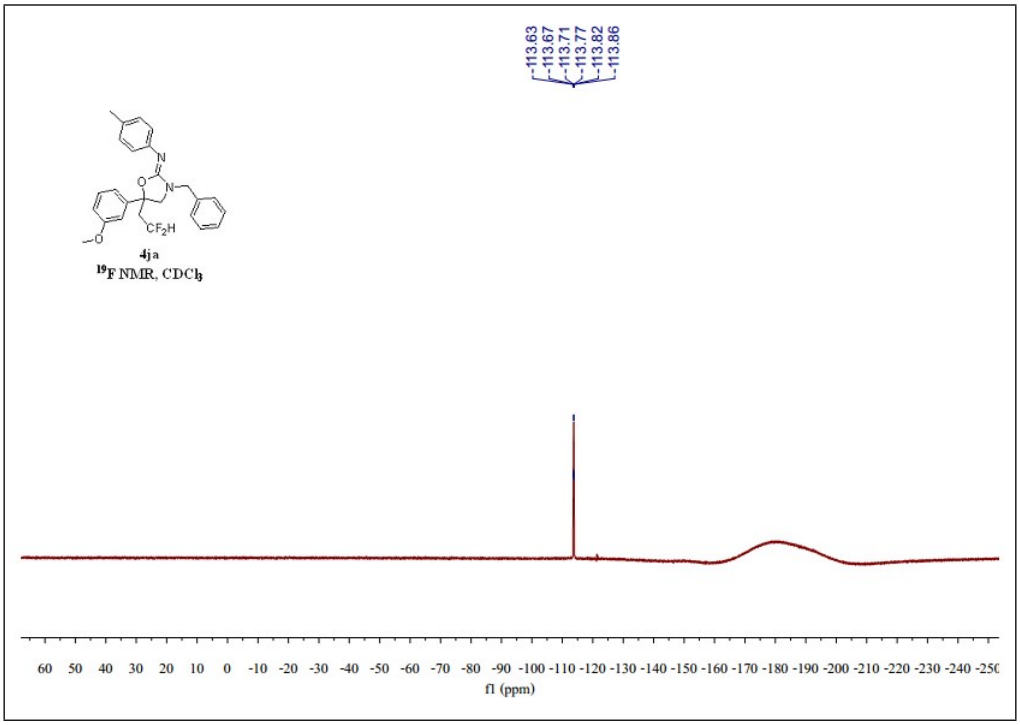
116.47
114.69
113.51
112.79
110.45
81.44
81.39
81.34
56.28
55.29
49.16
44.84
44.67
44.50
20.95
CF2H
4ja
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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113.82
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CF2H
4ja
19F NMR, CDCl3
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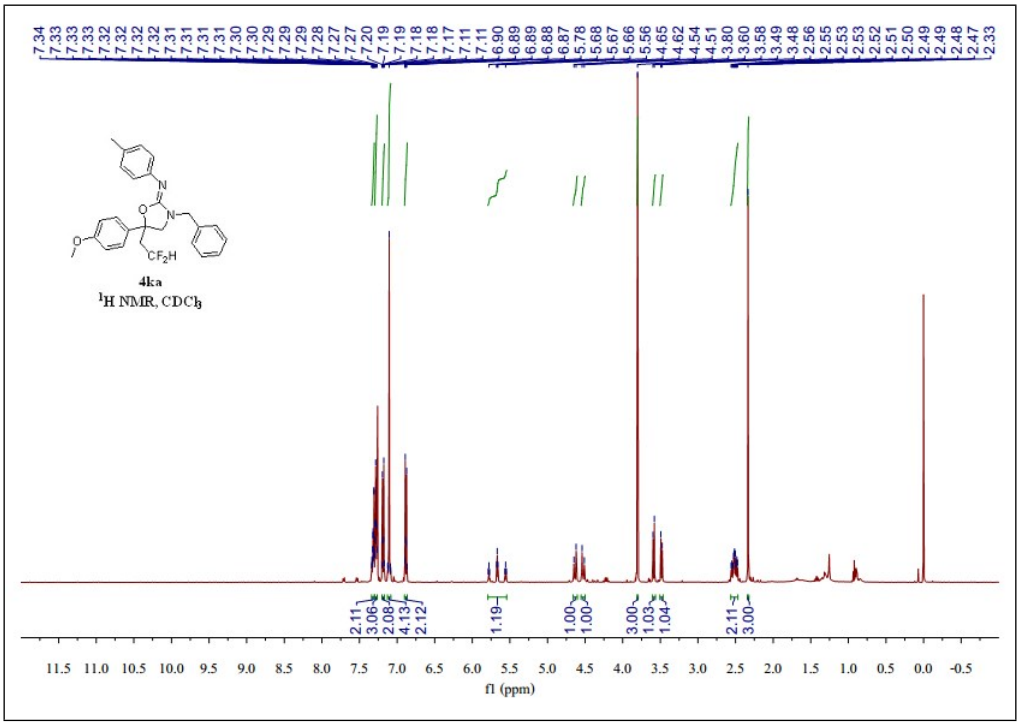
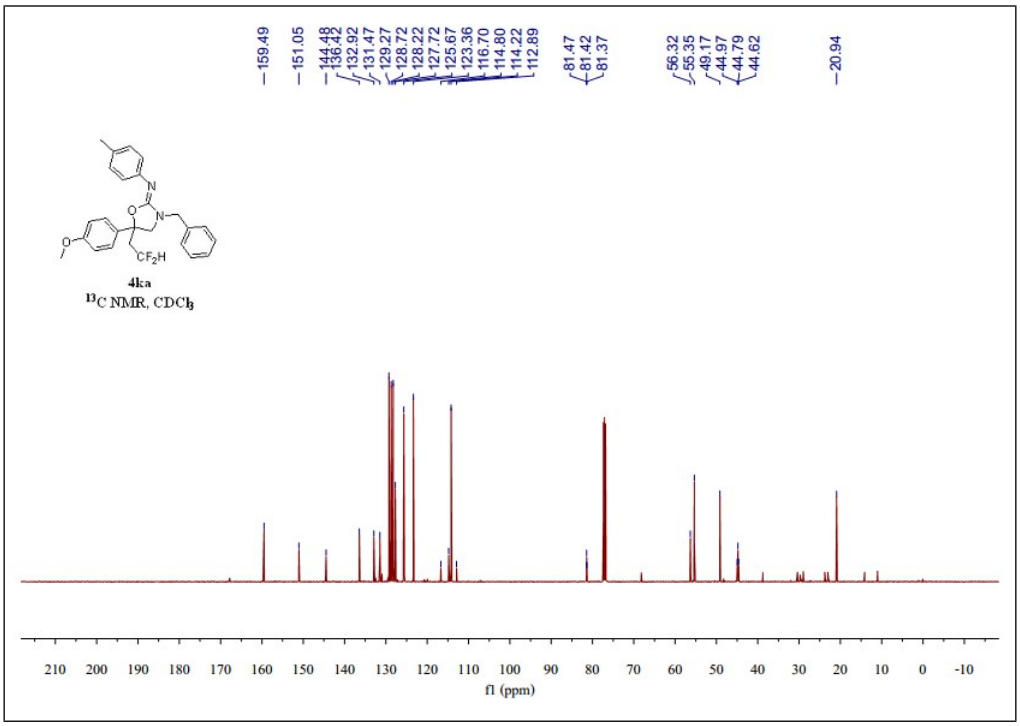
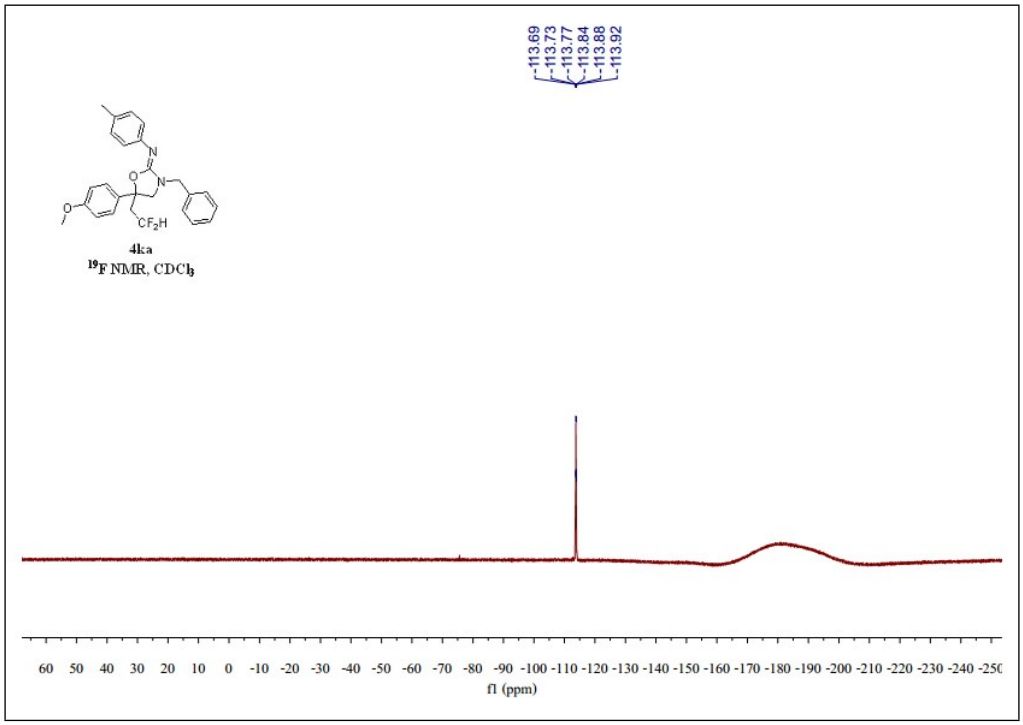
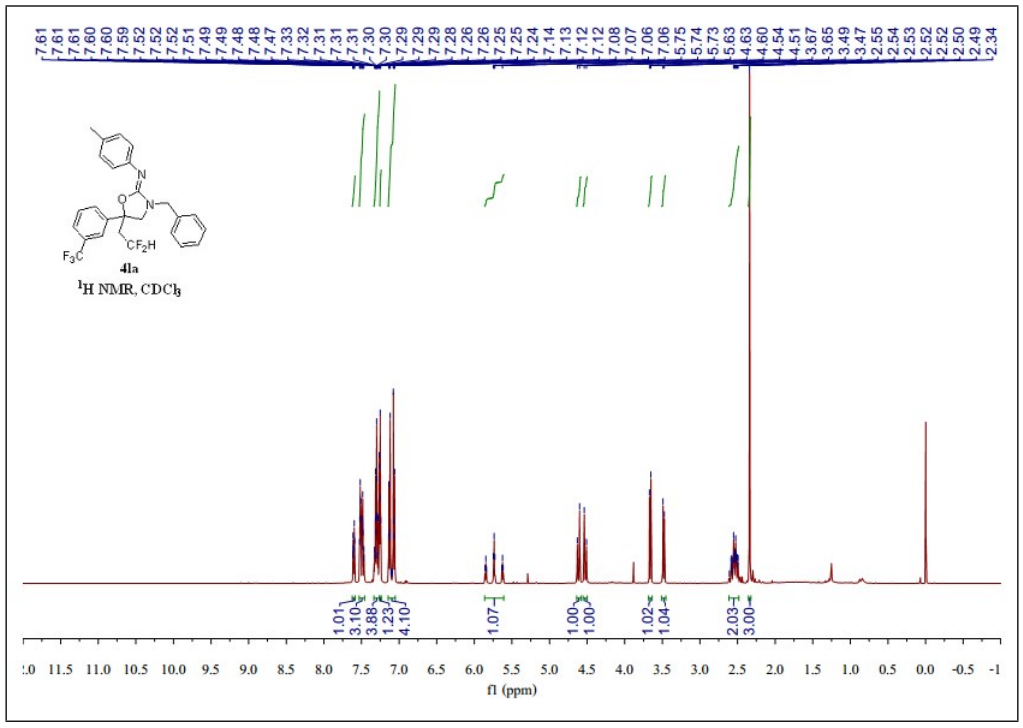
f1 (ppm)


4ka
^{1}H NMR, CDCl$_3$
fl (ppm)


4ka
^{13}C NMR, CDCl$_3$
fl (ppm)



4ka
^{19}F NMR, $CDCl_3$



4la
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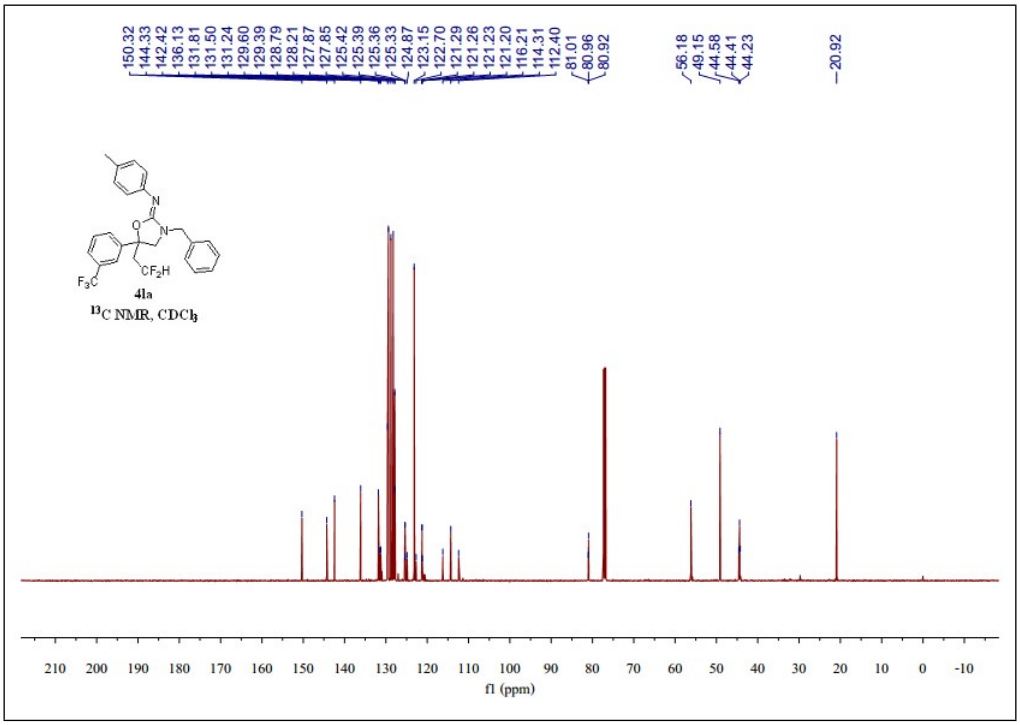
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125.39
125.36
125.33
124.87
123.15
122.70
121.29
121.26
121.23
121.20
116.21
114.31
112.40
81.01
80.96
80.92
56.18
49.15
44.58
44.41
44.23
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41a
13C NMR, CDCl3
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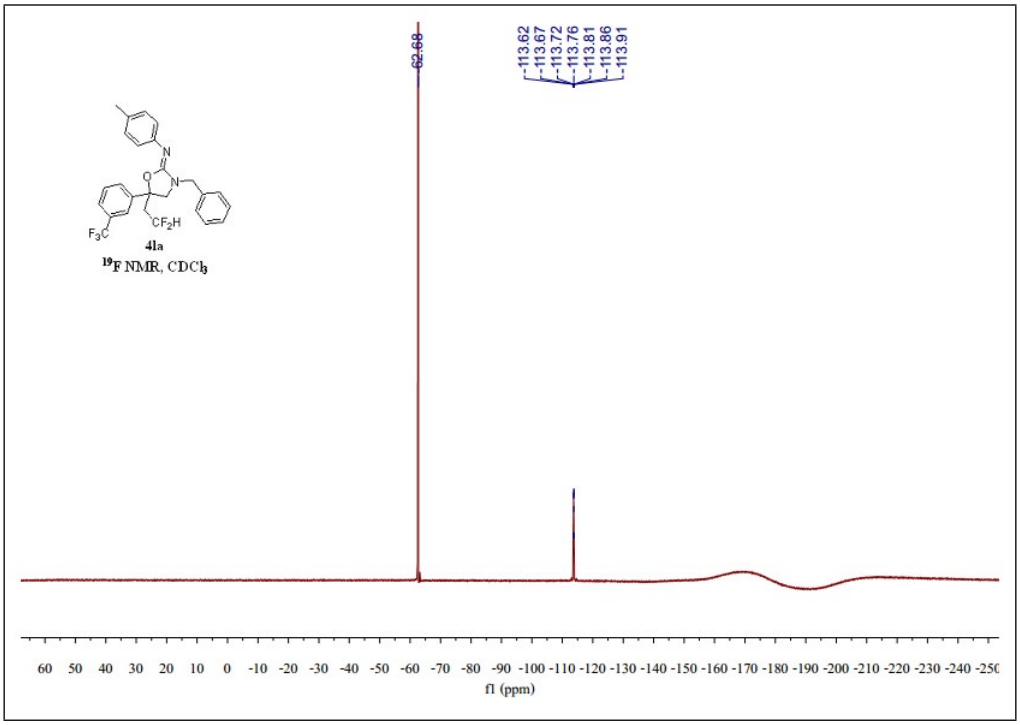
f1 (ppm)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-113.76
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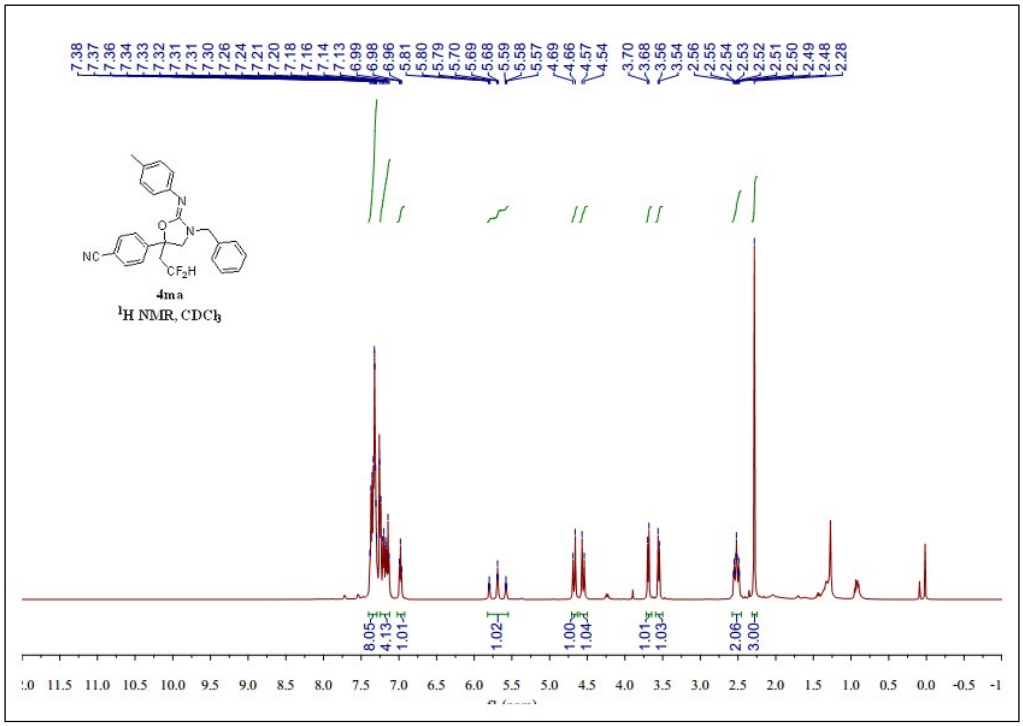
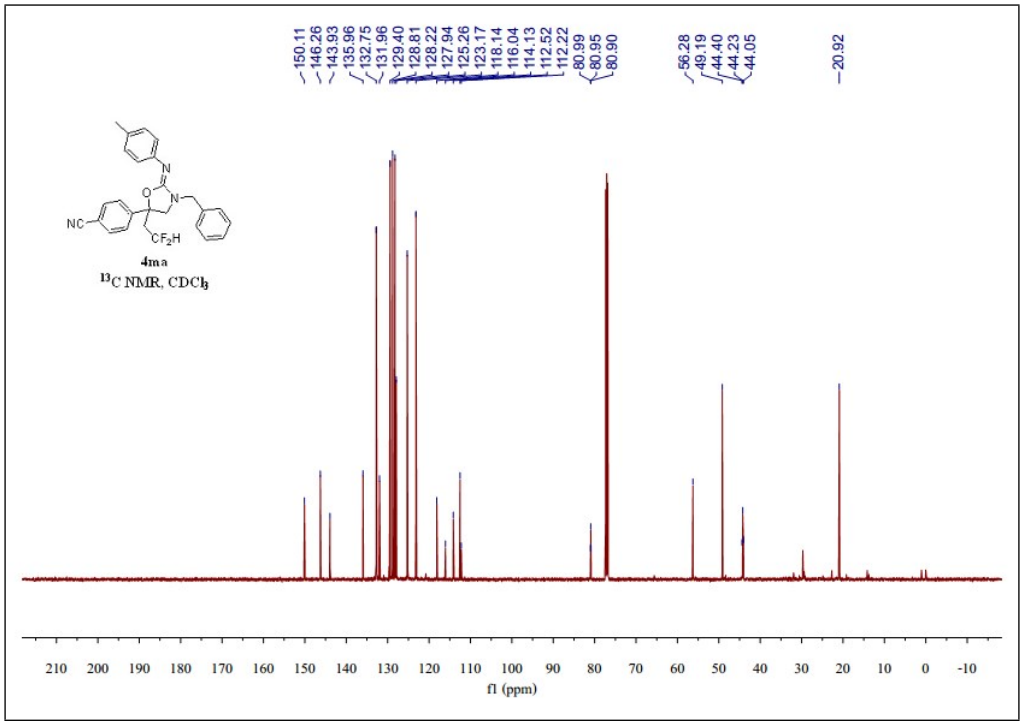
-113.86
-113.91
41a
19F NMR, CDCl3
60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250
f1 (ppm)



4ma

^{1}H NMR, $CDCl_3$



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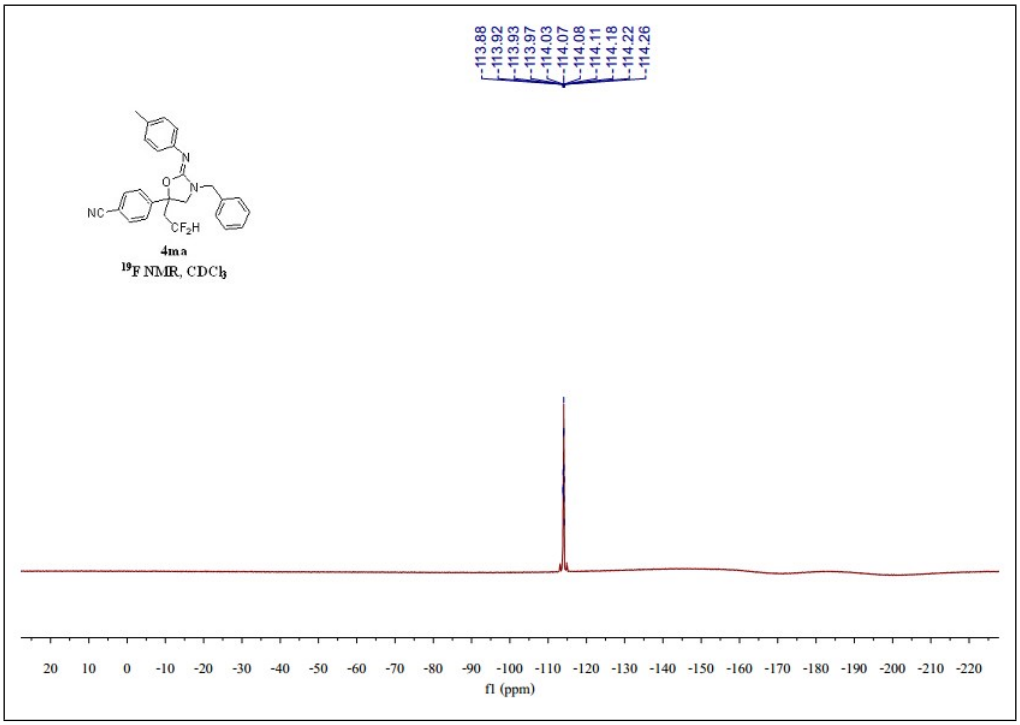
^{13}C NMR, $CDCl_3$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NC
CF2H
4na
19F NMR, CDCl3
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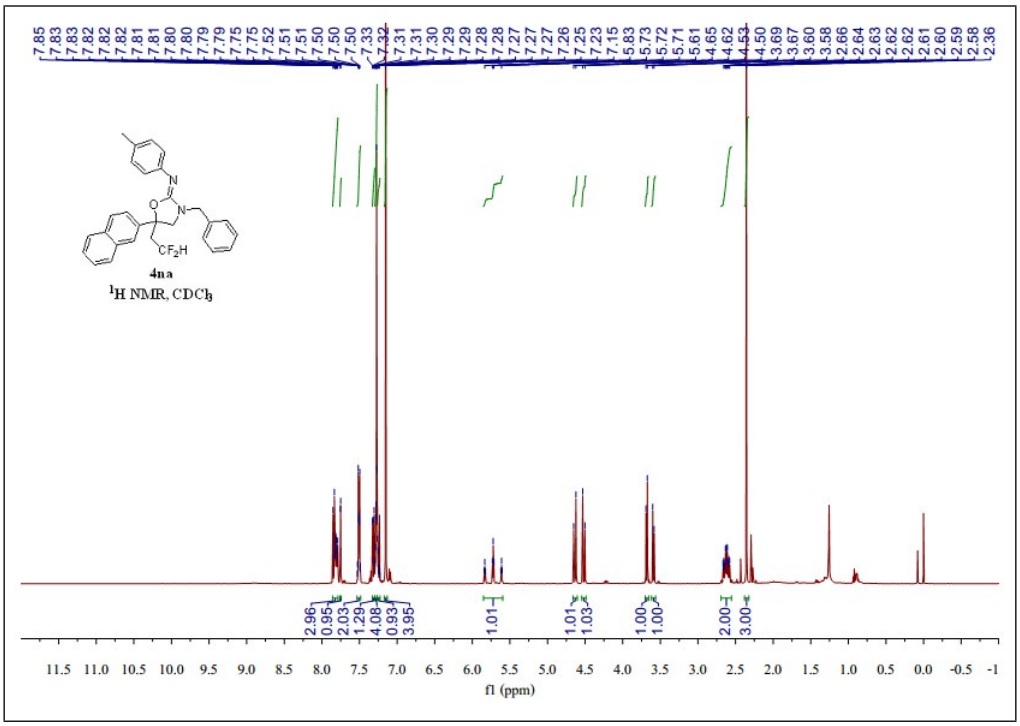
f1 (ppm)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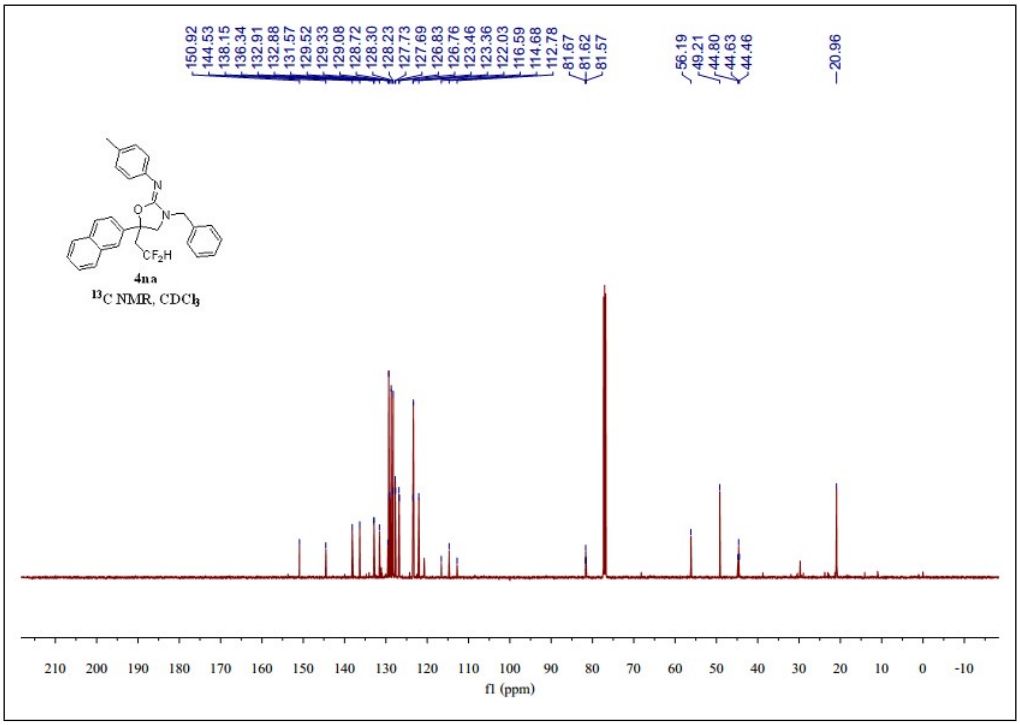
CF2H
4na
1H NMR, CDCl3
2.96 0.95 2.03 1.29 4.08 0.93 3.95 1.01 1.01 1.03 1.00 1.00 2.00 3.00
11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1
f1 (ppm)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114.68
112.78
81.67
81.62
81.57
56.19
49.21
44.80
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44.46
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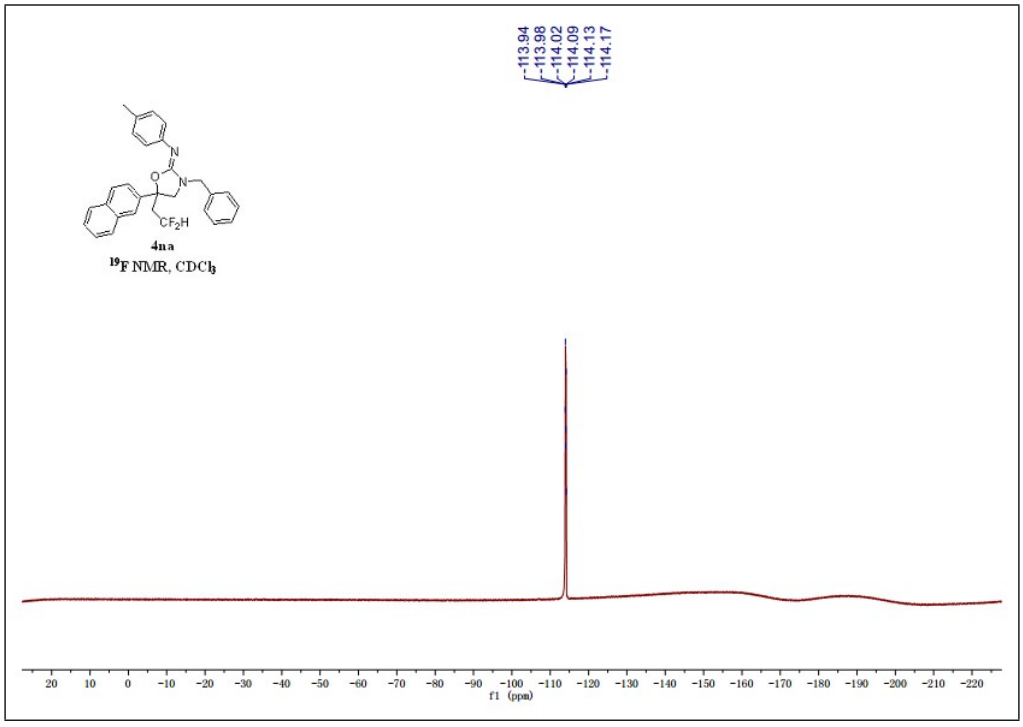
4na
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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19F NMR, CDCl3
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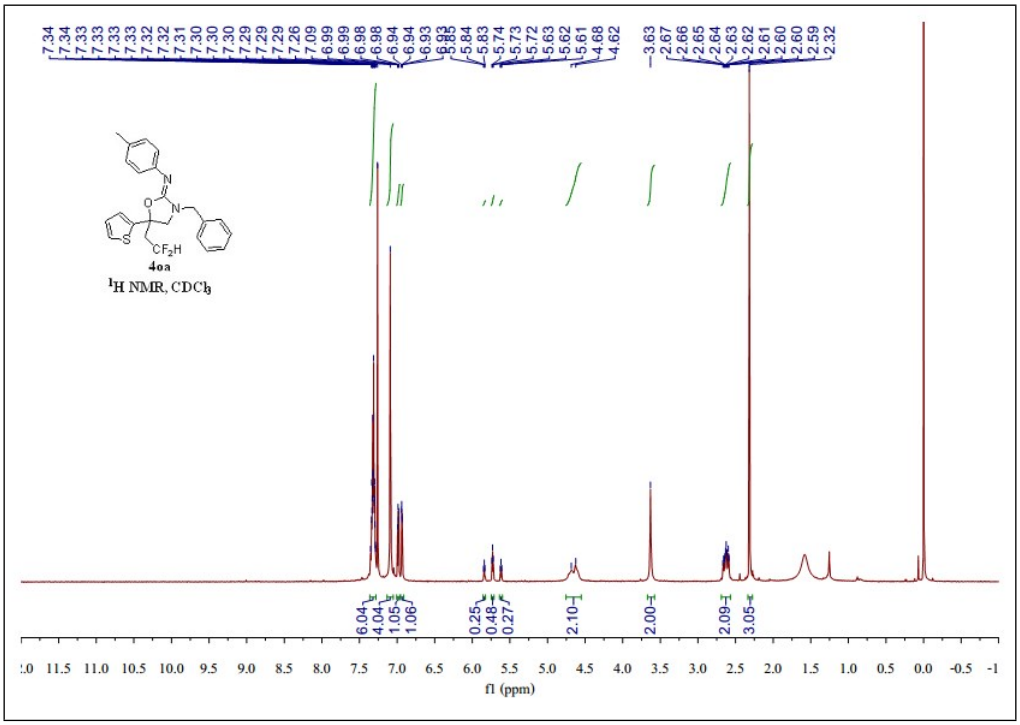
f1 (ppm)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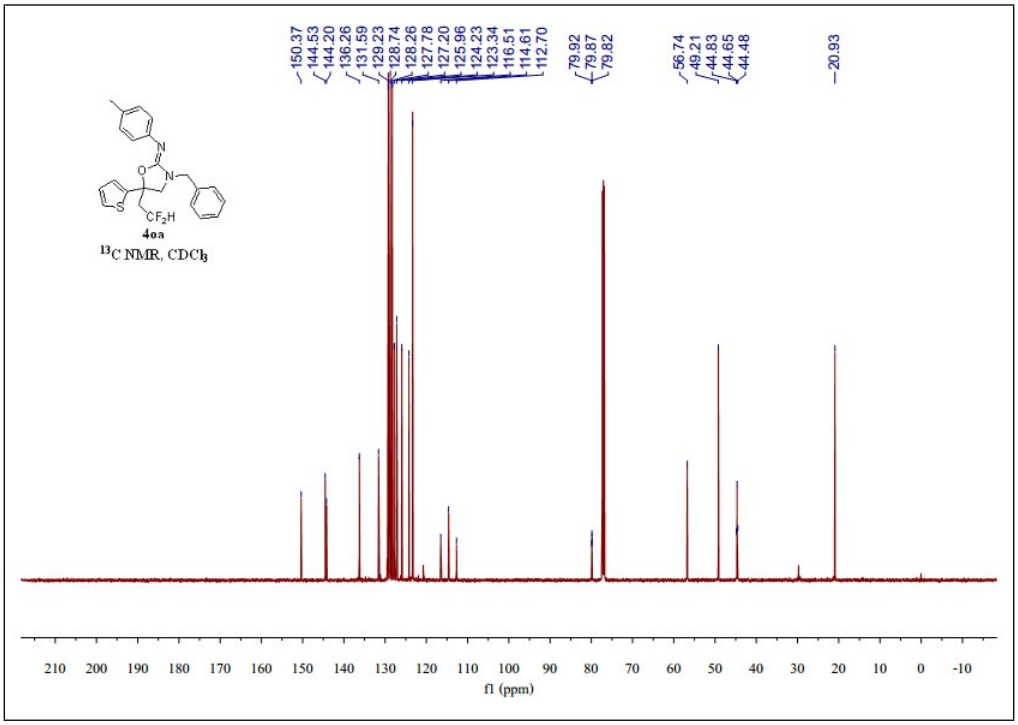
^{1}H NMR, CDCl$_3$
fl (ppm)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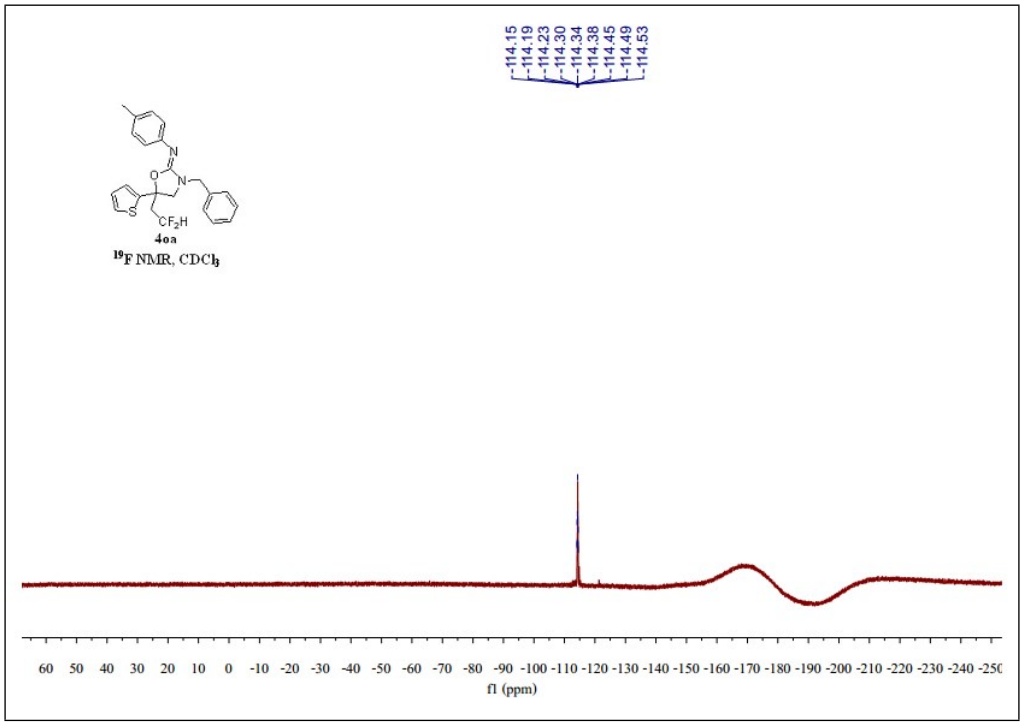
^{13}C NMR, CDCl$_3$
fl (ppm)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-114.53
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19F NMR, CDCl3
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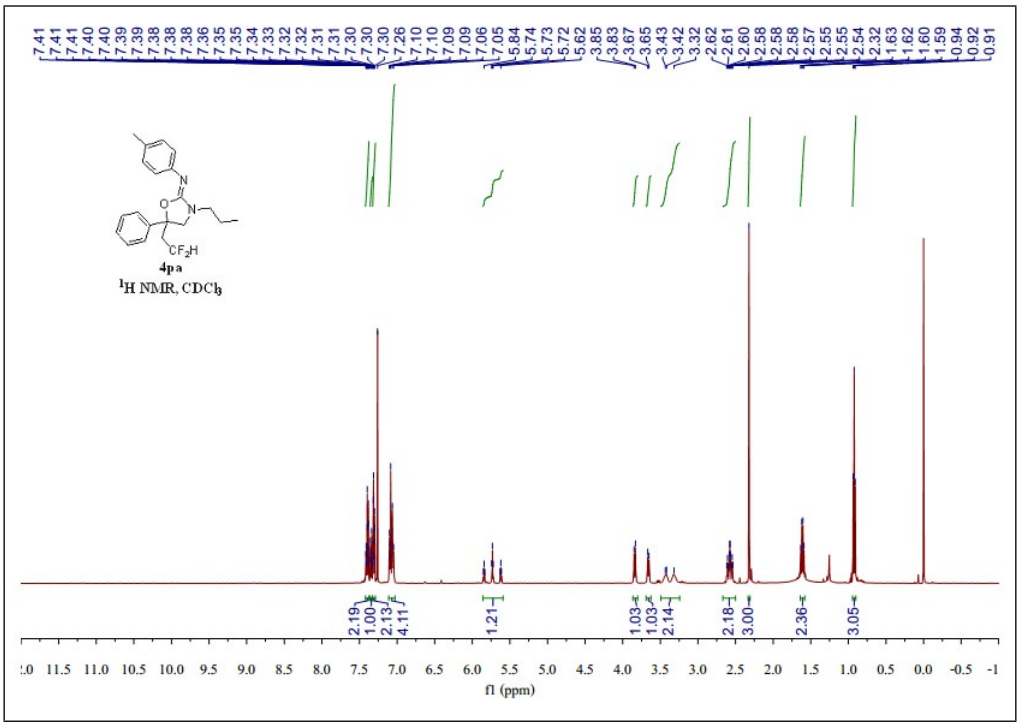
f1 (ppm)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2.13
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1.21
1.03
1.03
2.14
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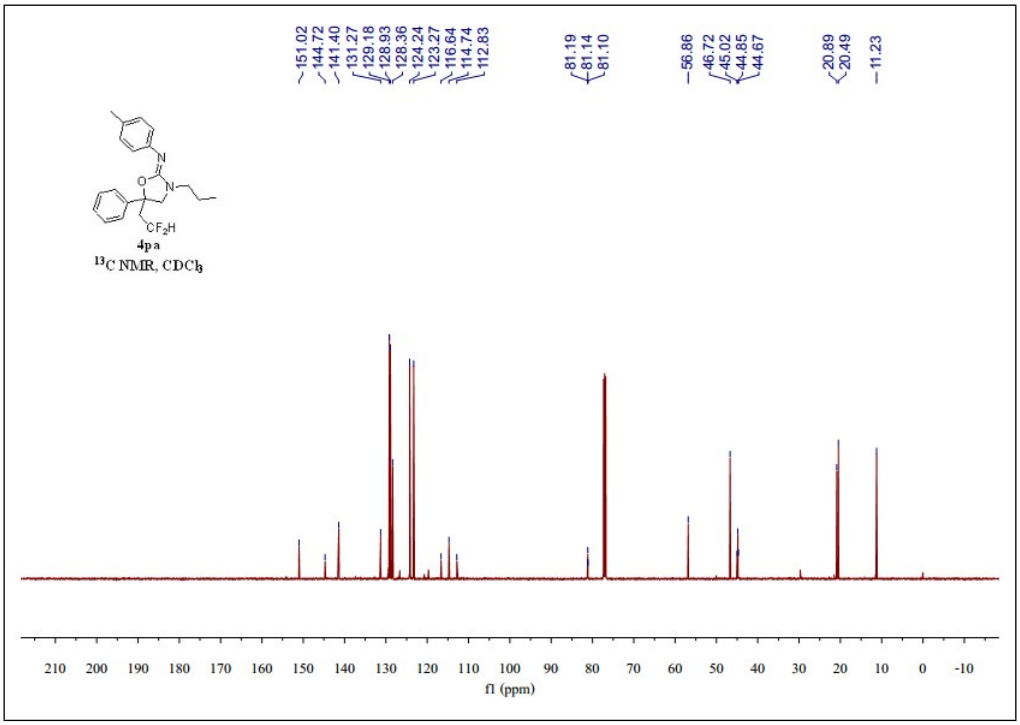
3.00
2.36
3.05
f1 (ppm)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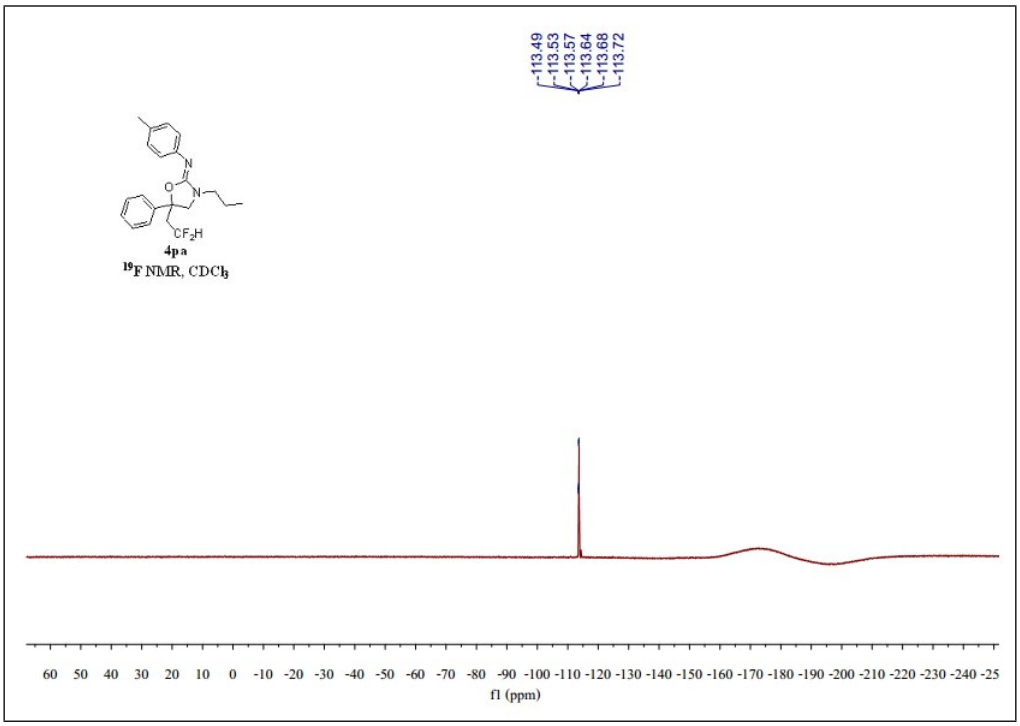
81.14
81.10
56.86
46.72
45.02
44.85
44.67
20.89
20.49
11.23
4pa
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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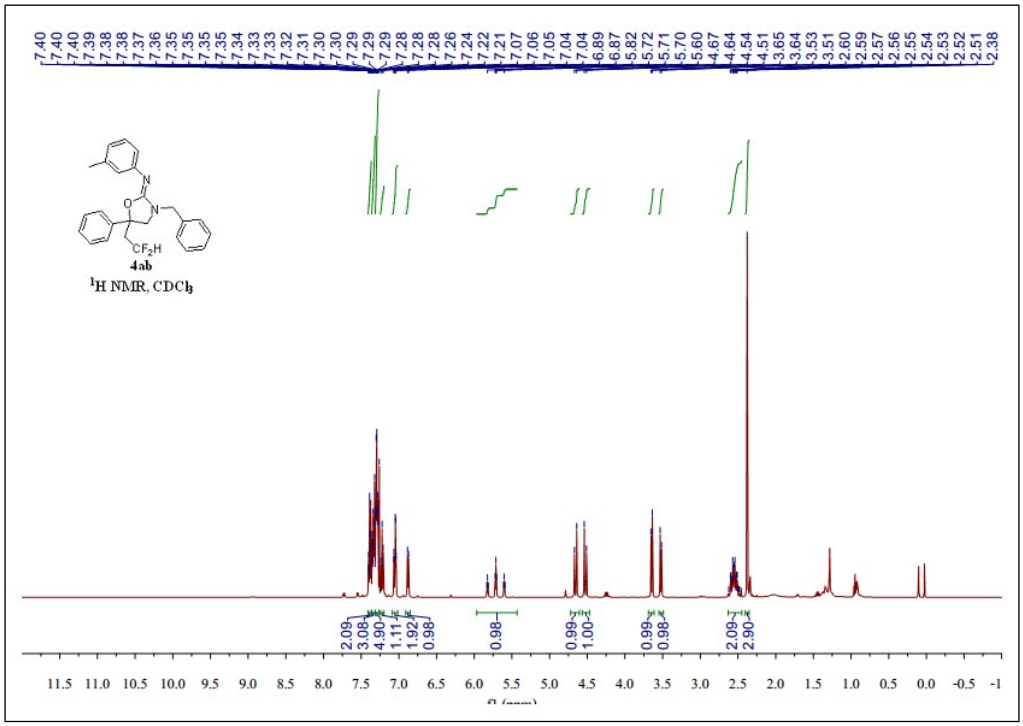
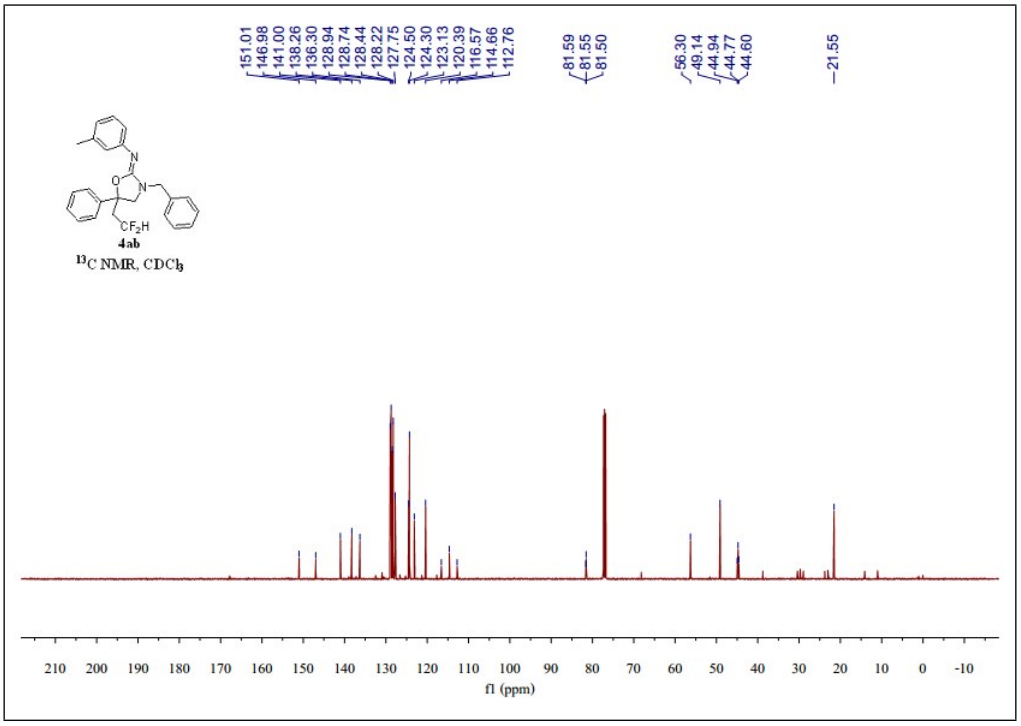
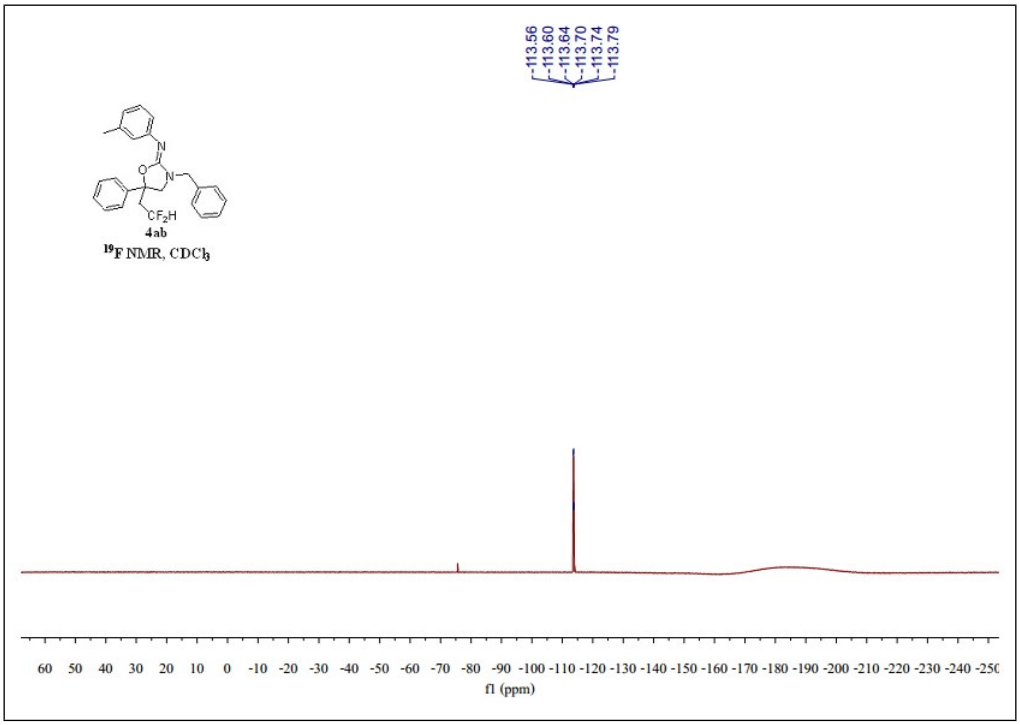
113.53
113.57
113.64
113.68
113.72
4pa
19F NMR, CDCl3
60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -25
f1 (ppm)


4ab
^{1}H NMR, CDCl$_3$


4ab
^{13}C NMR, CDCl$_3$
f1 (ppm)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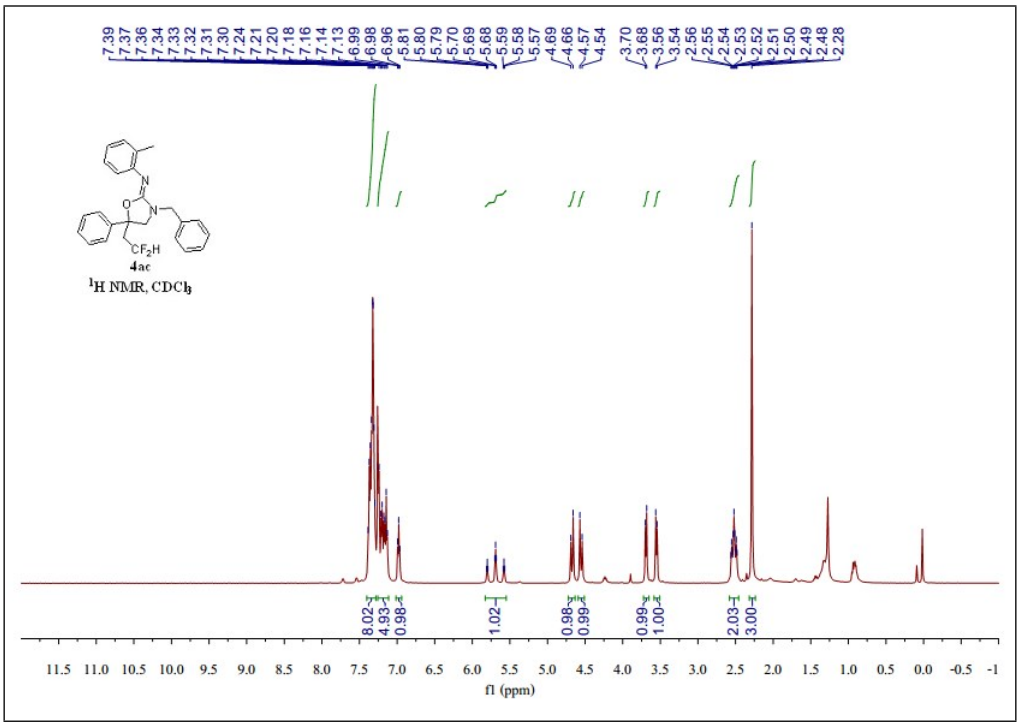
-113.60
-113.64
-113.70
-113.74
-113.79
4ab
^{19}F NMR, CDCl$_3$
f1 (ppm)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7.30
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7.18
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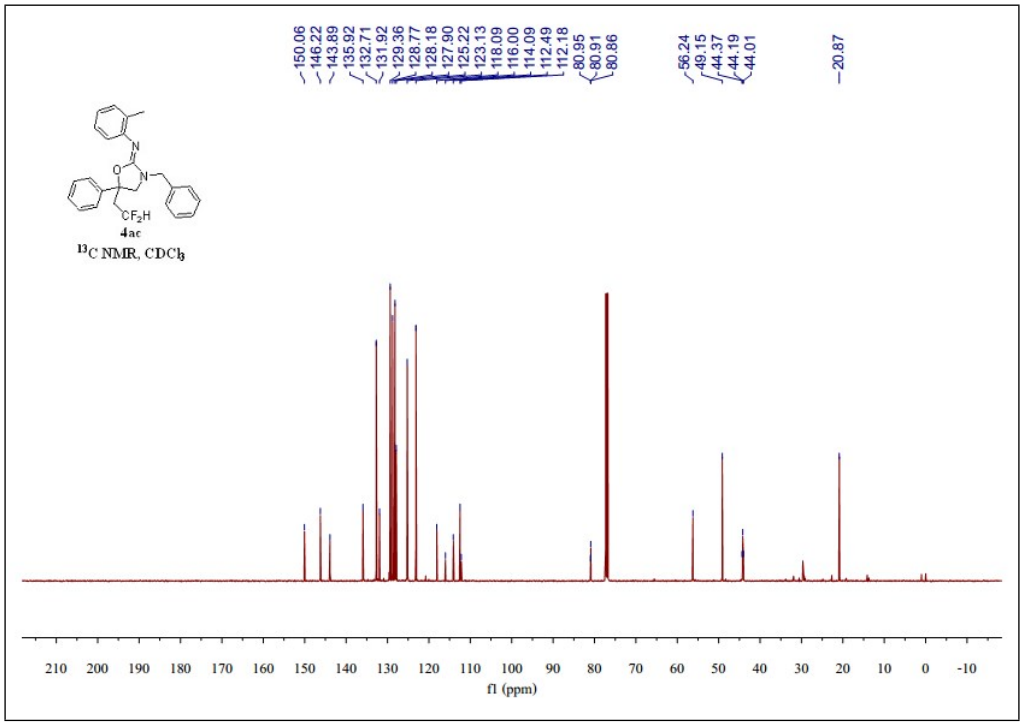
7.13
6.99
6.98
6.96
5.81
5.80
5.79
5.70
5.69
5.68
5.59
5.58
5.57
4.69
4.66
4.57
4.54
3.70
3.68
3.56
3.54
2.56
2.55
2.54
2.53
2.52
2.51
2.50
2.49
2.48
2.28
4ac
^{1}H NMR, CDCl$_3$
8.02
4.93
0.98
1.02
0.98
0.99
0.99
1.00
2.03
3.00
f1 (ppm)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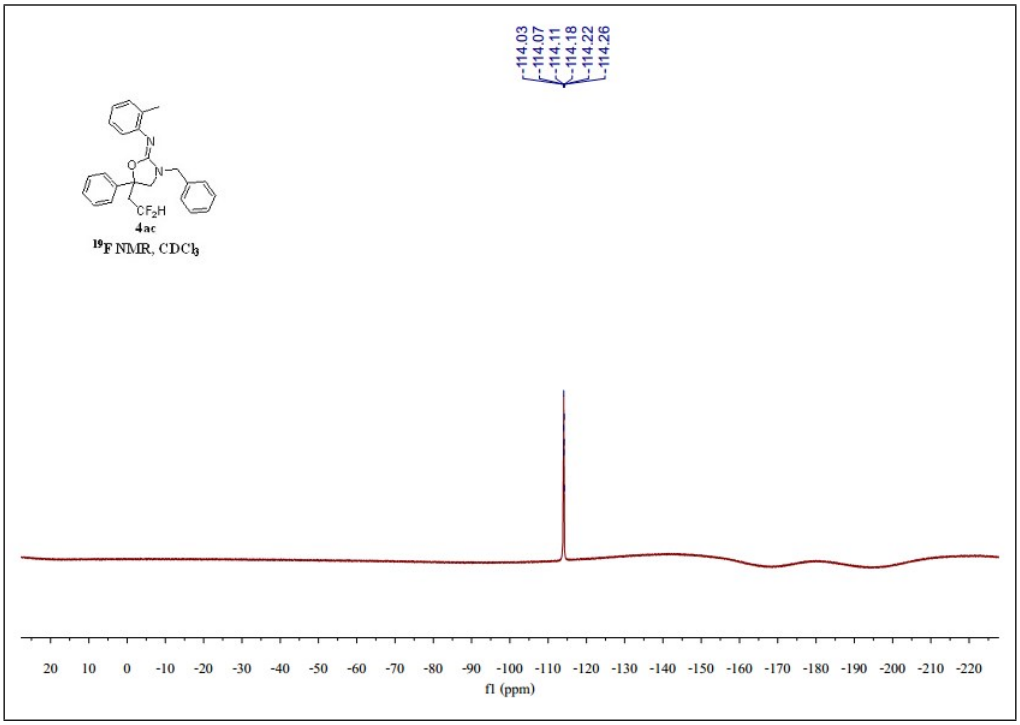
125.22
123.13
118.09
116.00
114.09
112.49
112.18
80.95
80.91
80.86
56.24
49.15
44.37
44.19
44.01
20.87
4ac
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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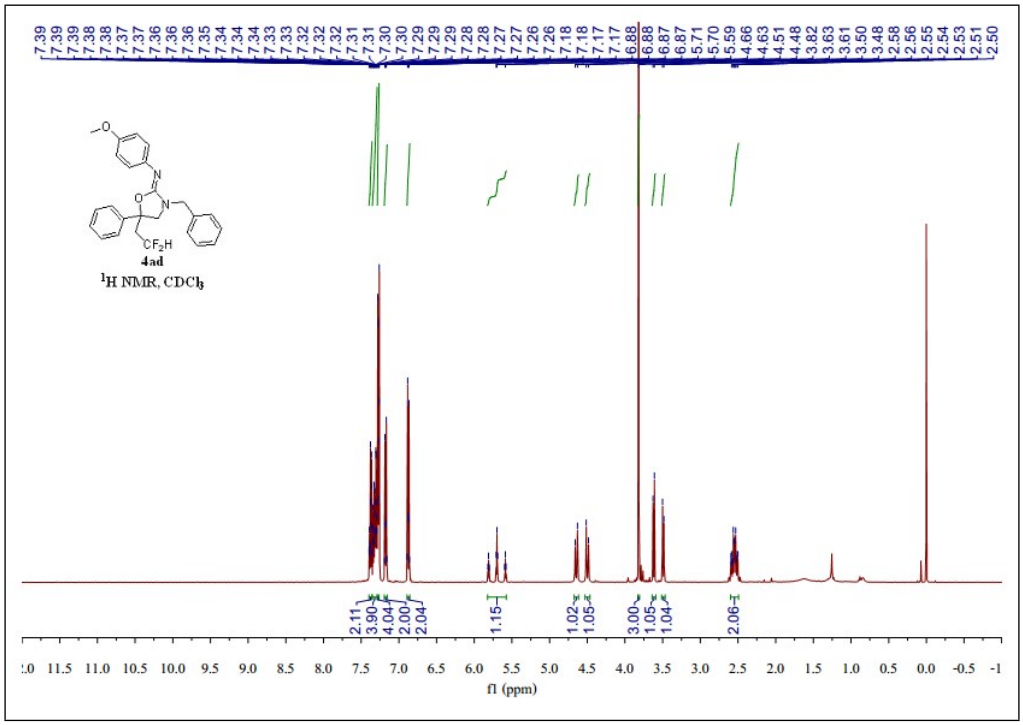
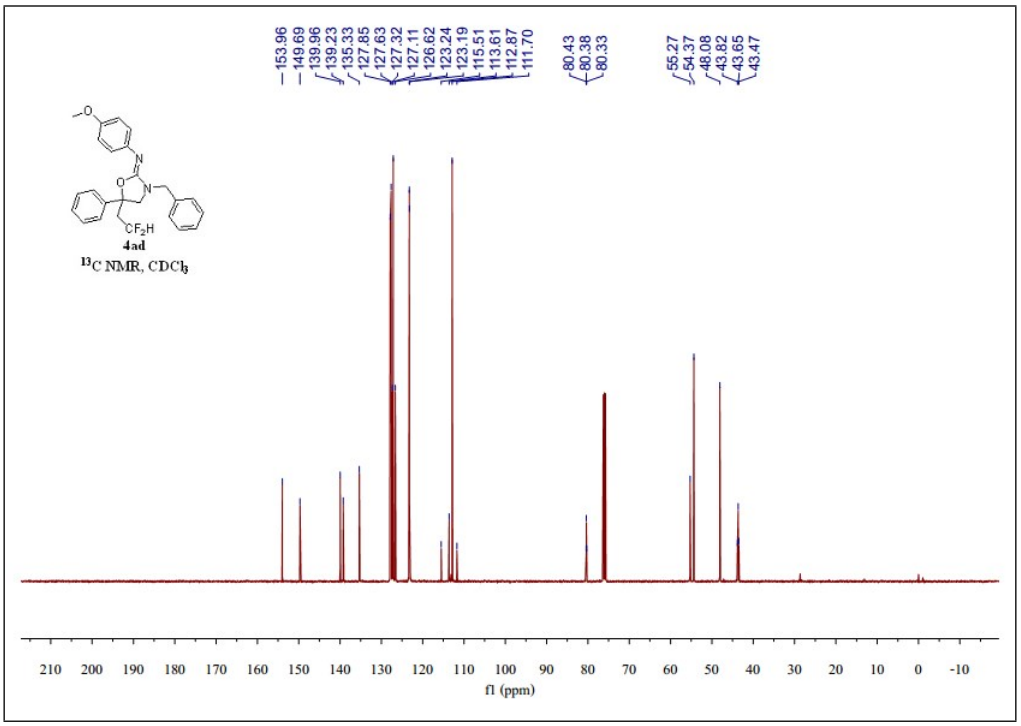
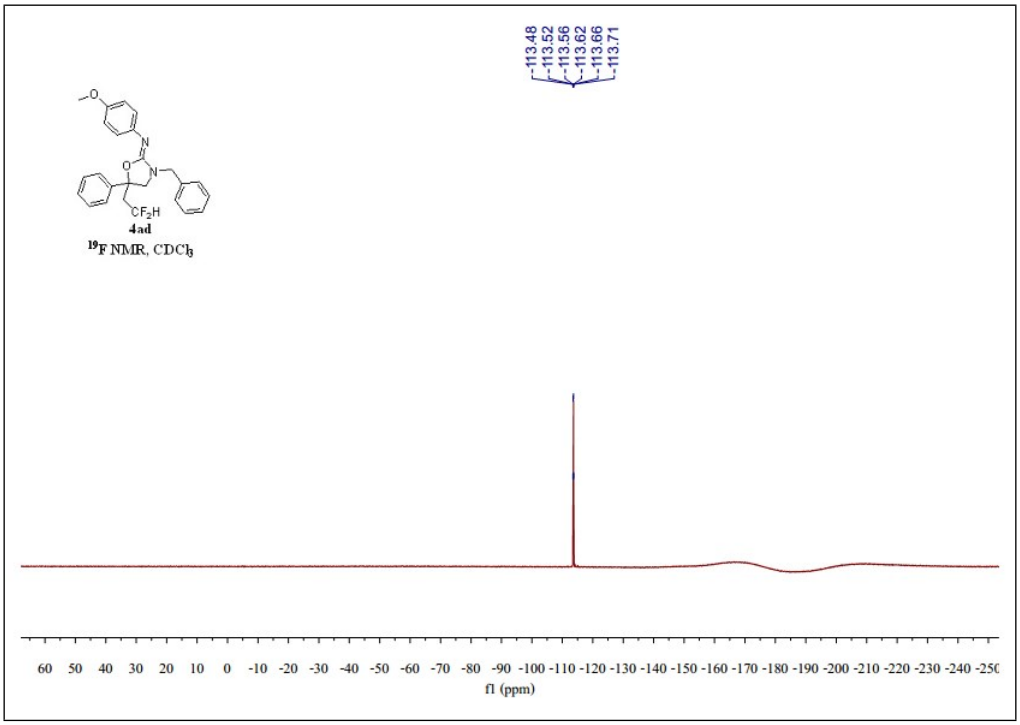
114.07
114.11
114.18
114.22
114.26
4ac
19F NMR, CDCl3
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)


4ad
^{1}H NMR, CDCl$_3$
fl (ppm)


4ad
^{13}C NMR, CDCl$_3$
fl (ppm)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-113.56
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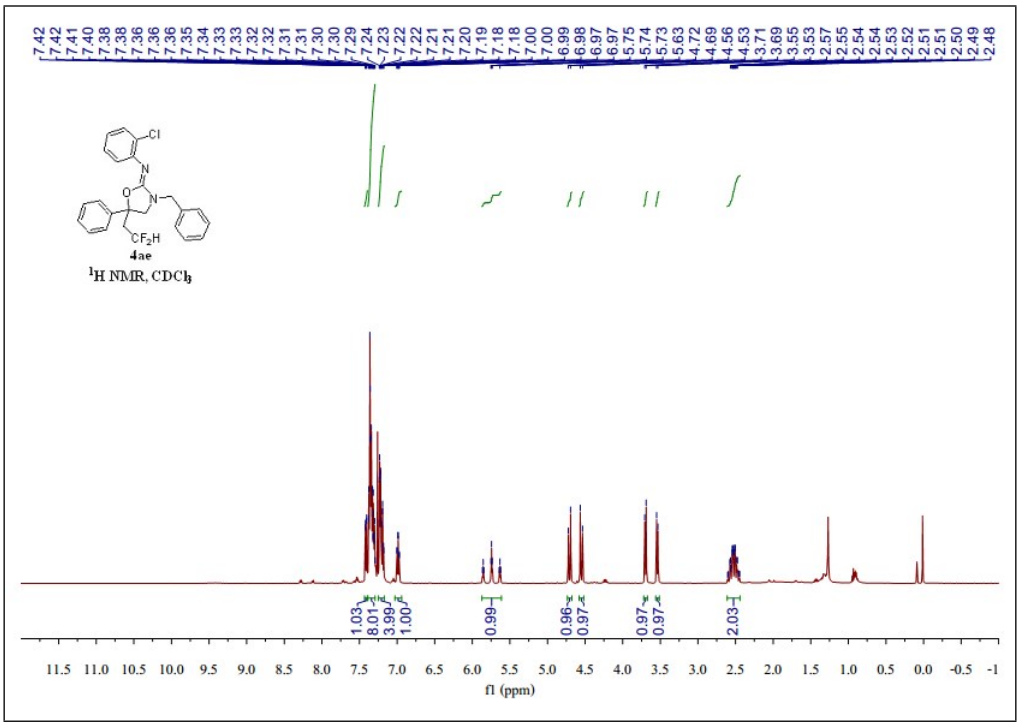
-113.66
-113.71
4ad
^{19}F NMR, CDCl$_3$
f1 (ppm)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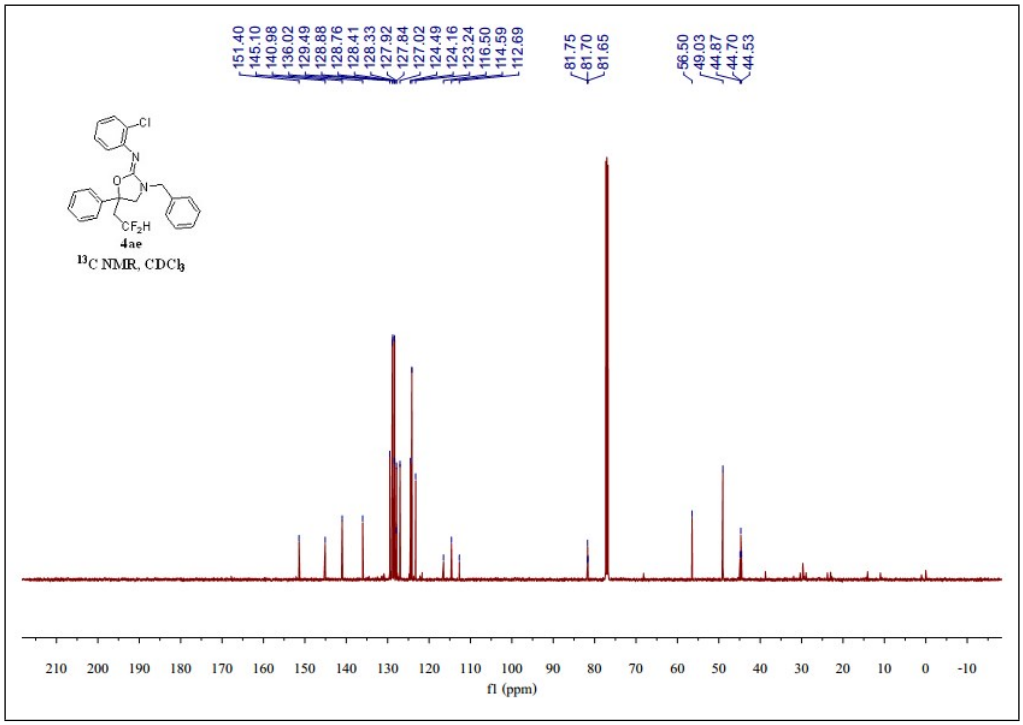
^{1}H NMR, CDCl$_3$
f1 (ppm)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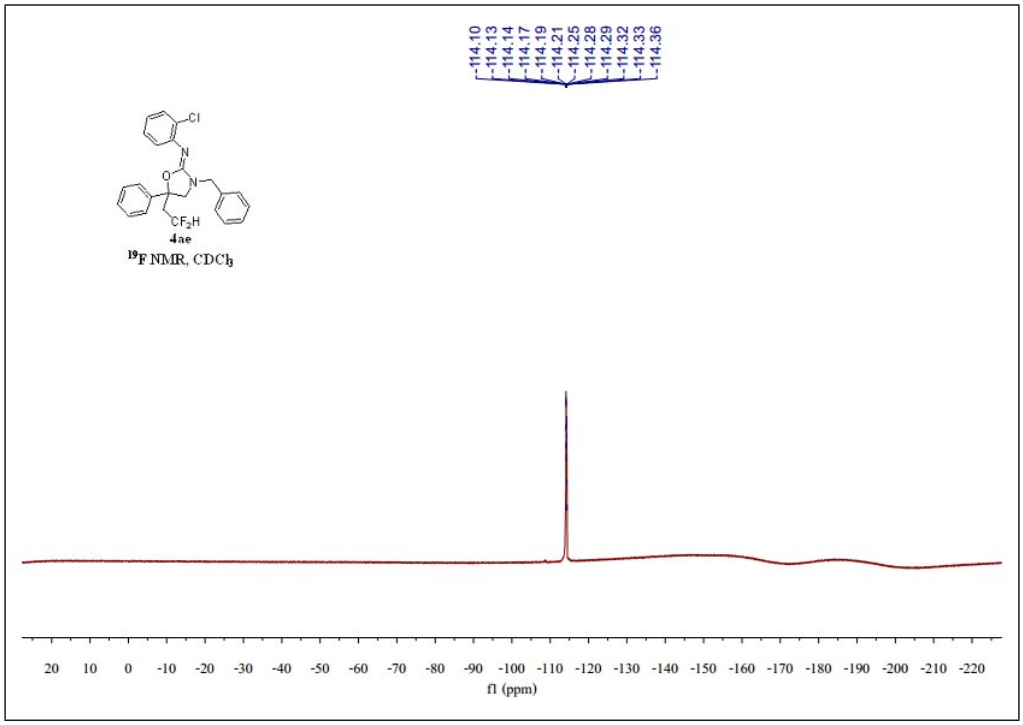
127.02
124.49
124.16
123.24
116.50
114.59
112.69
81.75
81.70
81.65
56.50
49.03
44.87
44.70
44.53
Cl
N
O
N
CF2H
4ae
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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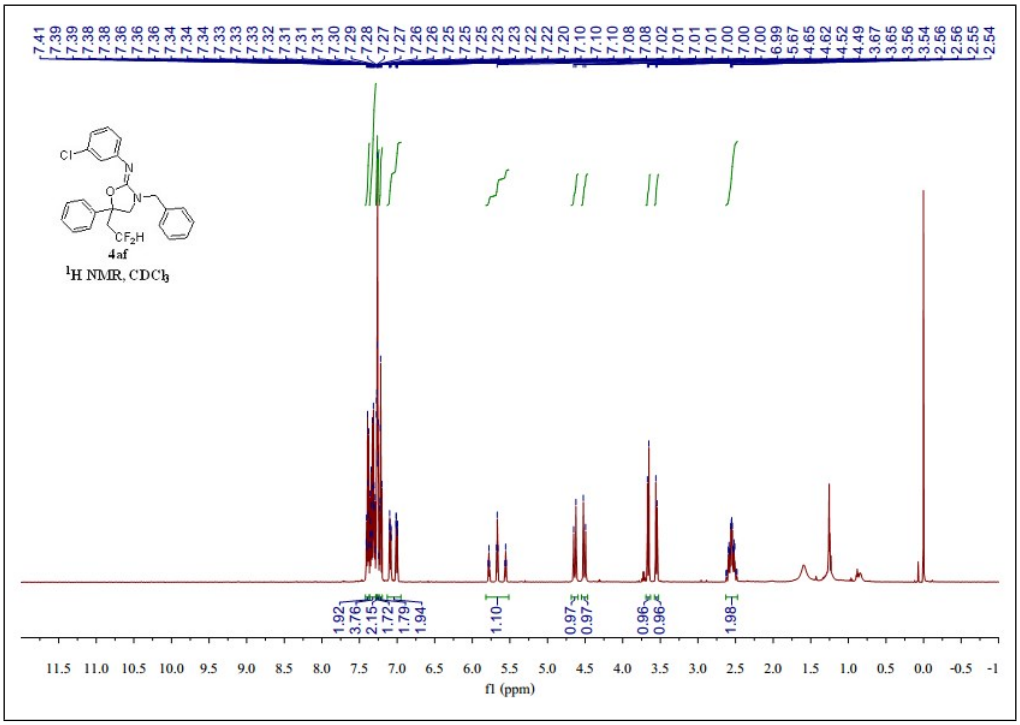
114.33
114.36
Cl
N
O
N
CF2H
4ae
19F NMR, CDCl3
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)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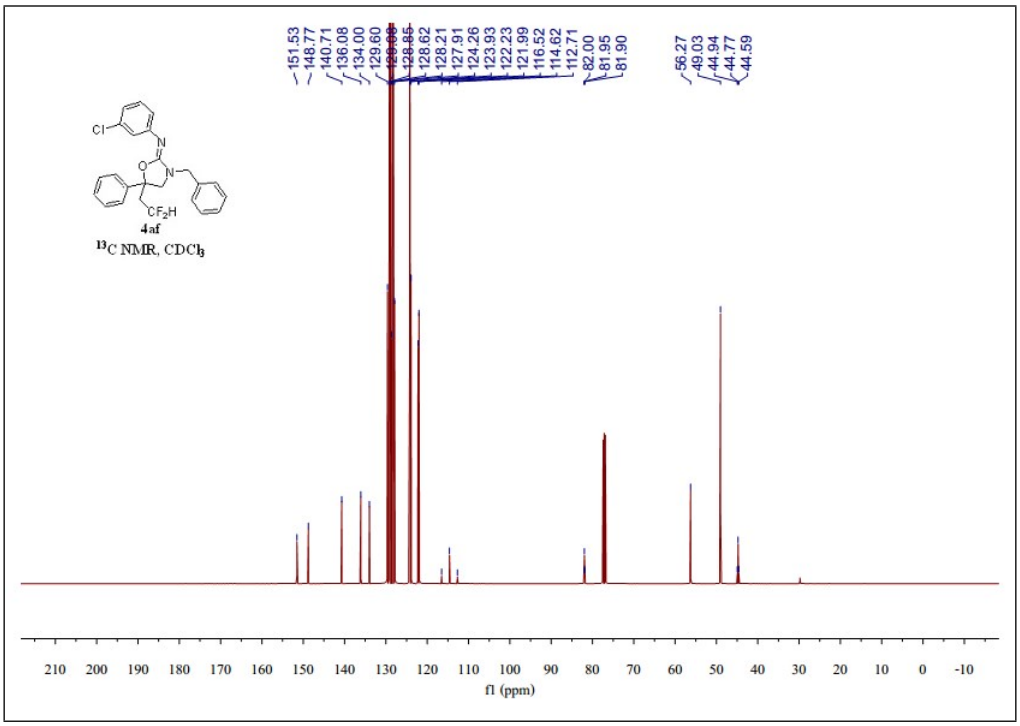
^{1}H NMR, CDCl$_3$
f1 (ppm)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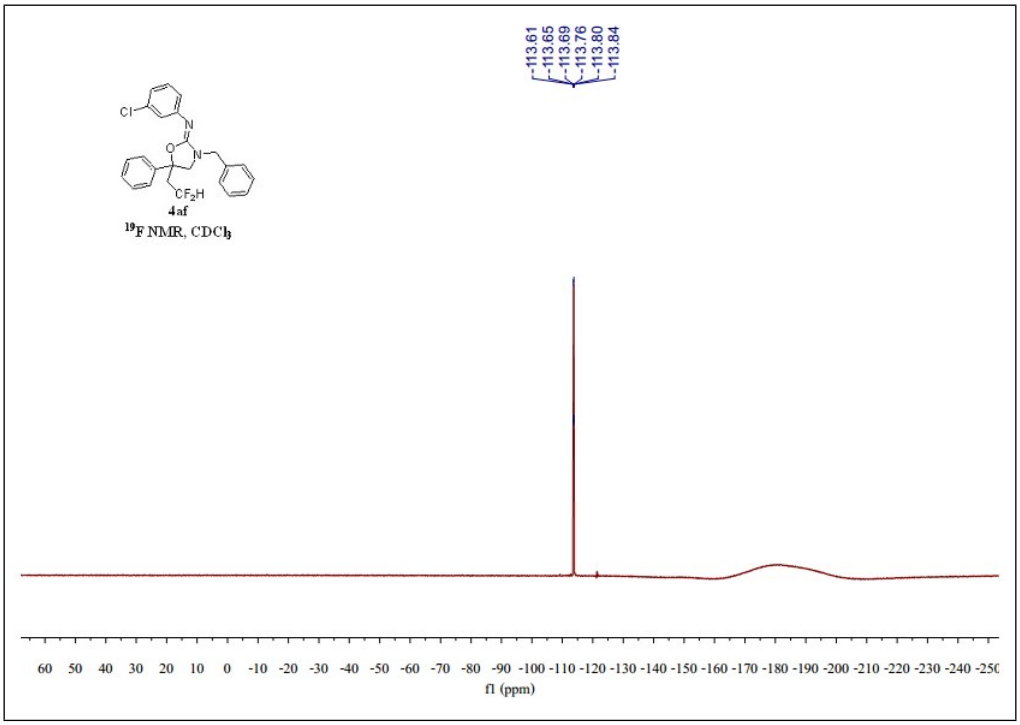
^{13}C NMR, CDCl$_3$
f1 (ppm)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-113.80
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Cl
N
O
N
CF2H
4af
19F NMR, CDCl3
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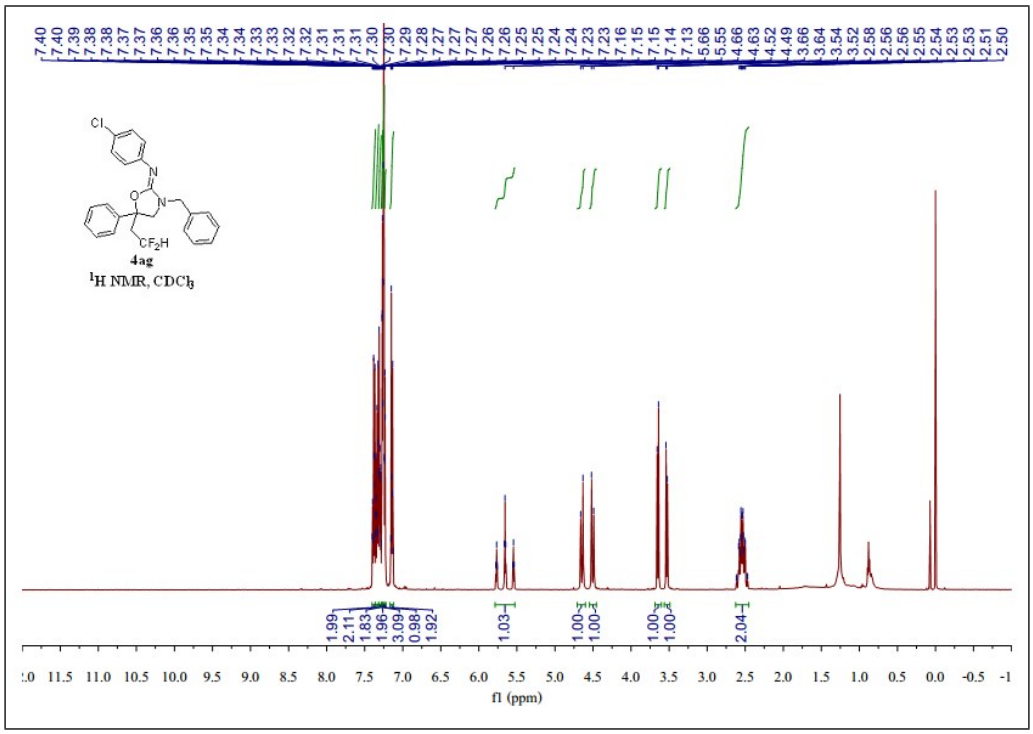
f1 (ppm)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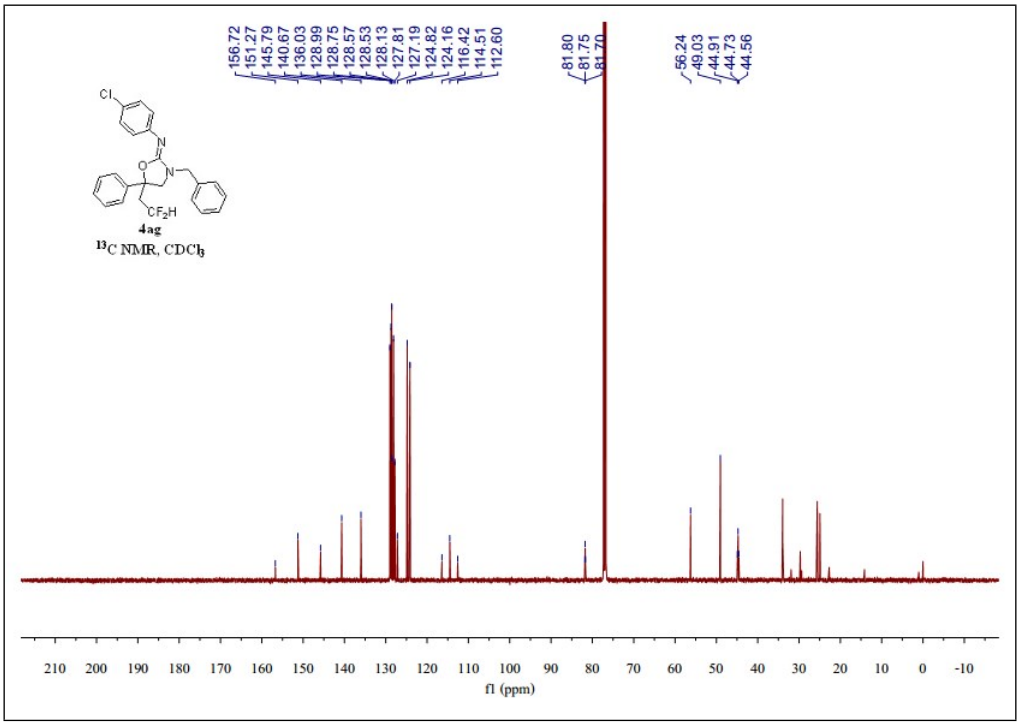
2.53
2.53
2.51
2.50
Cl
N
O
N
CF2H
4ag
1H NMR, CDCl3
1.99
2.11
1.83
1.96
3.09
0.98
1.92
1.03
1.00
1.00
1.00
1.00
2.04
.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1
f1 (ppm)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127.19
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124.16
116.42
114.51
112.60
81.80
81.75
81.70
56.24
49.03
44.91
44.73
44.56
Cl
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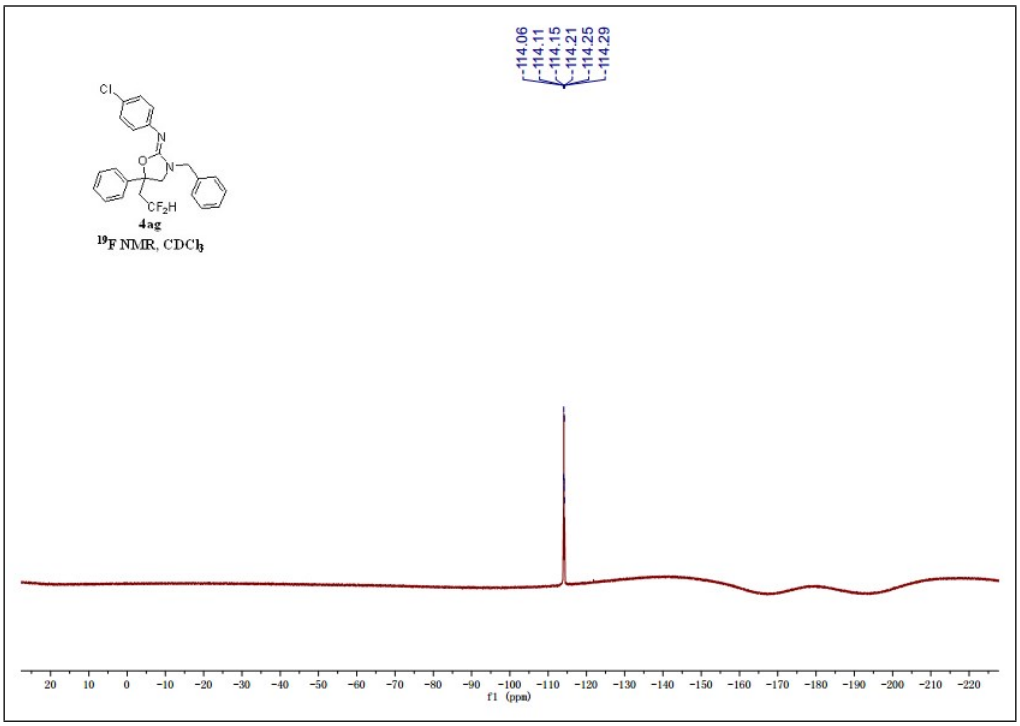
N
CF2H
4ag
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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114.29
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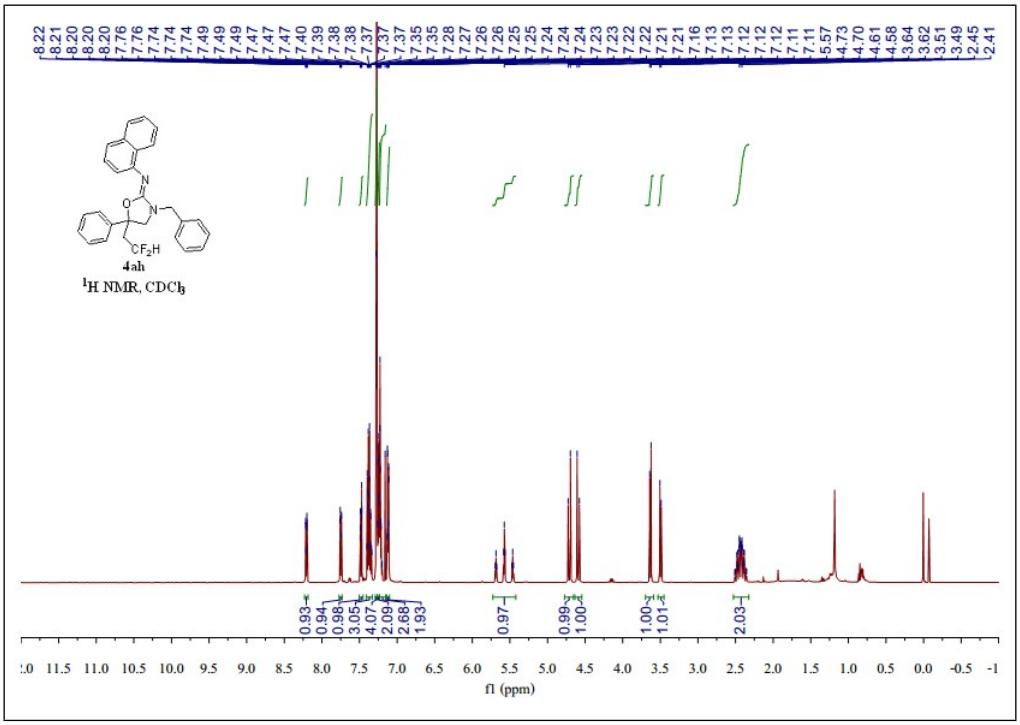
O
N
CF2H
4ag
19F NMR, CDCl3
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)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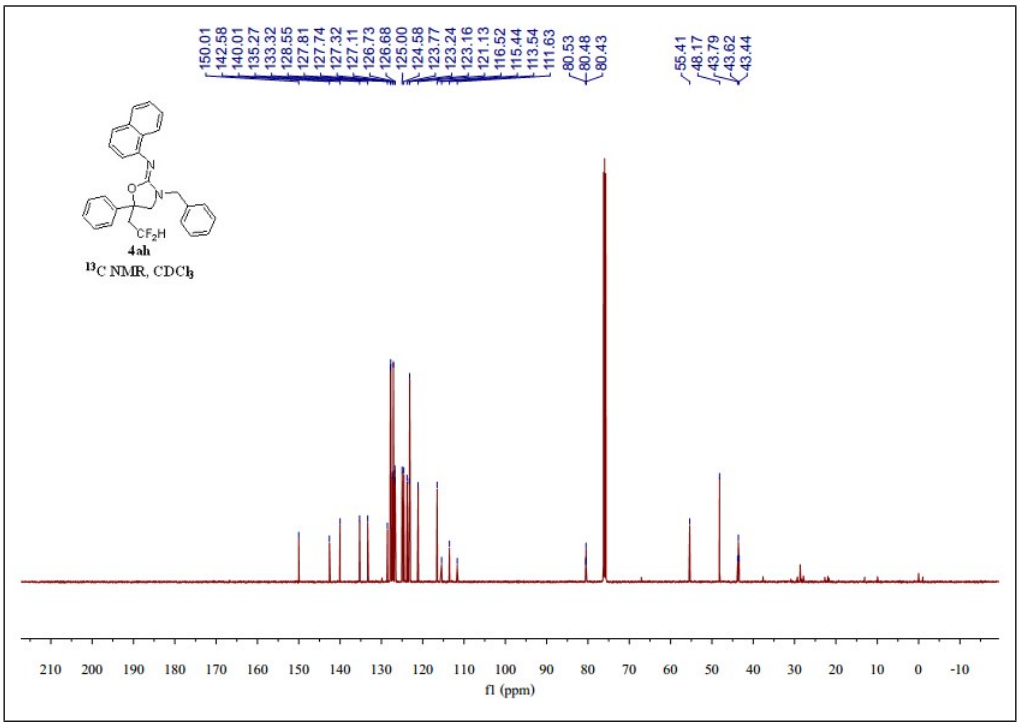
^{1}H NMR, CDCl$_3$
f1 (ppm)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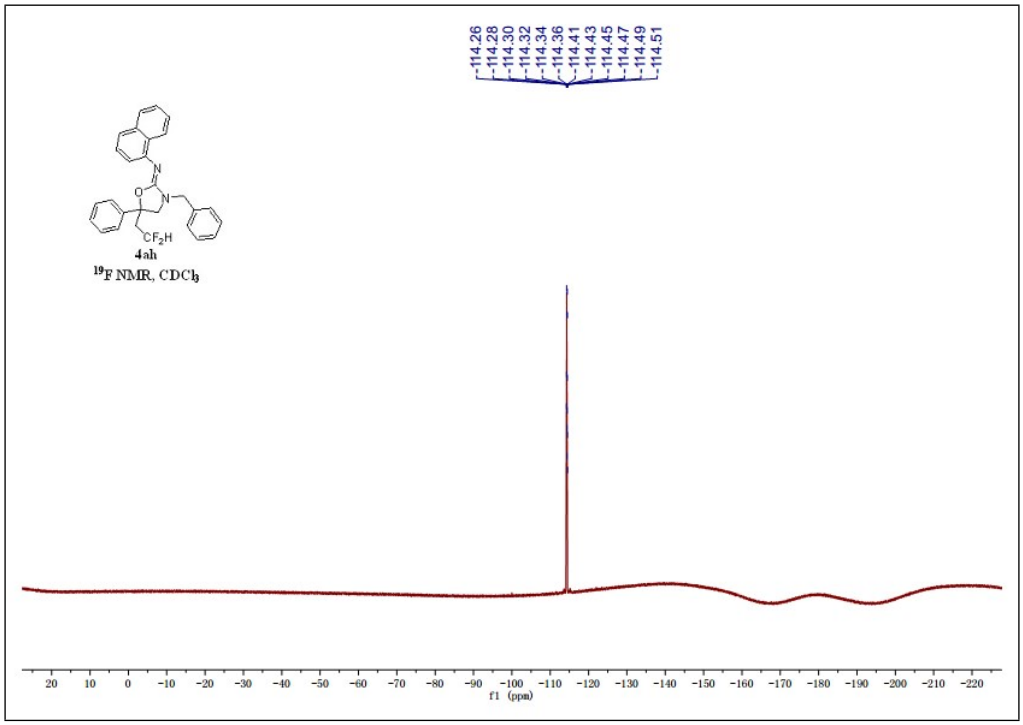
^{13}C NMR, CDCl$_3$
f1 (ppm)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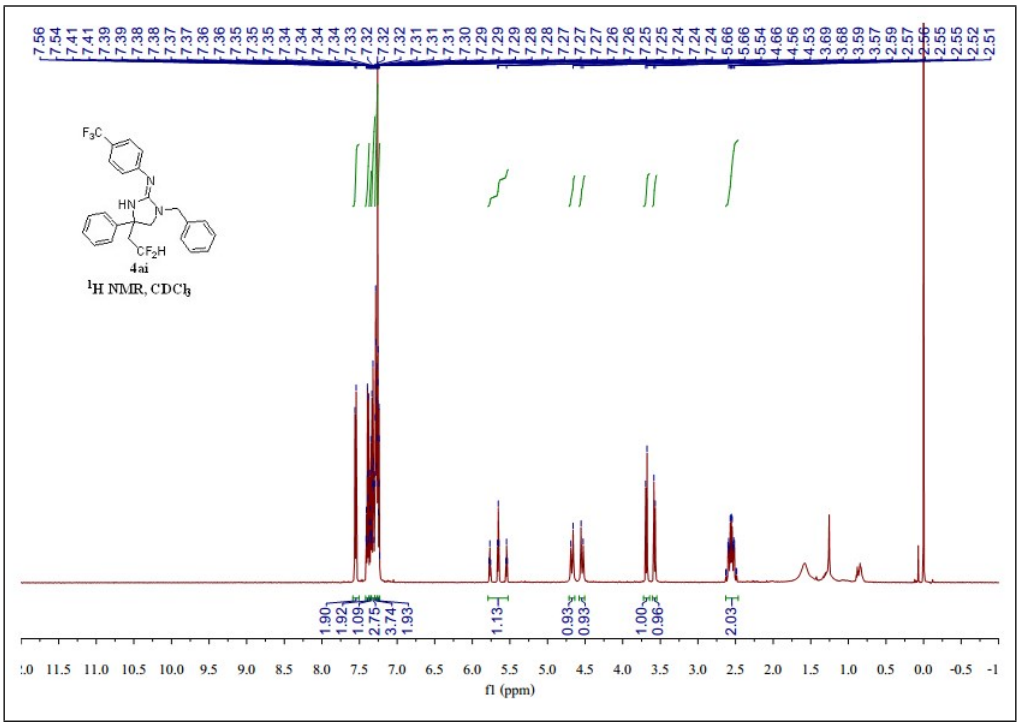
114.51
4ah
19F NMR, CDCl3
f1 (ppm)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1H NMR, CDCl3
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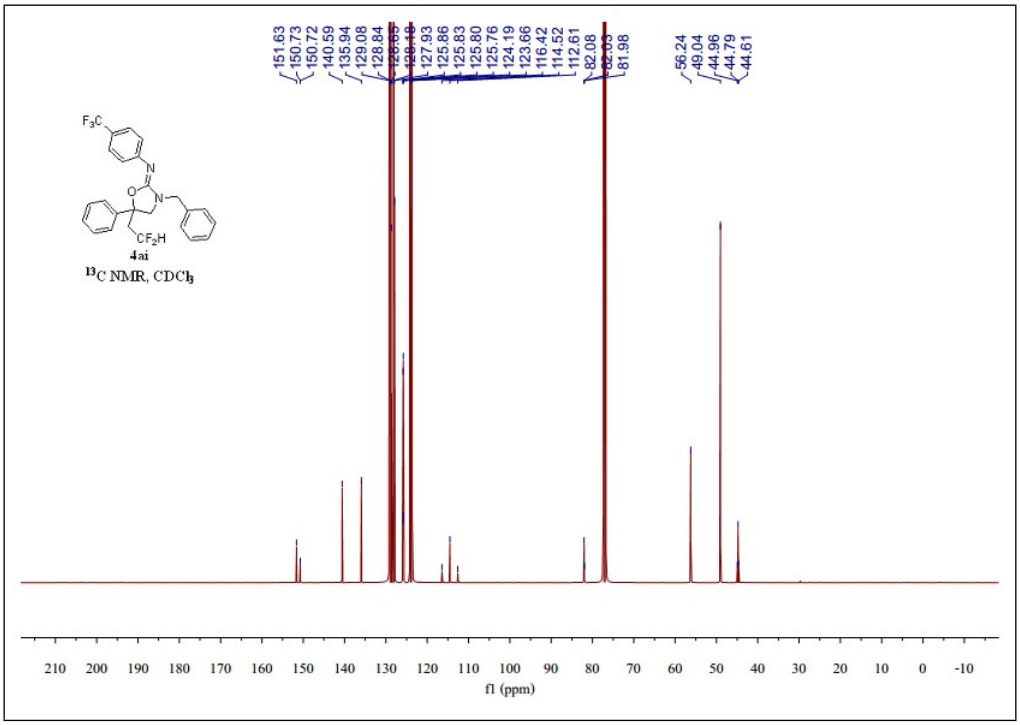
1.13
0.93
0.93
1.00
0.96
2.03
f1 (ppm)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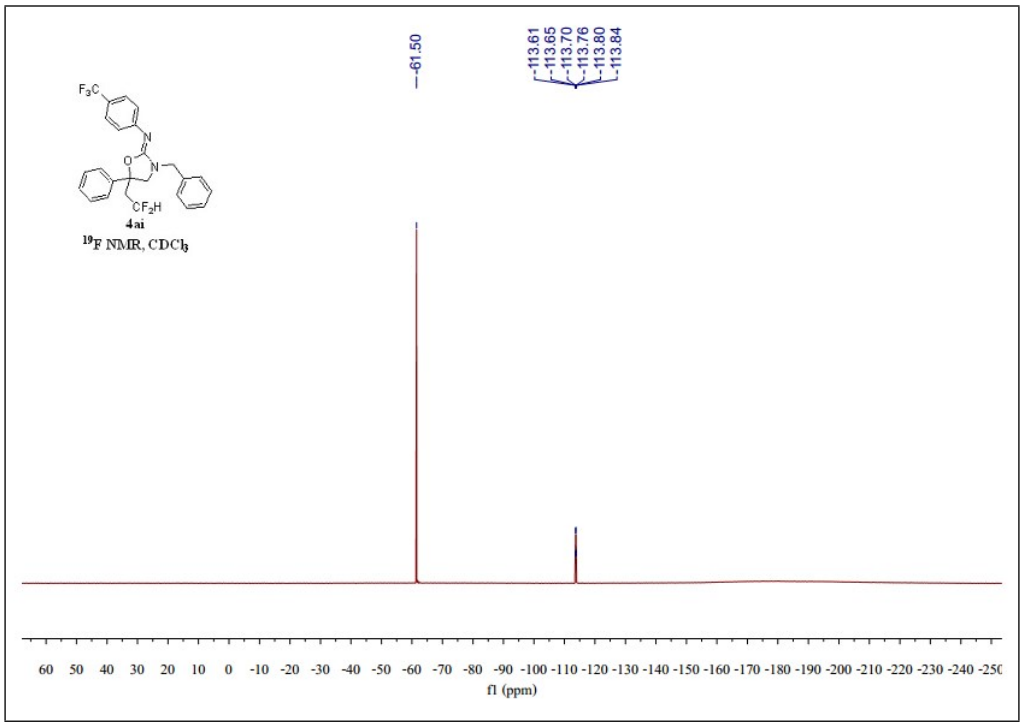
123.66
116.42
114.52
112.61
82.08
81.98
56.24
49.04
44.96
44.79
44.61
F3C
N
O
N
CF2H
4ai
13C NMR, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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-113.61
-113.65
-113.70
-113.76
-113.80
-113.84
F3C
N
O
N
CF2H
4ai
19F NMR, CDCl3
60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250
f1 (ppm)