Supporting Information

Dual role of nitroarenes as electrophiles and arylamine surrogates in Buchwald-Hartwig-type coupling for C–N bond construction

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Table of Contents

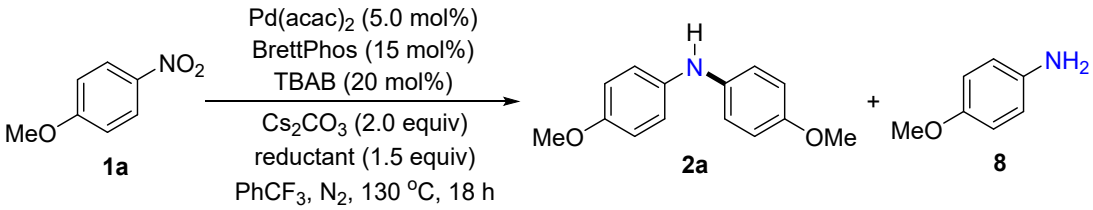
1. General Information

^{1}H NMR spectra were recorded on Bruker 500 MHz or 600 MHz spectrometer and the chemical shifts were reported in parts per million (δ) relative to internal solvent signal (7.261 ppm in $CDCl_3$ or 2.500 ppm in $(CD_3)_2SO$). The peak patterns are indicated as follows: s, singlet; d, doublet; dd, doublet of doublet; t, triplet; q, quartet; m, multiplet. The coupling constants, J, are reported in Hertz (Hz). ^{13}C NMR spectra were obtained at Bruker 125 MHz and 151 MHz and referenced to the internal solvent signals (central peak is 77.00 ppm in $CDCl_3$ or 40.000 ppm in $(CD_3)_2SO$). $CDCl_3$ was used as the NMR solvent. APEX II (Bruker Inc.) was used for HR-MS and APCI-MS.

Unless otherwise noted, all reagents were purchased from commercial suppliers (Energy-Chemical, Bidepharm, Heowns, or TCI) and used without further purification. Flash column chromatography was performed over silica gel 200-300. The reagents were weighed and handled in a glove box. All reactions were heated by metal sand bath (WATTCAS, LAB-500, https://www.wattcas.com).

2. Optimization of Reaction Conditions for the Synthesis of Symmetrical Diarylamines

Table S1. Screening of reductant [a]

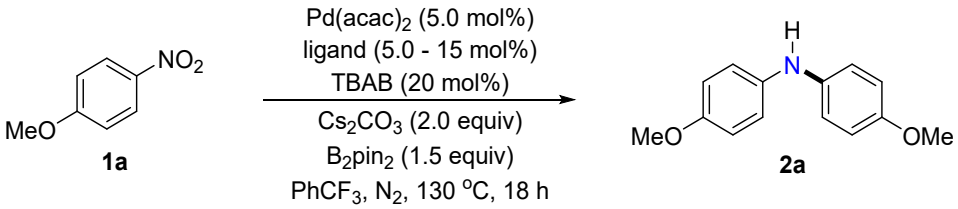


entry	reductant	**2a** [b] /yield/%	**8** [b] /yield/%
1 [c]	Fe	0	0
2 [c]	Mn	0	0
3 [d]	Ph_3P	0	0
4 [e]	propan-2-ol	trace	0
5	PHMS	0	77
6	$HSiEt_3$	19	27
7	$PHSiH_3$	0	81
8[d]	B_2cat_2	0	0
9	$B_2(OH)_4$	0	< 20
10	B_2nep_2	56	< 20
11 [f]	HBpin	55	0
12	B_2pin_2	83	0
13 [g]	B_2pin_2	36	0
14 [h]	B_2pin_2	61	< 20

[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), $Pd(acac)_2$ (5.0 mol%), BrettPhos (15 mol%), Cs_2CO_3 (2.0 equiv), TBAB (20 mol%), and reductant (1.5 equiv) in $PhCF_3$ (1.5 mL) at 130 °C for 18 hours under N_2; [b] Isolated yield; [c] Generating a complex mixture containing triarylamine (< 20%); [d] Most all of the starting material remained; [e]

When K_3PO_4 and 1,4-dioxane were used, a denitrative hydrogenation product anisole was formed; [f] A small amount of triarylamine was formed (< 20%); [g] 0.3 mmol B_2pin_2 was used, and a small amount of triarylamine was generated (37%); [h] 0.6 mmol B_2pin_2 were used, and a small amount of *p*-anisidine was formed (< 20%).

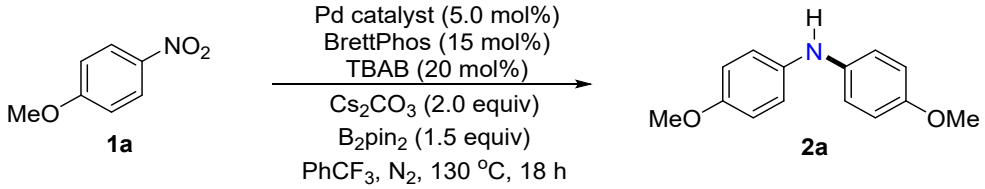
Table S2. Screening of ligand [a]



entry	ligand	**2a** [b] /yield/%
1	BrettPhos	83
2	XPhos	46
3	SPhos	0
4	RuPhos	0
5	JohnPhos	0
6	XantPhos	0
7	DPPF	0
8	IPr·HCl	0

[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), $Pd(acac)_2$ (5.0 mol%), ligand (15 mol% for monodentate, 5.0 mol% for bidentate and carbene ligand), Cs_2CO_3 (2.0 equiv), TBAB (20 mol%), and B_2pin_2 (1.5 equiv) in $PhCF_3$ (1.5 mL) at 130 °C for 18 hours under N_2; [b] Isolated yield.

Table S3. Screening of catalyst [a]

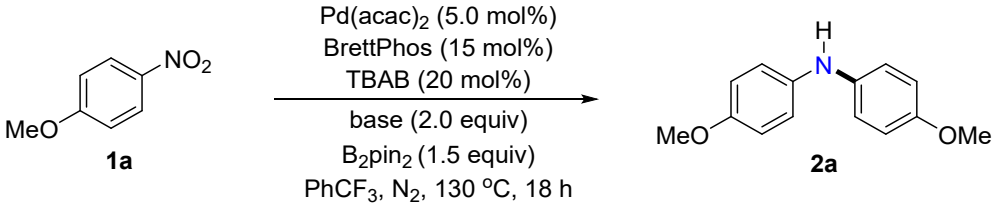


entry	Pd catalyst	**2a** [b] /yield/%
1	$Pd(acac)_2$	83
2	$Pd(dba)_2$	< 20
3	$Pd(OAc)_2$	50
4	$[Pd(allyl)Cl]_2$	25
5	$PdCl_2(cod)$	< 20
6	$Pd(TFA)_2$	37
7	$Pd(PPh_3)_4$	0
8	$Pd(^tBu_3P)_2$	0

[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), Pd catalyst (5.0 mol%), BrettPhos (15 mol%), Cs_2CO_3 (2.0 equiv), TBAB (20 mol%), and B_2pin_2 (1.5

equiv) in $PhCF_3$ (1.5 mL) at 130 °C for 18 hours under N_2; [b] Isolated yield.

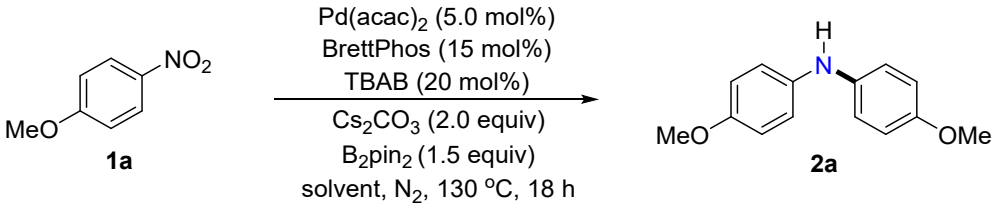
Table S4. Screening of base [a]



entry	base	**2a** [b] /yield/%
1 [c]	$CsOH·H_2O$	41
2	CsF	< 20
3	K_3PO_4	29
4	KO^{t}Bu	57
5	KF	0
6	K_2CO_3	48
7	Cs_2CO_3	83
8	DBU	0

[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), $Pd(acac)_2$ (5.0 mol%), BrettPhos (15 mol%), base (2.0 equiv), TBAB (20 mol%), and B_2pin_2 (1.5 equiv) in $PhCF_3$ (1.5 mL) at 130 °C for 18 hours under N_2; [b] Isolated yield; [c] When PPh_3 (0.2 mmol) in DMF was used instead of B_2pin_2 in $PhCF_3$ and no TBAB at 150 °C, the azoarene product was formed.

Table S5. Screening of solvent [a]

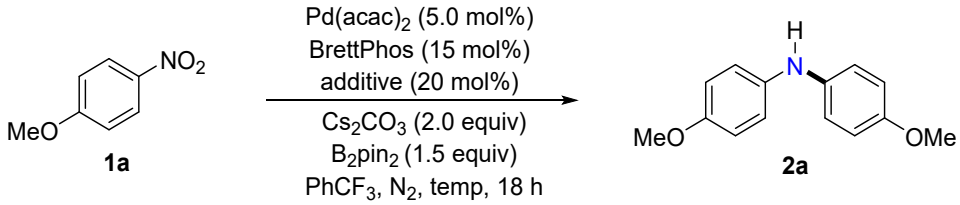


entry	solvent	**2a** [b] /yield/%
1	$PhCF_3$	83
2 [c]	DMF	0
3	DMSO	0
4	toluene	55
5	*o*-xylene	53
6	PhF	58
7	1,4-dioxane	27
8	*n*-heptane	41
9	THF	< 20

[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), $Pd(acac)_2$ (5.0 mol%), BrettPhos (15 mol%), Cs_2CO_3 (2.0 equiv), TBAB (20 mol%), and B_2pin_2 (1.5

equiv) in a solvent (1.5 mL) at 130 °C for 18 hours under N_2; [b] Isolated yield; [c] When LiO^{t}Bu or KOMe were used instead of Cs_2CO_3, the azoxyarene product was formed.

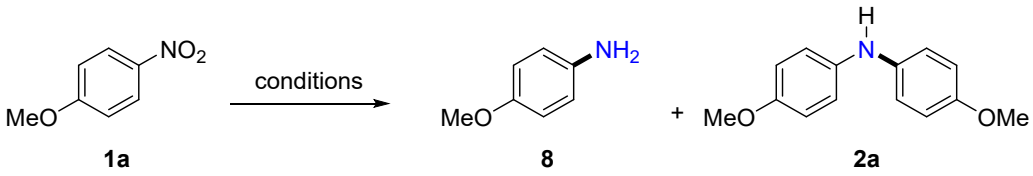
Table S6. Screening of additive and temperature [a]



entry	additive	temp (°C)	**2a** [b] /yield/%
1	-	130	65
2	TBAI	130	66
3	TBAA	130	75
4	TBAC	130	72
5	TBAB	130	83
6	TBAB	110	73
7	TBAB	150	70

[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), $Pd(acac)_2$ (5.0 mol%), BrettPhos (15 mol%), Cs_2CO_3 (2.0 equiv), additive (20 mol%), and B_2pin_2 (1.5 equiv) in $PhCF_3$ (1.5 mL) at a temperature for 18 hours under N_2; [b] Isolated yield.

Table S7. Control experiments [a]

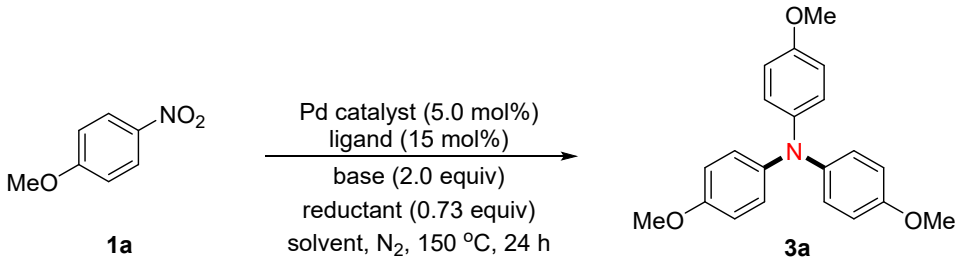


entry	Pd catalyst	ligand	base	reductant	**8** [b] /yield/%	**2a** [b] /yield/%
1	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	B_2pin_2	0	83
2	-	BrettPhos	Cs_2CO_3	B_2pin_2	40	0
3	$Pd(acac)_2$	-	Cs_2CO_3	B_2pin_2	43	0
4	$Pd(acac)_2$	BrettPhos	-	B_2pin_2	0	0
5	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	-	0	0
6[c]	-	-	Cs_2CO_3	B_2pin_2	84	0

[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), $Pd(acac)_2$ (5.0 mol%), BrettPhos (15 mol%), Cs_2CO_3 (2.0 equiv), TBAB (20 mol%), and B_2pin_2 (1.5 equiv) in $PhCF_3$ (1.5 mL) at 130 °C for 18 hours under N_2; [b] Isolated yield; [c] B_2pin_2 (3.0 equiv) and $PhCF_3$ (3.0 mL) were used.

3. Optimization of Reaction Conditions for the Synthesis of Symmetrical Triarylamine

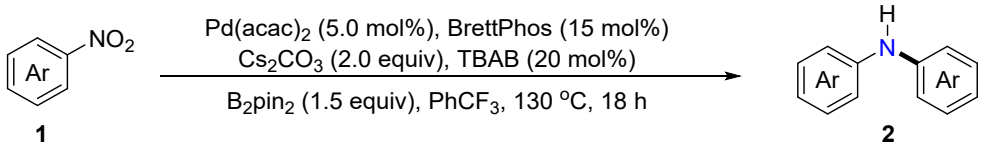
Table S8. Optimization of conditions for the synthesis of symmetrical triarylamine [a, b]



entry	Pd catalyst	ligand	base	solvent	reductant	**3a** [b] /yield/%
1 [c]	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCF_3$	B_2pin_2	45
2 [d]	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCF_3$	B_2pin_2	55
3	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCF_3$	B_2pin_2	63
4 [e]	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCF_3$	B_2pin_2	56
5 [f]	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCF_3$	B_2pin_2	53
6	$Pd(acac)_2$	BrettPhos	$CsOH·H_2O$	$PhCF_3$	B_2pin_2	0
7	$Pd(acac)_2$	BrettPhos	K_3PO_4	$PhCF_3$	B_2pin_2	30
8	$Pd(acac)_2$	BrettPhos	KO^{t}Bu	$PhCF_3$	B_2pin_2	0
9	$Pd(acac)_2$	BrettPhos	Na_2CO_3	$PhCF_3$	B_2pin_2	0
10	$Pd(acac)_2$	BrettPhos	K_2CO_3	$PhCF_3$	B_2pin_2	25
11	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	DMF	B_2pin_2	0
12	**$Pd(acac)_2$**	**BrettPhos**	**Cs_2CO_3**	**$PhCH_3$**	**B_2pin_2**	**70**
13	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	*m*-xylene	B_2pin_2	65
14	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	PhF	B_2pin_2	59
15	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	1,4-dioxane	B_2pin_2	61
16	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	*n*-heptane	B_2pin_2	55
17 [k]	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCH_3$	B_2pin_2	36
18 [l]	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCH_3$	B_2pin_2	25
19 [m]	$Pd(acac)_2$	BrettPhos	Cs_2CO_3	$PhCH_3$	B_2pin_2	47

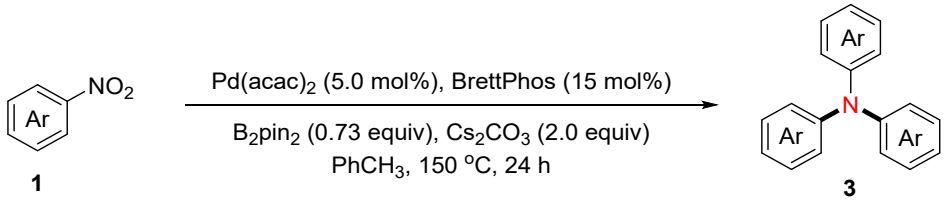
[a] Reaction conditions: 4-nitroanisole **1a** (0.30 mmol), catalyst (5.0 mol%), ligand (15 mol%), base (2.0 equiv), and reductant (0.22 mmol) in solvent (1.0 mL) at 150 °C for 24 hours under N_2; [b] Isolated yield; [c] B_2pin_2 (0.15 mmol); [d] B_2pin_2 (0.20 mmol), [e] B_2pin_2 (0.25 mmol), [f] B_2pin_2 (0.27 mmol); [k] additive (TBAB, 20 mol%), [l] 110 °C, [m] 130 °C.

4. General Procedure for Product 2 or 3



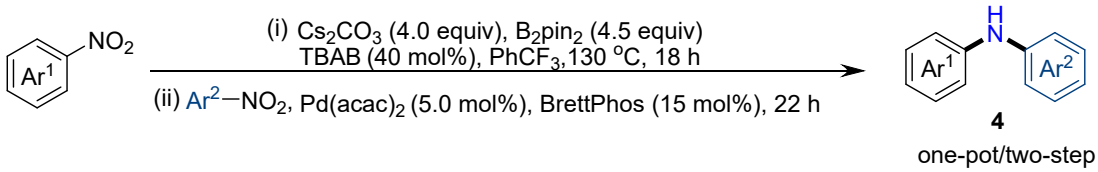
Procedure A: In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with $Pd(acac)_2$ (4.6 mg, 5.0 mol%), BrettPhos (24.2 mg, 15 mol%), nitroarene **1** (0.30 mmol), B_2pin_2 (114.3 mg, 0.45 mmol), Cs_2CO_3 (195.5 mg, 0.6 mmol), TBAB (19.3 mg, 20 mol%), and $PhCF_3$ (1.5 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 130 °C for 18 hours. After the mixture was cooled to room temperature, the

resulting solution was directly filtered. The solvent was evaporated in vacuo to give the crude products. The residue was purified by flash column chromatography on silica gel (PE : EA) to give the desired product **2**.

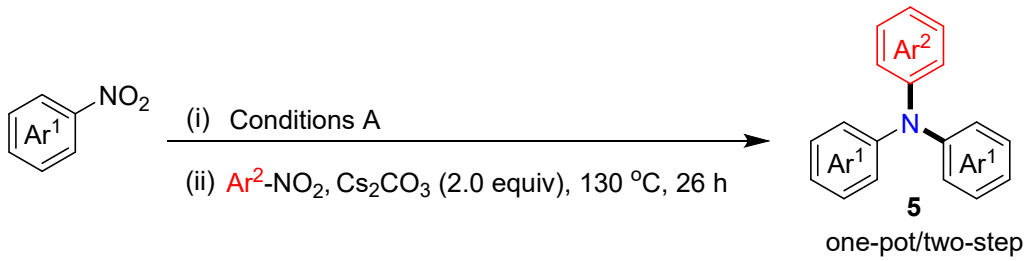


Procedure B: In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with $Pd(acac)_2$ (4.6 mg, 5 mol%), BrettPhos (24.2 mg, 15 mol%), nitroarene **1** (0.30 mmol), B_2pin_2 (56 mg, 0.22 mmol) Cs_2CO_3 (195.5 mg, 0.6 mmol), and $PhCH_3$ (1.0 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 150 °C for 24 hours. After the mixture was cooled to room temperature, the resulting solution was directly filtered. The solvent was evaporated in vacuo to give the crude products. The residue was purified by flash column chromatography on silica gel (PE : EA or PE : DCM) to give the desired product **3**.

5. General Procedure for Product 4 or 5



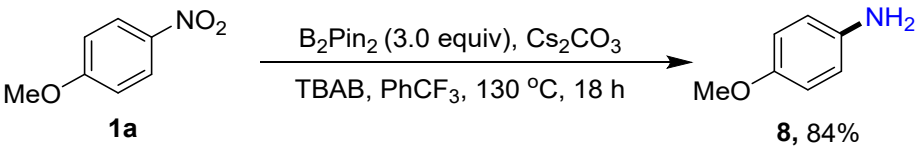
Procedure C: In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with nitroarene **Ar¹** (0.15 mmol), B_2pin_2 (114.3 mg, 0.45 mmol), Cs_2CO_3 (130.3 mg, 0.40 mmol), TBAB (12.9 mg, 40 mol%), and $PhCF_3$ (1.5 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 130 °C for 18 hours. After the mixture was cooled to room temperature, transferred the sealed tube to the glovebox and added $Pd(acac)_2$ (1.5 mg, 5.0 mol%), BrettPhos (8.1 mg, 15 mol%), and the nitroarene **Ar²** (0.10 mmol, 1.0 equiv) to the bottom of the sealed tube via a small filter paper, allowing them to mix thoroughly (Note：when the catalyst and ligand adhere to the reactor inner wall, the desired product yield decreases sharply). Continue stirring the reaction mixture at 130 °C for 22 hours. After the mixture was cooled to room temperature, the resulting solution was directly filtered. The solvent was evaporated in vacuo to give the crude products. The residue was purified by flash column chromatography on silica gel (PE : EA or PE : DCM) to give the desired product **4**.



Procedure D: In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with $Pd(acac)_2$ (3.1 mg, 5.0 mol%), BrettPhos (16.1 mg, 15 mol%), nitroarene **Ar¹** (0.20 mmol, 1.0 equiv), B_2pin_2 (76 mg, 0.30 mmol), Cs_2CO_3 (130.3 mg, 0.40 mmol), TBAB (12.9 mg, 20 mol%), and $PhCF_3$ (1.0 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 130 °C for 18 hours. After the mixture was cooled to room temperature, transferred the sealed tube to the glovebox and added Cs_2CO_3 (130.3 mg, 0.40 mmol) and the nitroarene **Ar²** (0.15 mmol) to the bottom of the sealed tube via a small filter paper, allowing them to mix thoroughly. Continue stirring the reaction mixture at 130 °C for 26 hours. After the mixture was cooled to room temperature, the resulting solution was directly filtered. The solvent was evaporated in vacuo to give the crude products. The residue was purified by flash column chromatography on silica gel (PE : EA or PE : DCM) to give the desired product **5**.

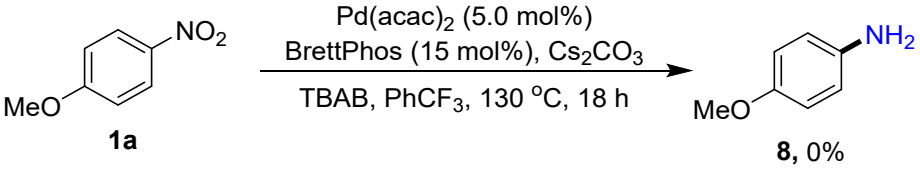
6. Mechanistic Studies

a) Examining the role of palladium catalyst



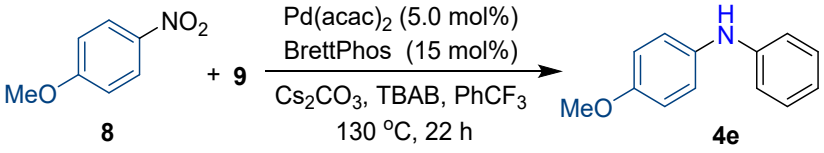
In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with 4-nitroanisole **1a** (46 mg, 0.30 mmol), B_2pin_2 (228.6 mg, 0.90 mmol), Cs_2CO_3 (195.5 mg, 0.60 mmol), TBAB (19.3 mg, 20 mol%), and $PhCF_3$ (3.0 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 130 °C for 18 hours. After the mixture was cooled to room temperature, the resulting solution was directly filtered. The solvent was evaporated in vacuo to give the crude products. The residue was purified by flash column chromatography on silica gel to give the *p*-anisidine **8** as a brown solid in 84 % (31 mg) yield.

b) Evaluating the role of B_2Pin_2

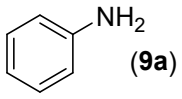
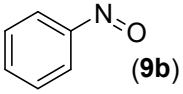
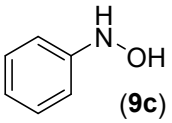
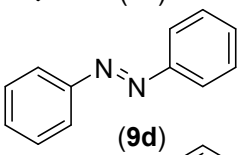
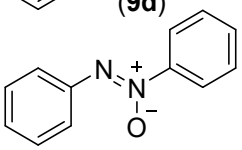


In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with $Pd(acac)_2$ (4.6 mg, 5.0 mol%), BrettPhos (24.2 mg, 15 mol%), 4-nitroanisole **1a** (46 mg, 0.30 mmol), Cs_2CO_3 (195.5 mg, 0.60 mmol), TBAB (19.3 mg, 20 mol%), and $PhCF_3$ (1.5 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 130 °C for 18 hours.

c) Verifying the possible intermediate



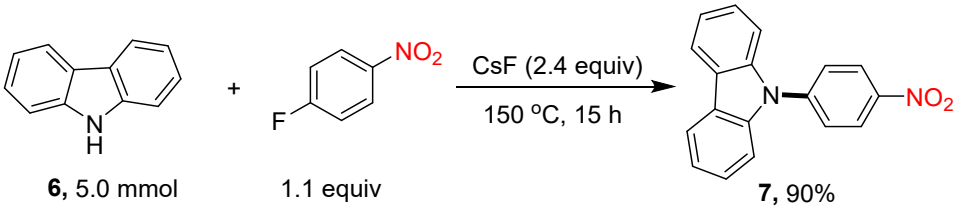
8 **4e**

entry	possible intermediates (**9**)	yield **4e** (%)
1	 (**9a**)	62
2	 (**9b**)	0
3	 (**9c**)	0
4	 (**9d**)	0
5	 (**9e**)	0

In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with $Pd(acac)_2$ (3.1 mg, 5.0 mol%), BrettPhos (16.1 mg, 15 mol%); 4-nitroanisole **1a** (30.6 mg, 0.20 mmol), intermediates **9** (0.30 mmol), Cs_2CO_3 (260.6 mg, 0.80 mmol), TBAB (25.8 mg, 40 mol%), and $PhCF_3$ (3.0 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 130 °C for 22 hours. After the mixture was cooled to room temperature, the resulting solution was directly filtered. The solvent was evaporated in vacuo to give the crude products. The residue was purified by flash column chromatography on silica gel to give the desired product **4e**.

7. General Procedure for Synthesis of Hole-Transporting Material TCTA

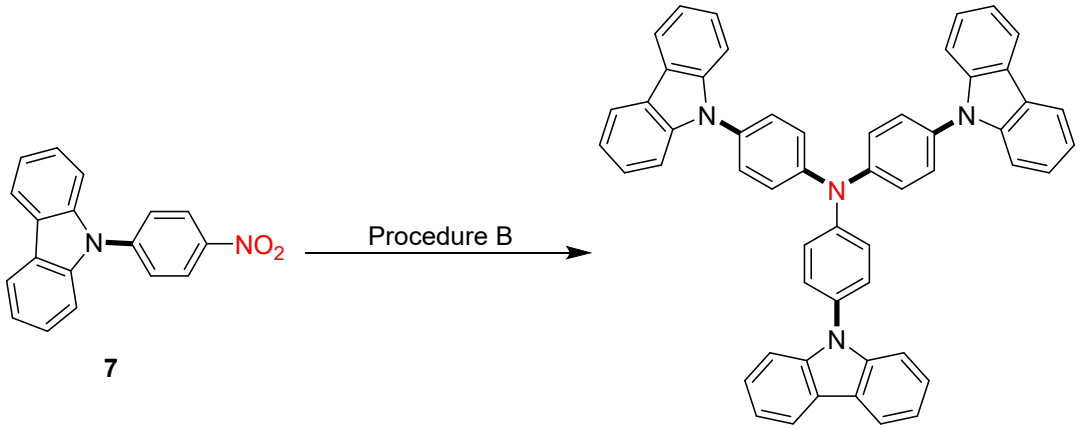
a) Efficient synthesis of the key intermediate of hole-transporting material TCTA



6, 5.0 mmol 1.1 equiv **7,** 90%

In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with carbazole **6** (835.4 mg, 5.0 mmol), 4-fluoronitrobenzene (775.6 mg, 5.5 mmol), dried cesium fluoride (1822.8 mg, 12 mmol), and DMSO (4.0 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 150 °C for 15 hours. After the mixture was cooled to room temperature, the mixture was poured into 12.5 mL of stirred methanol slowly, and the precipitated yellow crystals. The mixture was filtered, and the product 9-(4-nitrobenzene)-9*H*-carbazole **7** was obtained with 90% yield.

b) Single-step synthesis of TCTA



7 **3q** (TCTA), 71%

In a nitrogen gas filled glovebox, a reaction tube (35 mL) equipped with a magnetic stir bar was charged with $Pd(acac)_2$ (4.6 mg, 5 mol%), BrettPhos (24.2 mg, 15 mol%), 9-(4-nitrophenyl)-9*H*-carbazole **7** (86.5 mg 0.30 mmol), B_2pin_2 (56 mg, 0.22 mmol) Cs_2CO_3 (195.5 mg, 0.6 mmol) and $PhCH_3$ (1.0 mL) before being sealed with a rubber septum. The reaction mixture was stirred at 150 °C for 24 hours. After the mixture was cooled to room temperature, the resulting solution was directly filtered. The solvent was evaporated in vacuo to give the crude products. The residue was purified by flash column chromatography on silica gel (PE→PE : EA = 100 : 1) to give the desired product **3q** TCTA (52.6 mg, 71%).

8. Scale-Up Experiments

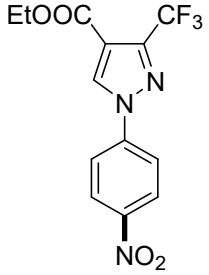
In a nitrogen gas filled glovebox, a Schlenk tube (100 mL) equipped with a magnetic stir bar was charged with 1-methoxy-2-nitrobenzene (306.3 mg, 2.0 mmol), $Pd(acac)_2$ (30.5 mg, 0.10 mmol), BrettPhos (161 mg, 0.30 mmol), Cs_2CO_3 (1303.3 mg, 4.0 mmol), B_2pin_2 (761.8 mg, 3.0 mmol), and TBAB (129.0 mg, 0.4 mmol). Then, $PhCF_3$ (10 mL) was added and the mixture stirred at 130 °C for 18 hours. After the reaction cooled to room temperature, the resulting

solution was directly filtered through a pad of silica by EA. Concentration in vacuo followed by silica gel column purification gave the desired product **2b** in 84 % yield (192.6 mg).

In a nitrogen gas filled glovebox, a Schlenk tube (100 mL) equipped with a magnetic stir bar was charged with nitrobenzene (369.3 mg, 3.0 mmol), $Pd(acac)_2$ (45.7 mg, 0.15 mmol), BrettPhos (241.5 mg, 0.30 mmol), Cs_2CO_3 (1995.0 mg, 4.0 mmol), and B_2pin_2 (558.7 mg, 2.2 mmol). Then, $PhCH_3$ (10 mL) was added and the mixture stirred at 150 ^oC for 24 hours. After the reaction cooled to room temperature, the resulting solution was directly filtered through a pad of silica by EA. Concentration in vacuo followed by silica gel column purification gave the desired product **3d** in 79 % yield (193.5 mg).

9. Characterization Data of Starting Materials and Products

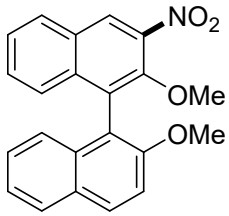
Ethyl 1-(4-nitrophenyl)-3-(trifluoromethyl)-1*H*-pyrazole-4-carboxylate (1x)



1x

The title compound was prepared according to previously reported literature procedure[1]; **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.39 (d, *J* = 2.2 Hz, 2H), 8.16 (s, 1H), 7.65 (d, *J* = 8.9 Hz, 2H), 4.38 (q, *J* = 7.1 Hz, 2H), 1.38 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 160.5, 148.2, 143.9, 143.2, 132.70 (q, $J_{C\text{-}F}$ = 40.4 Hz), 126.8, 124.6, 118.90 (q, $J_{C\text{-}F}$ = 271.6 Hz). 117.9, 61.6, 14.0.; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -54.95.

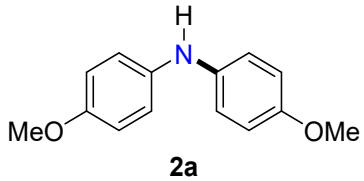
2,2'-Dimethoxy-3-nitro-1,1'-binaphthalene (1y)



1y

The title compound was prepared according to previously reported literature procedure[1]; **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.86 (d, *J* = 2.4 Hz, 1H), 8.17 (d, *J* = 9.1 Hz, 1H), 8.03 (d, *J* = 9.0 Hz, 1H), 7.96 (dd, *J* = 9.4, 2.4 Hz, 1H), 7.90 (d, *J* = 8.2 Hz, 1H), 7.60 (d, *J* = 9.1 Hz, 1H), 7.48 (d, *J* = 9.1 Hz, 1H), 7.35 (ddd, *J* = 8.0, 6.8, 1.0 Hz, 1H), 7.27 – 7.24 (m, 1H), 7.22 (d, *J* = 9.3 Hz, 1H), 7.05 (d, *J* = 8.5 Hz, 1H), 3.83 (s, 3H), 3.79 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 158.1, 154.8, 143.6, 136.8, 133.6, 131.8, 130.0, 129.1, 128.1, 127.1, 126.68, 126.65, 125.1, 124.6, 123.7, 120.0, 119.6, 117.8, 115.4, 113.8, 56.6, 56.5.

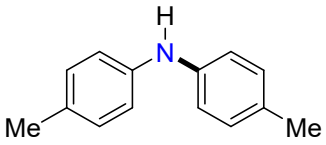
Bis(4-methoxyphenyl)amine (2a)



2a

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1) as a white solid in 83 % (28.5 mg) yield. The spectral data were in accordance with those reported in the literature[2]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.95 (d, *J* = 8.9 Hz, 4H), 6.84 (d, *J* = 8.9 Hz, 4H), 5.31 (s, 1H), 3.79 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 154.2, 137.9, 119.5, 114.7, 55.6.

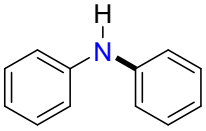
Di-*p*-tolylamine (2b)



2b

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a white solid in 85 % (25.2 mg) yield; The spectral data were in accordance with those reported in the literature[3]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.1 Hz, 4H), 6.96 (d, *J* = 8.4 Hz, 4H), 5.52 (s, 1H), 2.31 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 141.1, 130.1, 129.8, 117.9, 20.6.

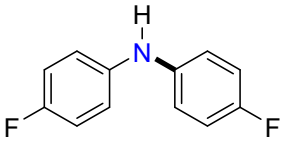
Diphenylamine (2c)



2c

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE) as a light yellow oil in 85 % (21.6 mg) yield; The spectral data were in accordance with those reported in the literature[3]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.32 – 7.26 (m, 4H), 7.09 (d, *J* = 7.5 Hz, 4H), 6.95 (t, *J* = 7.5 Hz, 2H), 5.71 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 143.1, 129.3, 121.0, 117.8.

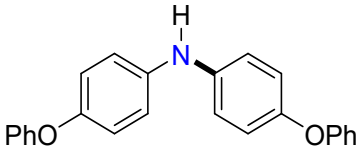
Dis(4-fluorophenyl)amine (2d)



2d

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 25 : 1) as a light yellow oil in 32 % (9.8 mg) yield. The spectral data were in accordance with those reported in the literature[3]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.00 – 6.92 (m, 8H), 5.49 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 157.8 (d, $J_{C\text{-}F}$ = 239.6 Hz), 139.7 (d, $J_{C\text{-}F}$ = 2.5 Hz), 119.4 (d, $J_{C\text{-}F}$ = 7.7 Hz), 116.0 (d, $J_{C\text{-}F}$ = 22.6 Hz); **^{19}F NMR** (565 MHz, $CDCl_3$) δ -122.59.

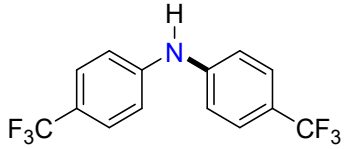
Bis(4-phenoxyphenyl)amine (2e)



2e

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 200 : 1) as a white solid in 79 % (41.9 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.34 (dd, *J* = 8.6, 7.3 Hz, 4H), 7.08 (t, *J* = 7.4 Hz, 2H), 7.06 – 7.03 (m, 4H), 7.02 (dd, *J* = 8.7, 1.1 Hz, 4H), 7.00 – 6.97 (m, 4H), 5.56 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 158.2, 150.7, 139.6, 129.6, 122.5, 120.6, 119.2, 117.8; **m.p.:** 102-104 °C; **HRMS** (APCI) calcd for $C_{24}H_{19}NO_2$ [M + H^+], 354.1489; found: 354.1488.

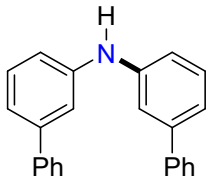
Bis(4-(trifluoromethyl)phenyl)amine (2f)



2f

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1) as a light yellow solid in 64 % (29.3 mg) yield. The spectral data were in accordance with those reported in the literature[2]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.55 (d, *J* = 8.4 Hz, 4H), 7.16 (d, *J* = 8.4 Hz, 4H), 6.12 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 144.8, 126.8 (q, $J_{C\text{-}F}$ = 3.8 Hz), 124.3 (q, $J_{C\text{-}F}$ = 271.0 Hz), 123.5 (q, $J_{C\text{-}F}$ = 33.0 Hz), 117.4; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -61.75.

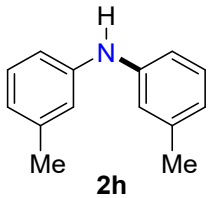
Di([1,1'-biphenyl]-3-yl)amine (2g)



2g

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 200 : 1→100 : 1) as a yellow oil in 75 % (36.2 mg) yield. The spectral data were in accordance with those reported in the literature[4]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.67 (d, *J* = 6.8 Hz, 4H), 7.59 – 7.47 (m, 4H), 7.46 – 7.33 (m, 6H), 7.27 (d, *J* = 6.9 Hz, 2H), 7.18 (d, *J* = 7.6 Hz, 2H), 5.88 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 143.4, 142.5, 141.0, 129.7, 128.7, 127.3, 127.1, 120.0, 116.71, 116.67.

Di-*m*-tolylamine (2h)

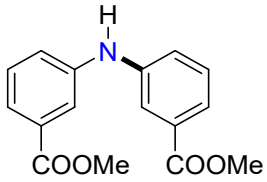


2h

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 200 : 1→100 : 1) as a light yellow oil in 89 % (26.3 mg) yield; The spectral data were in accordance with those reported in the literature[3]; **^{1}H NMR** (600

MHz, $CDCl_3$) δ 7.18 (t, *J* = 7.7 Hz, 2H), 6.91 (d, *J* = 7.4 Hz, 4H), 6.77 (d, *J* = 7.4 Hz, 2H), 5.63 (s, 1H), 2.34 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 143.2, 139.1, 129.1, 121.7, 118.5, 114.9, 21.5.

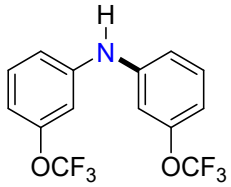
Dimethyl 3,3'-azanediyldibenzoate (2i)



2i

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 10 : 1) as a white solid in 54 % (23.1 mg) yield. The spectral data were in accordance with those reported in the literature[5]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.73 – 7.71 (m, 2H), 7.62 (dt, *J* = 7.6, 1.3 Hz, 2H), 7.34 (t, *J* = 7.8 Hz, 2H), 7.28 (ddd, *J* = 8.1, 2.5, 1.1 Hz, 2H), 6.03 (s, 1H), 3.90 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 166.9, 142.9, 131.4, 129.4, 122.5, 122.0, 118.9, 52.2.

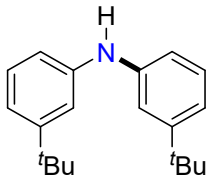
Bis(3-(trifluoromethoxy)phenyl)amine (2j)



2j

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1) as a yellow oil in 80 % (40.5 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.29 (t, *J* = 8.2 Hz, 2H), 6.98 (ddd, *J* = 8.2, 2.2, 0.9 Hz, 2H), 6.94 (s, 2H), 6.83 (d, *J* = 8.0 Hz, 2H), 5.88 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 150.3, 143.7, 130.6, 120.4 (q, $J_{C\text{-}F}$ = 257.2 Hz), 116.1, 113.7, 110.3; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -57.77; **HRMS** (APCI) calcd for $C_{14}H_9F_6NO_2$ [M + H^+], 338.0610; found: 338.0602.

Bis(4-(*tert*-butyl)phenyl)amine (2k)

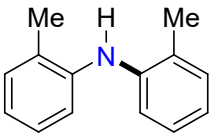


2k

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a light yellow oil in 84 % (35.5 mg) yield. The spectral data were in accordance with those reported in the literature[6]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.23 (t, *J* = 7.9 Hz, 2H), 7.17 (t, *J* = 2.1 Hz, 2H), 6.99 (d, *J* = 7.8 Hz, 2H), 6.91 (ddd, *J*

= 7.9, 2.3, 1.0 Hz, 2H), 5.77 (s, 1H), 1.34 (s, 18H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 152.5, 142.9, 128.9, 117.9, 115.0, 114.8, 34.7, 31.3.

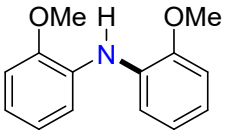
Di-*o*-tolylamine (2l)



2l

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a light yellow oil in 91 % (26.9 mg) yield; The spectral data were in accordance with those reported in the literature[7]; **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.23 (d, *J* = 7.1 Hz, 2H), 7.15 (t, *J* = 6.8 Hz, 2H), 7.02 (d, *J* = 7.4 Hz, 2H), 6.94 (t, *J* = 6.9 Hz, 2H), 5.17 (s, 1H), 2.30 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 141.9, 130.8, 127.5, 126.8, 121.3, 118.2, 17.8.

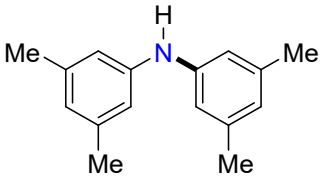
Bis(2-methoxyphenyl)amine (2m)



2m

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 200 : 1) as a colorless oil in 85 % (29.2 mg) yield. The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.46 – 7.35 (m, 2H), 7.04 – 6.84 (m, 6H), 6.52 (s, 1H), 3.92 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.9, 132.4, 120.7, 120.1, 115.4, 110.5, 55.6.

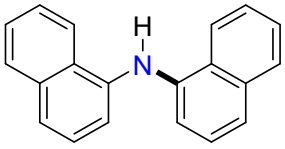
Bis(3,5-dimethylphenyl)amine (2n)



2n

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 200 : 1→100 : 1) as a light yellow oil in 84 % (28.4 mg) yield. The spectral data were in accordance with those reported in the literature[3]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.73 (s, 4H), 6.62 (s, 2H), 5.54 (s, 1H), 2.31 (s, 12H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 143.2, 138.9, 122.7, 115.7, 21.4.

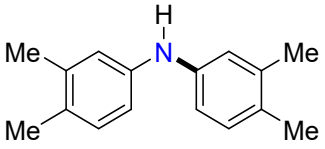
Di(naphthalen-1-yl)amine (2o)



2o

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 250 : 1) as a pink solid in 79 % (31.9 mg) yield. The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.11 (d, *J* = 8.4 Hz, 2H), 7.96 – 7.90 (m, 2H), 7.61 – 7.53 (m, 4H), 7.50 (t, *J* = 6.8 Hz, 2H), 7.37 (td, *J* = 7.5, 3.2 Hz, 2H), 7.06 (dd, *J* = 7.5, 4.2 Hz, 2H), 6.36 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 140.3, 134.6, 128.6, 126.9, 126.2, 126.1, 125.6, 122.4, 121.8, 115.4.

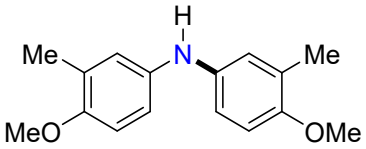
Bis(3,4-dimethylphenyl)amine (2p)



2p

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a yellow oil in 76 % (25.7 mg) yield. The spectral data were in accordance with those reported in the literature[8]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.04 (d, *J* = 8.0 Hz, 2H), 6.87 (d, *J* = 2.5 Hz, 2H), 6.84 (dd, *J* = 8.0, 2.5 Hz, 2H), 5.46 (s, 1H), 2.24 (d, *J* = 6.4 Hz, 12H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 141.5, 137.4, 130.2, 128.8, 119.4, 115.2, 19.9, 18.9.

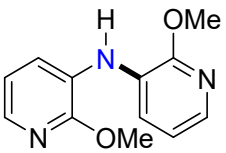
Bis(4-methoxy-3-methylphenyl)amine (2q)



2q

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a white solid in 75 % (28.9 mg) yield. The spectral data were in accordance with those reported in the literature[8]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.82 (d, *J* = 7.1 Hz, 4H), 6.75 (d, *J* = 9.2 Hz, 2H), 5.21 (s, 1H), 3.81 (s, 6H), 2.21 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 152.4, 137.6, 127.6, 121.4, 116.2, 111.1, 55.8, 16.3.

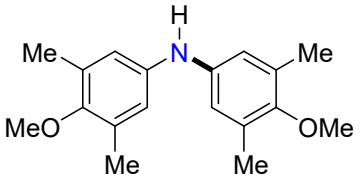
Bis(2-methoxypyridin-3-yl)amine (2r)



2r

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1) as a white solid in 92 % (31.9 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.70 (dd, *J* = 5.0, 1.6 Hz, 2H), 7.48 (dd, *J* = 7.7, 1.6 Hz, 2H), 6.82 (dd, *J* = 7.7, 5.0 Hz, 2H), 6.45 (s, 1H), 4.04 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 154.1, 136.9, 126.5, 120.3, 116.7, 53.6; **m.p.:** 60-62 °C; HRMS (APCI) calcd for $C_{12}H_{13}N_3O_2$ [M + H^+], 232.1081; found: 232.1076.

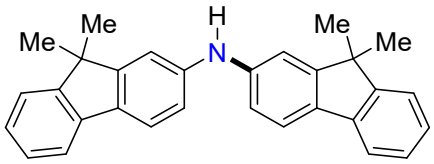
Bis(4-methoxy-3,5-dimethylphenyl)amine (2s)



2s

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a colorless oil in 82 % (35.1 mg) yield. The spectral data were in accordance with those reported in the literature[4]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.69 (s, 4H), 5.31 (s, 1H), 3.72 (s, 6H), 2.26 (s, 12H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 151.1, 139.5, 131.5, 118.1, 59.9, 16.2.

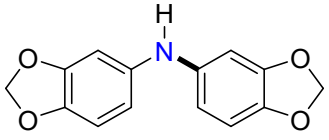
Bis(9,9-dimethyl-9*H*-fluoren-2-yl)amine (2t)



2t

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a white solid in 86 % (51.8 mg) yield. The spectral data were in accordance with those reported in the literature[9]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.69 (t, *J* = 8.4 Hz, 4H), 7.46 (d, *J* = 7.4 Hz, 2H), 7.38 (td, *J* = 7.4, 1.2 Hz, 2H), 7.31 (td, *J* = 7.4, 1.2 Hz, 2H), 7.28 (d, *J* = 2.2 Hz, 2H), 7.12 (dd, *J* = 8.1, 2.1 Hz, 2H), 5.96 (s, 1H), 1.54 (s, 12H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.3, 153.0, 142.7, 139.2, 132.5, 126.9, 126.0, 122.4, 120.9, 119.0, 116.9, 112.2, 46.7, 27.2.

Bis(benzo[*d*][1,3]dioxol-5-yl)amine (2u)

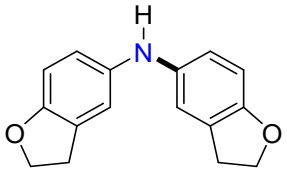


2u

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1) as a yellow oil in 57 % (22 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.70 (d, *J* = 8.2 Hz, 2H), 6.58 (d, *J* = 2.2 Hz, 2H), 6.42 (dd, *J* = 8.3, 2.3 Hz,

2H), 5.91 (s, 4H), 5.31 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.2, 142.1, 139.0, 110.9, 108.5, 100.93, 100.89; **HRMS** (APCI) calcd for $C_{14}H_{11}NO_4$ [M + H^+], 258.0761; found: 258.0756.

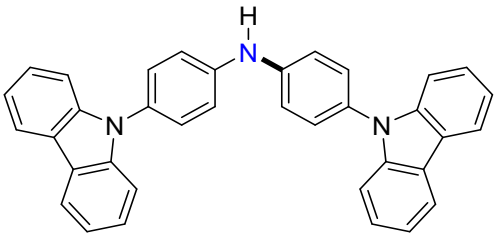
Bis(2,3-dihydrobenzofuran-5-yl)amine (2v)



2v

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 10 : 1) as a yellow solid in 73 % (27.7 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.89 – 6.86 (m, 2H), 6.73 (dd, *J* = 8.3, 2.3 Hz, 2H), 6.68 (d, *J* = 8.4 Hz, 2H), 5.20 (s, 1H), 4.54 (t, *J* = 8.6 Hz, 4H), 3.16 (t, *J* = 8.6 Hz, 4H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 154.7, 138.4, 127.8, 118.4, 115.9, 109.4, 71.1, 30.1; **m.p.:** 96-98 °C; **HRMS** (APCI) calcd for $C_{16}H_{15}O_2$ [M + H^+], 254.1176; found: 254.1170.

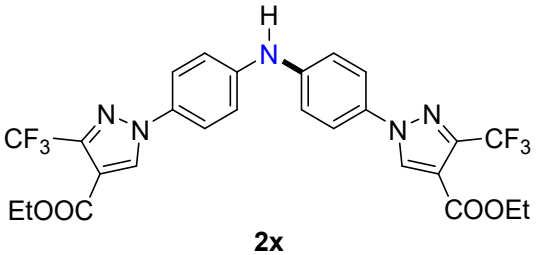
Bis(4-(9*H*-carbazol-9-yl)phenyl)amine (2w)



2w

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1) as a white solid in 75 % (56.2 mg) yield. The spectral data were in accordance with those reported in the literature[10]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.23 (d, *J* = 7.8 Hz, 4H), 7.54 – 7.46 (m, 12H), 7.36 (tt, *J* = 6.4, 2.1 Hz, 8H), 5.96 (s, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 142.0, 141.2, 130.7, 128.3, 125.9, 123.1, 120.3, 119.7, 118.8, 109.7.

Biethyl 1,1'-(azanediylbis(4,1-phenylene))bis(3-(trifluoromethyl)-1*H*-pyrazole-4-carboxylate) (2x)

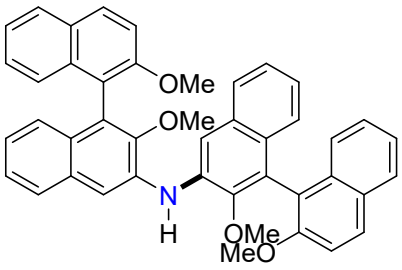


2x

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 10 : 1→5 : 1) as a white solid in 64 % (55.8 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.10 (s, 2H), 7.32 (d, *J* = 8.7 Hz, 4H), 7.17 (d, *J* = 8.8 Hz, 4H),

6.36 (s, 1H), 4.37 (q, J = 7.1 Hz, 4H), 1.38 (t, J = 7.2 Hz, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 161.0, 143.5, 142.2, 132.6, 132.5 (q, $J_{C\text{-}F}$ = 40.0 Hz), 127.1, 119.1 (q, $J_{C\text{-}F}$ = 271.4 Hz), 117.7, 116.4, 61.3, 14.0. **^{19}F NMR** (565 MHz, $CDCl_3$) δ -55.49; **m.p.:** 108-110 °C; **HRMS** (APCI) calcd for $C_{26}H_{21}F_6N_5O_4$ [M + H^+], 582.1570; found: 582.1561.

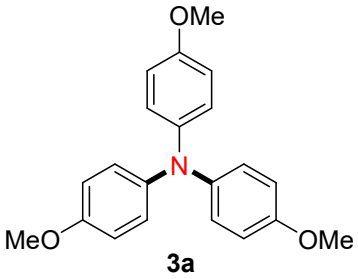
Bis(2,2'-dimethoxy-[1,1'-binaphthalen]-3-yl)amine (2y)



2y

Following the general **Procedure A**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 2 : 1→DCM) as a white solid in 72 % (69.3 mg) yield. **^{1}H NMR** (600 MHz, DMSO-d_6) δ 8.38 (s, 1H), 8.04 (d, J = 9.0 Hz, 2H), 7.93 (d, J = 8.2 Hz, 2H), 7.88 (d, J = 9.1 Hz, 2H), 7.67 (d, J = 2.2 Hz, 2H), 7.58 (d, J = 9.2 Hz, 2H), 7.48 (d, J = 9.2 Hz, 2H), 7.31 (ddd, J = 8.1, 6.7, 1.2 Hz, 2H), 7.23 (ddd, J = 8.2, 6.7, 1.3 Hz, 2H), 7.15 (dd, J = 9.1, 2.3 Hz, 2H), 7.01 (dd, J = 8.5, 1.1 Hz, 2H), 6.87 (d, J = 9.1 Hz, 2H), 3.73 (s, 6H), 3.65 (s, 6H); **^{13}C NMR** (151 MHz, DMSO-d_6) δ 155.1, 153.3, 139.8, 133.9, 130.5, 129.7, 129.2, 129.0, 128.4, 128.2, 126.8, 126.1, 125.1, 123.8, 121.4, 119.4, 119.3, 115.2, 114.7, 110.6, 56.8, 56.6; **m.p.:** 274-275 °C; **HRMS** (APCI) calcd for $C_{44}H_{35}NO_4$ [M + H^+], 642.2639; found: 642.2627.

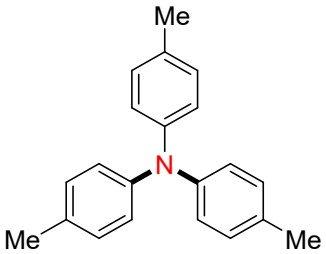
Tris(4-methoxyphenyl)amine (3a)



3a

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a light yellow solid in 70 % (23.4 mg) yield. The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.00 (d, J = 9.0 Hz, 6H), 6.82 (d, J = 9.0 Hz, 6H), 3.80 (s, 9H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 154.8, 141.9, 124.7, 114.4, 55.4.

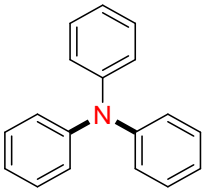
Tri-*p*-tolylamine (3b)



3b

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a colourless oil in 65 % (18.7 mg) yield; The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.05 (d, *J* = 7.9 Hz, 6H), 6.97 (d, *J* = 8.5 Hz, 6H), 2.31 (s, 9H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 145.7, 131.7, 129.7, 123.8, 20.7.

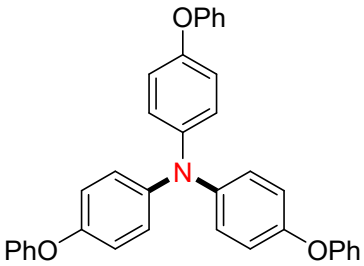
Triphenylamine (3c)



3c

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 77 % (18.9 mg) yield; The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.25 (t, *J* = 7.9 Hz, 6H), 7.10 (d, *J* = 8.6 Hz, 6H), 7.01 (t, *J* = 7.3 Hz, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 147.8, 129.2, 124.1, 122.6.

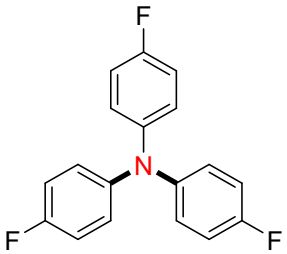
Tris(4-phenoxyphenyl)amine (3d)



3d

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 65 % (33.9 mg) yield. The spectral data were in accordance with those reported in the literature[11]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.38 – 7.29 (m, 6H), 7.09 (dd, *J* = 13.4, 8.1 Hz, 9H), 7.04 (d, *J* = 7.9 Hz, 6H), 6.94 (d, *J* = 8.9 Hz, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 157.6, 152.2, 143.6, 129.7, 125.0, 122.9, 120.0, 118.4.

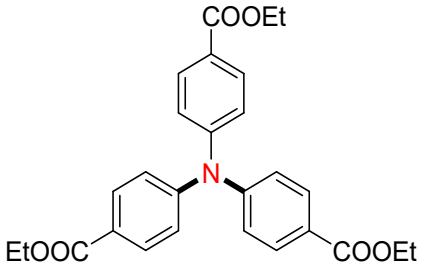
Tris(4-fluorophenyl)amine (3e)



3e

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 29 % (8.7 mg) yield. The spectral data were in accordance with those reported in the literature[3]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.08 – 6.69 (m, 12H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 158.6 (d, $J_{C\text{-}F}$ = 243.1 Hz), 144.0 (d, $J_{C\text{-}F}$ = 2.8 Hz), 125.2 (d, $J_{C\text{-}F}$ = 8.1 Hz), 116.1 (d, $J_{C\text{-}F}$ = 22.6 Hz); **^{19}F NMR** (565 MHz, $CDCl_3$) δ -120.08.

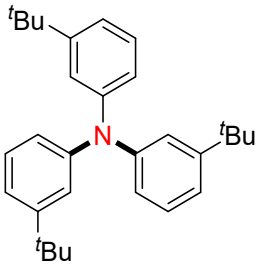
Triethyl 4,4',4''-nitrilotribenzoate (3f)



3f

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1→10 : 1) as a white solid in 48 % (22.1 mg) yield. The spectral data were in accordance with those reported in the literature[12]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.95 (d, J = 8.7 Hz, 6H), 7.11 (d, J = 8.7 Hz, 6H), 4.36 (q, J = 7.1 Hz, 6H), 1.38 (t, J = 7.2 Hz, 9H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 165.9, 150.3, 131.1, 125.8, 123.7, 60.9, 14.3.

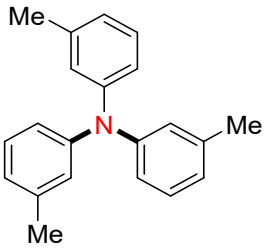
Tris(3-(*tert*-butyl)phenyl)amine (3g)



3g

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a colorless oil in 65 % (26.9 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.20 (s, 3H), 7.17 (t, J = 7.9 Hz, 3H), 7.03 (d, J = 7.9 Hz, 3H), 6.87 (d, J = 9.2 Hz, 3H), 1.26 (s, 27H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 152.0, 147.7, 128.5, 121.25, 121.15, 119.2, 34.7, 31.3; **HRMS** (APCI) calcd for $C_{30}H_{39}N$ [M + H^+], 414.3155; found: 414.3147.

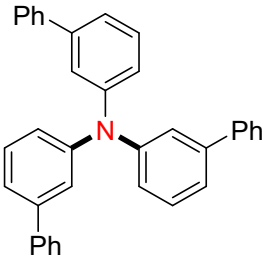
Tri-*m*-tolylamine (3h)



3h

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a colourless oil in 74 % (21.2 mg) yield; The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.14 (t, *J* = 7.8 Hz, 3H), 6.92 (s, 3H), 6.89 (d, *J* = 7.9 Hz, 3H), 6.84 (d, *J* = 7.4 Hz, 3H), 2.28 (s, 9H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.0, 138.9, 128.9, 124.8, 123.3, 121.4, 21.4.

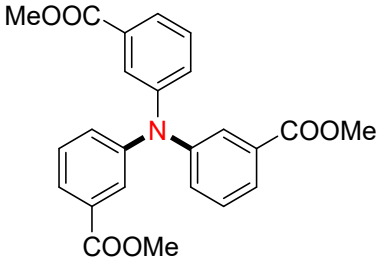
Tri([1,1'-biphenyl]-3-yl)amine (3i)



3i

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 66 % (31.3 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.61 – 7.56 (m, 6H), 7.50 (t, *J* = 2.0 Hz, 3H), 7.43 (dd, *J* = 8.4, 7.0 Hz, 6H), 7.39 (d, *J* = 7.9 Hz, 3H), 7.36 (dt, *J* = 14.7, 1.3 Hz, 3H), 7.33 (dt, *J* = 7.7, 1.3 Hz, 3H), 7.22 (ddd, *J* = 8.0, 2.3, 1.1 Hz, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.2, 142.4, 140.8, 129.7, 128.7, 127.3, 127.0, 123.1, 122.9, 121.7; **m.p.:** 145-147 °C; **HRMS** (APCI) calcd for $C_{36}H_{27}N$ [M + H^+], 474.2216; found: 474.2208.

Timethyl 3,3',3''-nitrilotribenzoate (3j)

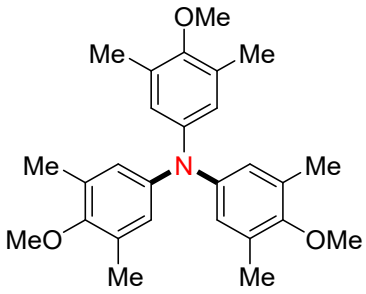


3j

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 20 : 1→10 : 1) as a white solid in 56 % (23.4 mg) yield. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.76 – 7.68 (m, 6H), 7.34 (t, *J* = 7.8 Hz, 3H), 7.25 (ddd, *J* = 8.1, 2.5, 1.3 Hz, 3H), 3.86 (s, 9H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 166.6, 147.4, 131.8, 129.7, 128.5,

125.0, 124.6, 52.2; **m.p.:** 176-177 °C; **HRMS** (APCI) calcd for $C_{24}H_{21}NO_6$ [M + H^+], 420.1442; found: 420.1441.

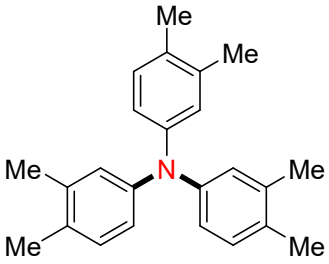
Tris(4-methoxy-3,5-dimethylphenyl)amine (3k)



3k

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 4 : 1) as a white solid in 55 % (23 mg) yield. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 6.66 (s, 6H), 3.72 (s, 9H), 2.19 (s, 18H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 152.1, 143.8, 131.2, 124.1, 59.8, 16.2; **m.p.:** 253-255 °C; **HRMS** (APCI) calcd for $C_{27}H_{33}NO_3$ [M + H^+], 420.2533; found: 420.2524.

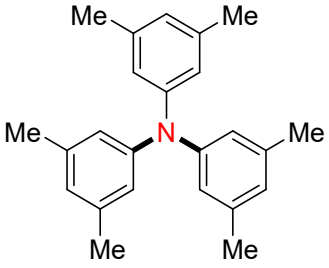
Tris(3,4-dimethylphenyl)amine (3l)



3l

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 63 % (20.8 mg) yield. The spectral data were in accordance with those reported in the literature[13]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.03 (d, *J* = 7.9 Hz, 3H), 6.92 (s, 3H), 6.84 (dt, *J* = 8.2, 2.2 Hz, 3H), 2.26 (t, *J* = 2.1 Hz, 9H), 2.21 (t, *J* = 2.2 Hz, 9H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 146.1, 137.2, 130.3, 130.1, 125.2, 121.5, 19.8, 19.1.

Tris(3,5-dimethylphenyl)amine (3m)

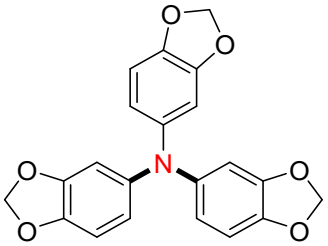


3m

Following the general **Procedure B**, the title compound was isolated by flash column

chromatography on silica gel (PE) as a white solid in 68 % (22.4 mg) yield; The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.71 (s, 6H), 6.67 (s, 3H), 2.24 (s, 18H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.1, 138.6, 124.2, 122.1, 21.3.

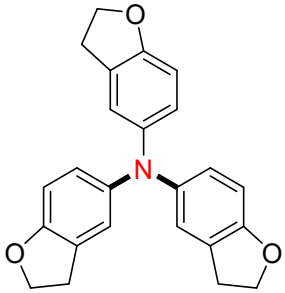
Tris(benzo[*d*][1,3]dioxol-5-yl)amine (3n)



3n

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a yellow oil in 60 % (22.6 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 6.67 (d, J = 8.3 Hz, 3H), 6.57 (d, J = 2.2 Hz, 3H), 6.47 (dd, J = 8.4, 2.2 Hz, 3H), 5.92 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.1, 143.0, 116.8, 108.3, 105.8, 101.1; **HRMS** (APCI) calcd for $C_{21}H_{15}NO_6$ [M + H^+], 378.0972; found: 378.0964.

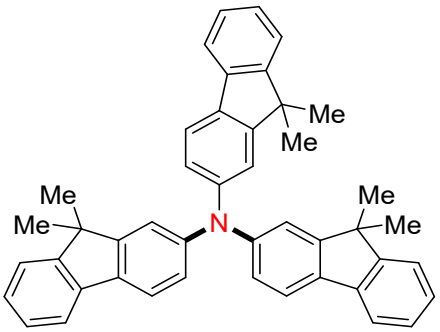
Tris(2,3-dihydrobenzofuran-5-yl)amine (3o)



3o

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 55 % (20.4 mg) yield. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 6.90 (s, 3H), 6.79 (d, J = 8.5 Hz, 3H), 6.65 (d, J = 8.5 Hz, 3H), 4.54 (t, J = 8.6 Hz, 6H), 3.13 (t, J = 8.6 Hz, 6H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 155.3, 142.6, 127.7, 123.6, 120.9, 109.3, 71.2, 30.0; **m.p.:** 168-170 °C; **HRMS** (APCI) calcd for $C_{24}H_{21}NO_3$ [M + H^+], 372.1594; found: 372.1587.

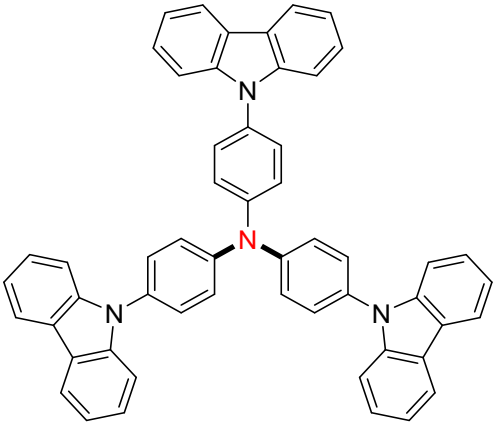
Tris(9,9-dimethyl-9*H*-fluoren-2-yl)amine (3p)



3p

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 70 % (41.5 mg) yield. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.69 (d, *J* = 7.4 Hz, 3H), 7.64 (d, *J* = 8.2 Hz, 3H), 7.43 (d, *J* = 7.4 Hz, 3H), 7.34 (m, *J* = 7.6 Hz, 6H), 7.29 (t, *J* = 7.4 Hz, 3H), 7.18 (d, *J* = 8.1 Hz, 3H), 1.46 (s, 18H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 155.0, 153.5, 147.5, 139.0, 133.9, 127.0, 126.4, 123.0, 122.5, 120.6, 119.3, 118.5, 46.8, 27.0; **HRMS** (APCI) calcd for $C_{45}H_{39}N$ [M + H^+], 594.3155; found: 594.3144.

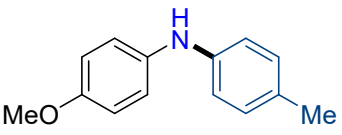
Tris(4-(9*H*-carbazol-9-yl)phenyl)amine (3q)



3q

Following the general **Procedure B**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 71 % (52.6 mg) yield. The spectral data were in accordance with those reported in the literature[7]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.22 (d, *J* = 7.7 Hz, 6H), 7.63 (d, *J* = 8.7 Hz, 6H), 7.60 – 7.55 (m, 12H), 7.51 (t, *J* = 7.7 Hz, 6H), 7.36 (t, *J* = 7.4 Hz, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 146.3, 140.9, 132.8, 128.2, 125.9, 125.3, 123.3, 120.3, 119.9, 109.8.

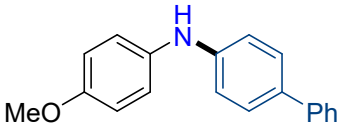
4-Methoxy-*N*-(*p*-tolyl)aniline (4a)



4a

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 6 : 1) as a yellow oil in 75 % (16 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.06 – 7.01 (m, 4H), 6.88 – 6.84 (m, 4H), 5.41 (s, 1H), 3.80 (s, 3H), 2.29 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 154.8, 142.4, 136.6, 129.8, 129.3, 121.1, 116.5, 114.6, 55.6, 20.5.

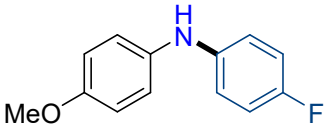
***N*-(4-methoxyphenyl)-[1,1'-biphenyl]-4-amine (4b)**



4b

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 4 : 1) as a white solid in 79 % (21.8 mg) yield. The spectral data were in accordance with those reported in the literature[15]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.57 (dd, *J* = 8.2, 1.1 Hz, 2H), 7.48 (d, *J* = 8.6 Hz, 2H), 7.42 (t, *J* = 7.8 Hz, 2H), 7.30 (t, *J* = 7.9 Hz, 1H), 7.13 (d, *J* = 8.9 Hz, 2H), 6.99 (d, *J* = 8.6 Hz, 2H), 6.90 (d, *J* = 8.9 Hz, 2H), 5.59 (s, 1H), 3.83 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.4, 144.6, 141.0, 135.4, 132.3, 128.7, 127.9, 126.4, 126.3, 122.4, 115.7, 114.7, 55.6.

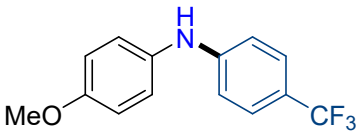
4-Fluoro-*N*-(4-methoxyphenyl)aniline (4c)



4c

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 8 : 1) as a yellow oil in 46 % (10 mg) yield. The spectral data were in accordance with those reported in the literature[16]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.00 (d, *J* = 8.9 Hz, 2H), 6.93 (t, *J* = 8.7 Hz, 2H), 6.90 – 6.83 (m, 4H), 5.39 (s, 1H), 3.80 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 157.1 (d, $J_{C\text{-}F}$ = 238.2 Hz), 155.0, 141.1, 136.5, 121.2, 117.8 (d, $J_{C\text{-}F}$ = 7.6 Hz), 115.8 (d, $J_{C\text{-}F}$ = 22.2 Hz), 114.7, 55.6; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -124.37.

4-Methoxy-*N*-(4-(trifluoromethyl)phenyl)aniline (4d)

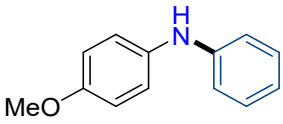


4d

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 8 : 1) as a yellow oil in 85 % (22.7 mg) yield. The spectral data were in accordance with those reported in the literature[16]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.42 (d, *J* = 8.6 Hz, 2H), 7.12 (d, *J* = 8.9 Hz, 2H), 6.91 (d, *J* = 8.9 Hz, 2H), 6.86 (d, *J* =

8.5 Hz, 2H), 5.74 (s, 1H), 3.83 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 156.5, 148.6, 133.7, δ 126.6 (q, J_{C-F} = 3.8 Hz), δ 124.7 (q, J_{C-F} = 270.6 Hz), 124.2, 120.4 (q, J_{C-F} = 32.6 Hz), 114.8, 113.7, 55.5; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -61.22.

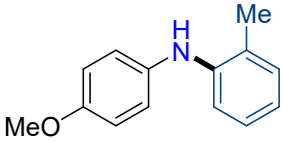
4-Methoxy-*N*-phenylaniline (4e)



4e

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 6 : 1) as a yellow solid in 77 % (15.4 mg) yield. The spectral data were in accordance with those reported in the literature[17]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.23 (t, *J* = 7.9 Hz, 2H), 7.09 (d, *J* = 8.8 Hz, 2H), 6.92 (d, *J* = 7.8 Hz, 2H), 6.88 (d, *J* = 8.8 Hz, 2H), 6.85 (t, *J* = 7.3 Hz, 1H), 3.81 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.2, 145.1, 135.7, 129.3, 122.2, 119.5, 115.6, 114.6, 55.5.

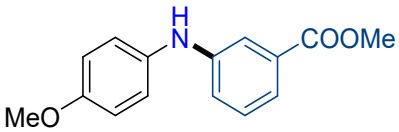
***N*-(4-methoxyphenyl)-2-methylaniline (4f)**



4f

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 4 : 1) as a yellow oil in 83 % (17.7 mg) yield. The spectral data were in accordance with those reported in the literature[16]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.19 – 7.15 (m, 1H), 7.10 (t, *J* = 7.6 Hz, 1H), 7.05 – 7.01 (m, 3H), 6.90 – 6.87 (m, 2H), 6.84 (t, *J* = 7.3 Hz, 1H), 5.24 (s, 1H), 3.82 (s, 3H), 2.27 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.1, 143.3, 136.3, 130.7, 126.7, 125.2, 122.1, 119.9, 115.1, 114.6, 55.6, 17.7.

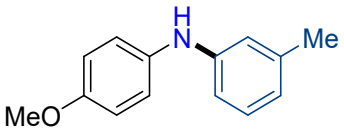
Methyl 3-((4-methoxyphenyl)amino)benzoate (4g)



4g

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 4 : 1) as a yellow solid in 71 % (18.2 mg) yield. The spectral data were in accordance with those reported in the literature[16]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.56 – 7.54 (m, 1H), 7.48 (d, *J* = 7.7 Hz, 1H), 7.28 – 7.23 (m, 1H), 7.10 – 7.05 (m, 3H), 6.90 – 6.87 (m, 2H), 5.63 (s, 1H), 3.88 (s, 3H), 3.81 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 167.2, 155.7, 145.5, 134.9, 131.2, 129.2, 122.8, 120.4, 119.4, 116.0, 114.8, 55.5, 52.1.

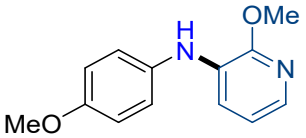
***N*-(4-methoxyphenyl)-3-methylaniline (4h)**



4h

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 6 : 1) as a yellow oil in 86 % (18.3 mg) yield. The spectral data were in accordance with those reported in the literature[17]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.11 (t, *J* = 7.6 Hz, 1H), 7.08 (d, *J* = 8.9 Hz, 2H), 6.87 (d, *J* = 8.9 Hz, 2H), 6.73 (d, *J* = 8.1 Hz, 2H), 6.67 (d, *J* = 7.4 Hz, 1H), 5.46 (s, 1H), 3.81 (s, 3H), 2.29 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.2, 145.1, 139.1, 135.8, 129.1, 122.2, 120.4, 116.3, 114.6, 112.8, 55.6, 21.5.

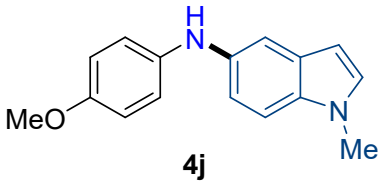
2-Methoxy-*N*-(4-methoxyphenyl)pyridin-3-amine (4i)



4i

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 3 : 1) as an orange oil in 84 % (19.3 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.58 (dd, *J* = 5.0, 1.6 Hz, 1H), 7.16 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.11 (d, *J* = 8.9 Hz, 2H), 6.89 (d, *J* = 8.9 Hz, 2H), 6.73 (dd, *J* = 7.7, 5.0 Hz, 1H), 5.92 (s, 1H), 4.03 (s, 3H), 3.80 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.8, 152.7, 134.6, 134.1, 130.2, 123.2, 117.0, 116.9, 114.7, 55.5, 53.4; **HRMS** (APCI) calcd for $C_{13}H_{14}N_2O_2$ [M + H^+], 231.1128; found: 231.1125.

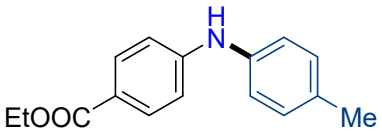
N-(4-methoxyphenyl)-1-methyl-1*H*-indol-5-amine (4j)



4j

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 6 : 1) as a brown solid in 50 % (12.6 mg) yield. The spectral data were in accordance with those reported in the literature[18]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.29 (d, *J* = 2.0 Hz, 1H), 7.26 – 7.23 (m, 1H), 7.03 (d, *J* = 3.0 Hz, 1H), 7.00 – 6.95 (m, 3H), 6.86 – 6.81 (m, 2H), 6.38 (d, *J* = 3.0 Hz, 1H), 5.39 (s, 1H), 3.79 (s, 3H), 3.78 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 153.7, 139.4, 136.8, 133.1, 129.3, 129.1, 118.6, 116.2, 114.7, 110.6, 109.8, 100.2, 55.7, 32.9.

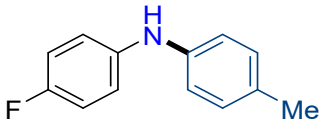
Ethyl 4-(*p*-tolylamino)benzoate (4k)



4k

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 8 : 1) as a yellow solid in 63 % (16.1 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.90 (d, *J* = 8.8 Hz, 2H), 7.17 – 7.13 (m, 2H), 7.08 (d, *J* = 8.3 Hz, 2H), 6.92 (d, *J* = 8.8 Hz, 2H), 5.98 (s, 1H), 4.33 (q, *J* = 7.1 Hz, 2H), 2.34 (s, 3H), 1.37 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 166.6, 148.6, 138.1, 133.0, 131.4, 130.0, 121.2, 120.9, 114.0, 60.4, 20.8, 14.4.

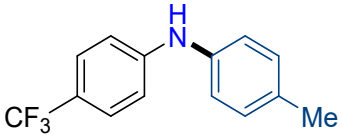
4-Fluoro-*N*-(*p*-tolyl)aniline (4l)



4l

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 65 % (13.1 mg) yield. The spectral data were in accordance with those reported in the literature[19]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.09 (d, *J* = 8.0 Hz, 2H), 7.01 – 6.95 (m, 4H), 6.95 – 6.91 (m, 2H), 5.50 (s, 1H), 2.32 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 157.6 (d, $J_{C\text{-}F}$ = 239.1 Hz), δ 141.1, 139.8, 130.5, 129.9, 119.3 (d, $J_{C\text{-}F}$ = 7.7 Hz), 117.8, 115.8 (d, $J_{C\text{-}F}$ = 22.5 Hz) 20.6; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -123.08.

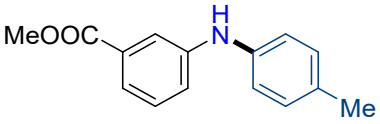
4-Methyl-*N*-(4-(trifluoromethyl)phenyl)aniline (4m)



4m

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 37 % (9.3 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.44 (d, *J* = 8.5 Hz, 2H), 7.15 (d, *J* = 8.1 Hz, 2H), 7.06 (d, *J* = 8.3 Hz, 2H), 6.97 (d, *J* = 8.5 Hz, 2H), 5.83 (s, 1H), 2.34 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 147.5, 138.3, 133.0, 130.1, 126.6 (q, $J_{C\text{-}F}$ = 3.8 Hz), 124.7 (q, $J_{C\text{-}F}$ = 270.6 Hz), 121.04, 121.02 (q, $J_{C\text{-}F}$ = 32.7 Hz), 114.6, 20.8; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -61.36.

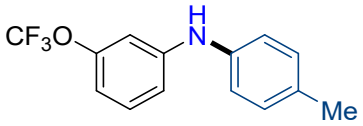
Methyl 3-(*p*-tolylamino)benzoate (4n)



4n

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 6 : 1) as a white solid in 54 % (13.0 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.67 – 7.64 (m, 1H), 7.53 (d, *J* = 7.7 Hz, 1H), 7.28 (t, *J* = 7.9 Hz, 1H), 7.18 (ddd, *J* = 8.1, 2.6, 1.0 Hz, 1H), 7.12 (d, *J* = 8.3 Hz, 2H), 7.02 (d, *J* = 8.3 Hz, 2H), 5.73 (s, 1H), 3.89 (s, 3H), 2.32 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 167.2, 144.3, 139.5, 131.7, 131.2, 130.0, 129.3, 121.1, 120.5, 119.5, 117.2, 52.1, 20.7.

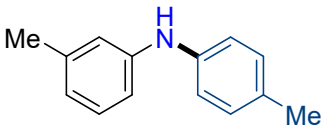
***N*-(*p*-tolyl)-3-(trifluoromethoxy)aniline (4o)**



4o

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 62 % (16.6 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.21 (t, *J* = 8.2 Hz, 1H), 7.14 (d, *J* = 8.0 Hz, 2H), 7.04 (d, *J* = 8.4 Hz, 2H), 6.87 (dd, *J* = 7.8, 2.5 Hz, 1H), 6.83 (s, 1H), 6.70 (d, *J* = 8.1 Hz, 1H), 5.71 (s, 1H), 2.34 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 150.3, 145.9, 138.9, 132.3, 130.3, 130.0, δ 120.5 (q, $J_{C\text{-}F}$ = 256.8 Hz), 120.1, 114.1, 111.6, 108.2, 20.7; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -57.62; **HRMS** (APCI) calcd for $C_{14}H_{12}F_3NO$ [M + H$^+$], 268.0944; found: 268.0940.

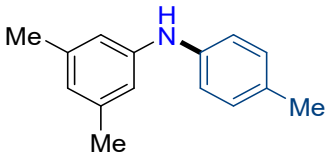
3-Methyl-*N*-(*p*-tolyl)aniline (4p)



4p

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 86 % (17.0 mg) yield. The spectral data were in accordance with those reported in the literature[19]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.15 (t, *J* = 7.7 Hz, 1H), 7.11 (d, *J* = 8.0 Hz, 2H), 7.01 (d, *J* = 8.4 Hz, 2H), 6.84 (d, *J* = 7.8 Hz, 2H), 6.73 (d, *J* = 7.5 Hz, 1H), 5.58 (s, 1H), 2.33 (s, 3H), 2.32 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 143.9, 140.4, 139.1, 130.8, 129.8, 129.1, 121.2, 118.9, 117.5, 114.0, 21.5, 20.7.

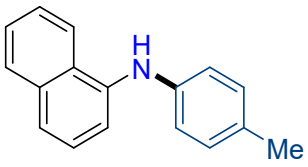
3,5-Dimethyl-*N*-(*p*-tolyl)aniline (4q)



4q

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 86 % (18.1 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.09 (d, *J* = 8.1 Hz, 2H), 6.99 (d, *J* = 8.3 Hz, 2H), 6.65 (s, 2H), 6.55 (s, 1H), 5.53 (s, 1H), 2.31 (s, 3H), 2.26 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 143.9, 140.4, 139.0, 130.7, 129.8, 122.2, 119.0, 114.6, 21.4, 20.7.

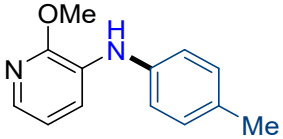
_N_-(_p_-tolyl)naphthalen-1-amine (4r)



4r

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 81 % (19.0 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.03 (d, *J* = 8.1 Hz, 1H), 7.90 – 7.85 (m, 1H), 7.55 – 7.46 (m, 3H), 7.38 (t, *J* = 7.8 Hz, 1H), 7.30 (dd, *J* = 7.5, 1.1 Hz, 1H), 7.15 – 7.08 (m, 2H), 6.97 (d, *J* = 8.4 Hz, 2H), 5.91 (s, 1H), 2.34 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 141.8, 139.6, 134.6, 130.4, 129.9, 128.5, 127.0, 126.1, 126.0, 125.5, 122.0, 121.5, 118.5, 114.1, 20.6.

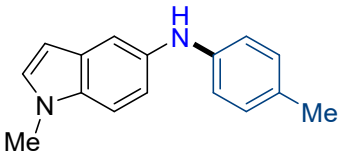
2-Methoxy-_N_-(_p_-tolyl)pyridin-3-amine (4s)



4s

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 4 : 1) as a yellow oil in 89 % (19.1 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.61 (dd, *J* = 5.0, 1.6 Hz, 1H), 7.35 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.13 (d, *J* = 8.2 Hz, 2H), 7.06 (d, *J* = 8.4 Hz, 2H), 6.76 (dd, *J* = 7.7, 5.0 Hz, 1H), 6.03 (s, 1H), 4.04 (s, 3H), 2.32 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 153.0, 138.6, 135.1, 131.9, 129.9, 129.1, 120.1, 117.9, 117.0, 53.4, 20.7.

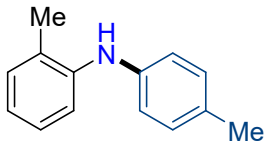
1-Methyl-_N_-(_p_-tolyl)-1_H_-indol-5-amine (4t)



4t

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE : DCM = 8 : 1) as a white solid in 69 % (16.3 mg) yield. The spectral data were in accordance with those reported in the literature[14]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.38 (d, *J* = 2.1 Hz, 1H), 7.28 – 7.25 (m, 1H), 7.04 (dt, *J* = 5.7, 2.6 Hz, 4H), 6.89 (d, *J* = 8.4 Hz, 2H), 6.40 (d, *J* = 3.5 Hz, 1H), 5.52 (s, 1H), 3.79 (s, 3H), 2.29 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 143.7, 135.5, 133.5, 129.7, 129.4, 129.0, 128.5, 117.3, 115.9, 112.4, 109.7, 100.4, 32.9, 20.5.

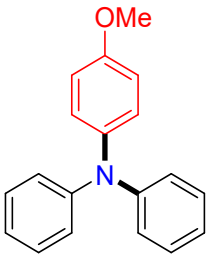
2-Methyl-*N*-(*p*-tolyl)aniline (4u)



4u

Following the general **Procedure C**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 79 % (15.7 mg) yield. The spectral data were in accordance with those reported in the literature[19]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.19 (t, *J* = 7.1 Hz, 2H), 7.13 (td, *J* = 7.8, 1.5 Hz, 1H), 7.10 (d, *J* = 8.1 Hz, 2H), 6.93 (d, *J* = 8.3 Hz, 2H), 6.90 (td, *J* = 7.4, 1.3 Hz, 1H), 5.32 (s, 1H), 2.33 (s, 3H), 2.27 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 142.0, 141.0, 130.8, 130.4, 129.8, 127.0, 126.7, 121.0, 118.6, 117.2, 20.6, 17.8.

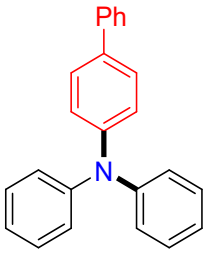
4-Methoxy-*N*,*N*-diphenylaniline (5a)



5a

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 81 % (22.3 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.22 (t, *J* = 7.9 Hz, 4H), 7.09 (d, *J* = 8.9 Hz, 2H), 7.05 (d, *J* = 8.0 Hz, 4H), 6.96 (t, *J* = 7.3 Hz, 2H), 6.86 (d, *J* = 8.9 Hz, 2H), 3.81 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 156.1, 148.1, 140.7, 129.0, 127.3, 122.8, 121.8, 114.7, 55.4.

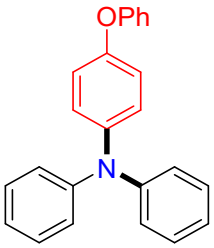
***N*,*N*-diphenyl-[1,1'-biphenyl]-4-amine (5b)**



5b

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a pink solid in 79 % (25.4 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.60 (d, *J* = 7.8 Hz, 2H), 7.50 (dd, *J* = 8.7, 2.0 Hz, 2H), 7.44 (t, *J* = 7.6 Hz, 2H), 7.33 (t, *J* = 7.4 Hz, 1H), 7.30 (t, *J* = 7.7 Hz, 4H), 7.17 (d, *J* = 8.0 Hz, 6H), 7.06 (t, *J* = 7.3 Hz, 2H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 147.7, 147.1, 140.6, 135.1, 129.2, 128.7, 127.7, 126.8, 126.6, 124.4, 123.9, 122.9.

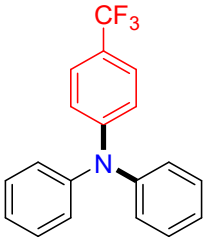
4-Phenoxy-*N*,*N*-diphenylaniline (5c)



5c

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a light yellow oil in 67 % (22.6 mg) yield. The spectral data were in accordance with those reported in the literature. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.35 (dd, *J* = 8.5, 7.5 Hz, 2H), 7.26 (dd, *J* = 9.4, 6.4 Hz, 4H), 7.10 (d, *J* = 8.6 Hz, 7H), 7.05 (d, *J* = 7.7 Hz, 2H), 7.00 (t, *J* = 7.3 Hz, 2H), 6.94 (d, *J* = 8.9 Hz, 2H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 157.5, 152.7, 147.9, 143.3, 129.7, 129.2, 126.3, 123.5, 123.0, 122.4, 119.9, 118.5. **HRMS** (APCI) calcd for $C_{24}H_{19}NO$ [M + H^+], 338.1539; found: 338.1535.

***N*,*N*-diphenyl-4-(trifluoromethyl)aniline (5d)**

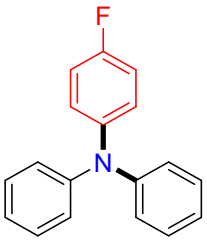


5d

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a colorless oil in 75 % (23.5 mg) yield. The spectral data were in accordance with those reported in the literature[21]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.42 (d, *J* = 8.6 Hz, 2H), 7.31 (t, *J* = 7.9 Hz, 4H), 7.12 (dd, *J* = 16.1, 7.7 Hz, 6H), 7.06 (d, *J* = 8.6 Hz, 2H);

^{13}C NMR (151 MHz, $CDCl_3$) δ 150.9, 146.8, 129.6, 126.2 (q, J_{C-F} = 3.7 Hz), 125.5, 124.5 (q, J_{C-F} = 271.1 Hz), 124.2, 122.8 (q, J_{C-F} = 32.5 Hz), 121.0; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -61.67.

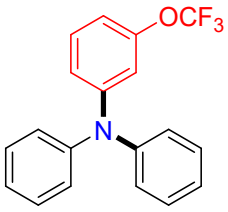
4-Fluoro-*N*,*N*-diphenylaniline (5e)



5e

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 57 % (15.1 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.24 (tdd, *J* = 9.5, 4.0, 2.0 Hz, 4H), 7.11 – 7.02 (m, 6H), 7.02 – 6.93 (m, 4H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ158.9 (d, J_{C-F} = 242.8 Hz), 147.9, 143.9, 129.2, 126.4 (d, J_{C-F} = 7.8 Hz), 123.5, 122.5, 116.0 (d, J_{C-F} = 22.4 Hz); **^{19}F NMR** (565 MHz, $CDCl_3$) δ -119.71.

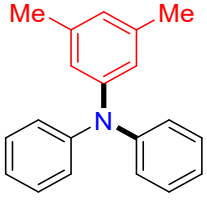
***N*,*N*-diphenyl-3-(trifluoromethoxy)aniline (5f)**



5f

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 78 % (25.7 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.31 – 7.27 (m, 4H), 7.20 (t, *J* = 8.2 Hz, 1H), 7.12 (d, *J* = 7.6 Hz, 4H), 7.09 (t, *J* = 7.4 Hz, 2H), 6.95 (dd, *J* = 8.0, 1.8 Hz, 1H), 6.89 (s, 1H), 6.81 (d, *J* = 8.2 Hz, 1H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 150.0, 149.4, 147.0, 129.9, 129.5, 125.0, 123.8, 120.5, 120.4 (q, J_{C-F} = 256.9 Hz), 115.0, 113.7; **^{19}F NMR** (565 MHz, $CDCl_3$) δ -57.76; **HRMS** (APCI) calcd for $C_{19}H_{14}F_3NO$ [M + H^+], 330.1100; found: 330.1097.

3,5-Dimethyl-*N*,*N*-diphenylaniline (5g)

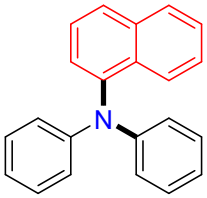


5g

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a colorless oil in 85 % (23.2 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.24 (t,

J = 7.8 Hz, 4H), 7.08 (d, *J* = 7.9 Hz, 4H), 7.00 (t, *J* = 7.3 Hz, 2H), 6.73 (s, 2H), 6.69 (s, 1H), 2.23 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.0, 147.7, 138.8, 129.1, 124.8, 124.0, 122.34, 122.30, 21.3.

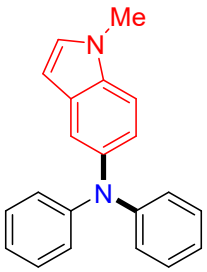
_N_,_N_-diphenylnaphthalen-1-amine (5h)



5h

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a pink solid in 57 % (16.8 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.96 (d, *J* = 8.5 Hz, 1H), 7.89 (d, *J* = 8.2 Hz, 1H), 7.77 (d, *J* = 8.2 Hz, 1H), 7.49 – 7.44 (m, 2H), 7.38 – 7.32 (m, 2H), 7.20 (dd, *J* = 8.5, 7.4 Hz, 4H), 7.04 (d, *J* = 7.7 Hz, 4H), 6.94 (t, *J* = 7.3 Hz, 2H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.4, 143.6, 135.3, 131.3, 129.0, 128.3, 127.2, 126.4, 126.34, 126.32, 126.1, 124.3, 121.8, 121.6.

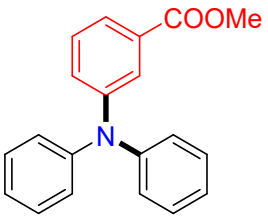
1-Methyl-_N_,_N_-diphenyl-1_H_-indol-5-amine (5i)



5i

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 60 % (17.9 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.43 (d, *J* = 1.9 Hz, 1H), 7.29 (d, *J* = 8.7 Hz, 1H), 7.21 (dd, *J* = 8.6, 7.4 Hz, 4H), 7.10 – 7.07 (m, 5H), 7.05 (d, *J* = 3.1 Hz, 1H), 6.93 (t, *J* = 7.3 Hz, 2H), 6.40 (d, *J* = 3.6 Hz, 1H), 3.80 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 148.7, 140.0, 134.2, 129.5, 129.3, 128.9, 122.5, 121.9, 121.2, 119.2, 110.1, 100.9, 33.0.

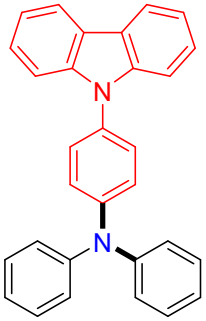
Methyl 3-(diphenylamino)benzoate (5j)



5j

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a yellow oil in 77 % (23.4 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.78 – 7.74 (m, 1H), 7.66 (dt, *J* = 7.5, 1.4 Hz, 1H), 7.31 – 7.24 (m, 6H), 7.11 – 7.06 (m, 4H), 7.05 (t, *J* = 7.4 Hz, 2H), 3.85 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 166.9, 148.1, 147.4, 131.3, 129.4, 129.2, 128.0, 124.41, 124.37, 123.4, 123.2, 52.1.

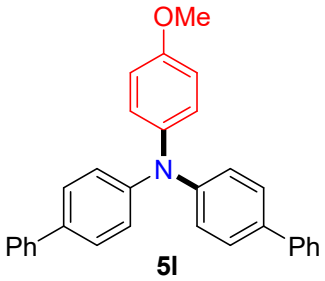
4-(9*H*-carbazol-9-yl)-*N*,*N*-diphenylaniline (5k)



5k

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE) as a white solid in 84 % (34.5 mg) yield. The spectral data were in accordance with those reported in the literature[20]. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 8.17 (d, *J* = 7.7 Hz, 2H), 7.49 – 7.41 (m, 6H), 7.38 – 7.33 (m, 4H), 7.33 – 7.28 (m, 4H), 7.27 – 7.23 (m, 4H), 7.12 (t, *J* = 7.3 Hz, 2H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 147.5, 147.1, 141.1, 131.4, 129.4, 127.8, 125.8, 124.7, 124.0, 123.4, 123.2, 120.2, 119.7, 109.8.

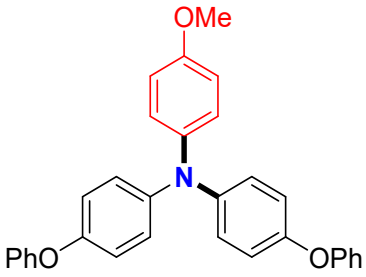
***N*-([1,1'-biphenyl]-4-yl)-*N*-(4-methoxyphenyl)-[1,1'-biphenyl]-4-amine (5l)**



5l

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a white solid in 70 % (29.9 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.60 (dd, *J* = 8.3, 1.1 Hz, 4H), 7.53 – 7.48 (m, 4H), 7.46 – 7.41 (m, 4H), 7.35 – 7.29 (m, 2H), 7.22 – 7.12 (m, 6H), 6.91 (d, *J* = 9.0 Hz, 2H), 3.84 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 156.4, 147.3, 140.7, 140.4, 134.6, 128.7, 127.7, 127.5, 126.7, 126.6, 123.0, 114.9, 55.5; **HRMS** (APCI) calcd for $C_{31}H_{25}NO$ [M + H^+], 428.2009; found: 428.2006.

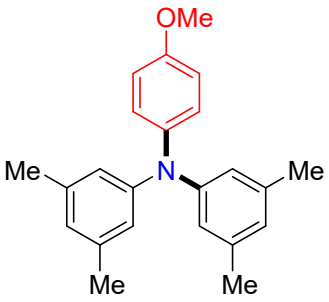
4-Methoxy-*N*,*N*-bis(4-phenoxyphenyl)aniline (5m)



5m

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 50 : 1) as a yellow oil in 60 % (27.6 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.33 (t, *J* = 8.0 Hz, 4H), 7.11 – 7.07 (m, 4H), 7.06 – 7.01 (m, 8H), 6.92 (d, *J* = 8.9 Hz, 4H), 6.86 (d, *J* = 9.0 Hz, 2H), 3.81 (s, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 157.8, 155.8, 151.6, 144.0, 141.0, 129.6, 126.3, 124.2, 122.8, 120.0, 118.2, 114.7, 55.5; **HRMS** (APCI) calcd for $C_{31}H_{25}NO_3$ [M + H^+], 460.1907; found:460.1902.

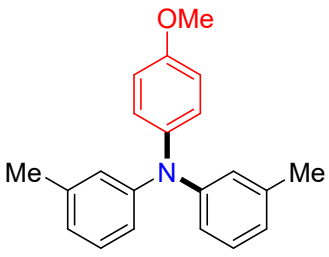
***N*-(3,5-dimethylphenyl)-*N*-(4-methoxyphenyl)-3,5-dimethylaniline (5n)**



5n

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a white solid in 52 % (17.2 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.06 (d, *J* = 8.9 Hz, 2H), 6.84 (d, *J* = 8.9 Hz, 2H), 6.67 (s, 4H), 6.62 (s, 2H), 3.82 (s, 3H), 2.22 (s, 12H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.7, 148.3, 141.2, 138.5, 127.1, 123.6, 120.9, 114.5, 55.4, 21.3; **HRMS** (APCI) calcd for $C_{23}H_{25}NO$ [M + H^+], 332.2009; found: 332.2004.

***N*-(4-methoxyphenyl)-3-methyl-*N*-(m-tolyl)aniline (5o)**

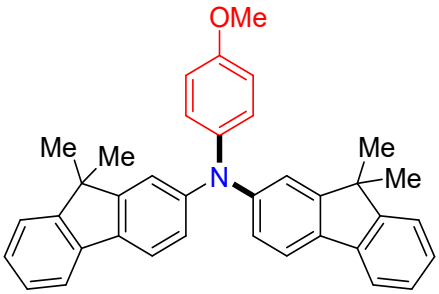


5o

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 100 : 1) as a yellow oil in 75 % (22.8 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.11 (t, *J* = 7.8 Hz, 2H), 7.10 – 7.05 (m, 2H), 6.85 (ddd, *J* = 10.0, 6.8,

3.9 Hz, 6H), 6.78 (d, *J* = 7.5 Hz, 2H), 3.82 (s, 3H), 2.26 (s, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 155.9, 148.2, 141.0, 138.8, 128.8, 127.2, 123.6, 122.6, 120.2, 114.6, 55.4, 21.4; **HRMS** (APCI) calcd for $C_{21}H_{21}NO$ [M + H^+], 304.1696; found: 304.1692.

***N*-(9,9-dimethyl-9*H*-fluoren-2-yl)-*N*-(4-methoxyphenyl)-9,9-dimethyl-9*H*-fluoren-2-amine (5p)**



5p

Following the general **Procedure D**, the title compound was isolated by flash column chromatography on silica gel (PE : EA = 200 : 1) as a yellow solid in 59 % (29.9 mg) yield. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.64 (dt, *J* = 7.5, 0.9 Hz, 2H), 7.58 (d, *J* = 8.2 Hz, 2H), 7.40 (dt, *J* = 7.4, 0.9 Hz, 2H), 7.32 (td, *J* = 7.4, 1.2 Hz, 2H), 7.26 (td, *J* = 7.4, 1.2 Hz, 2H), 7.24 (d, *J* = 2.1 Hz, 2H), 7.19 (d, *J* = 8.9 Hz, 2H), 7.03 (dd, *J* = 8.2, 2.1 Hz, 2H), 6.89 (d, *J* = 8.9 Hz, 2H), 3.85 (s, 3H), 1.43 (s, 12H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 156.0, 154.9, 153.4, 147.9, 141.0, 139.1, 133.2, 127.1, 126.9, 126.2, 122.4, 121.9, 120.5, 119.2, 117.2, 114.7, 55.5, 46.7, 27.1; **HRMS** (APCI) calcd for $C_{37}H_{33}NO$ [M + H^+], 508.2635; found: 508.2632.

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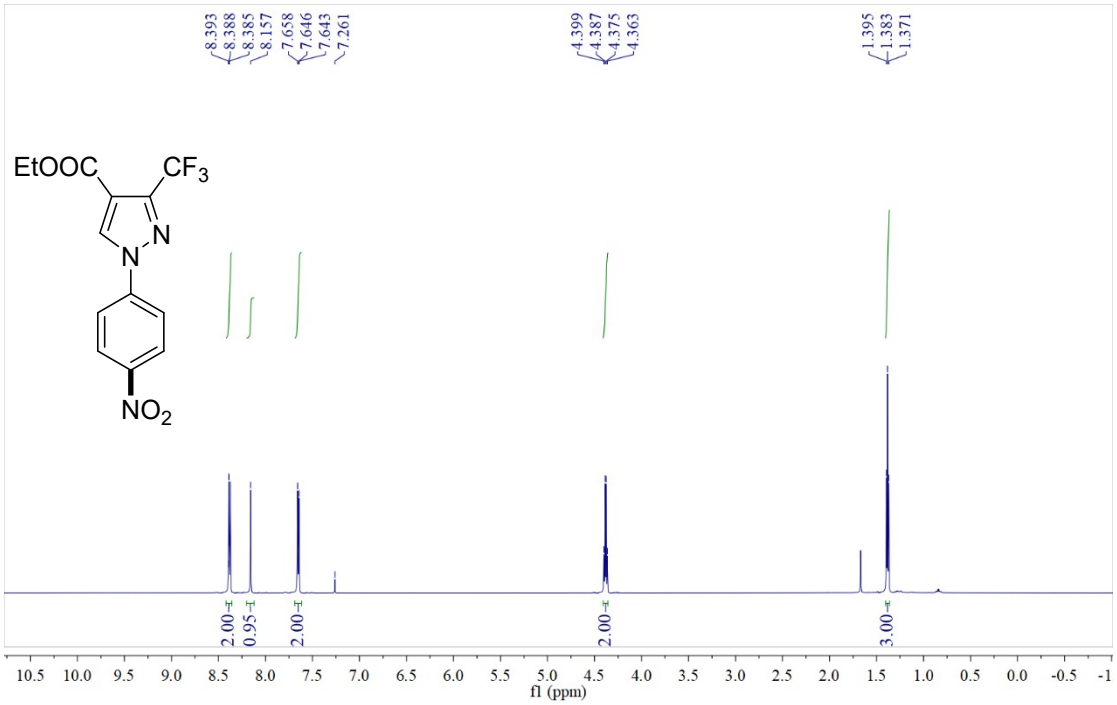
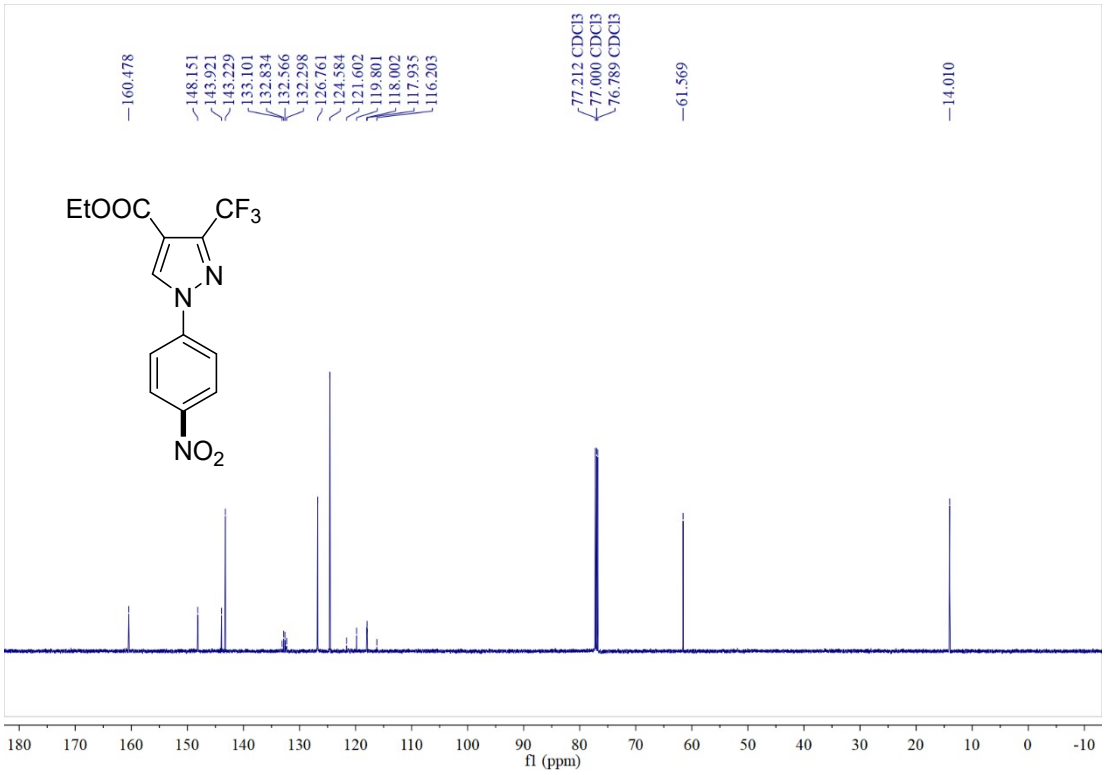
11. NMR Spectra of Starting Materials and Products

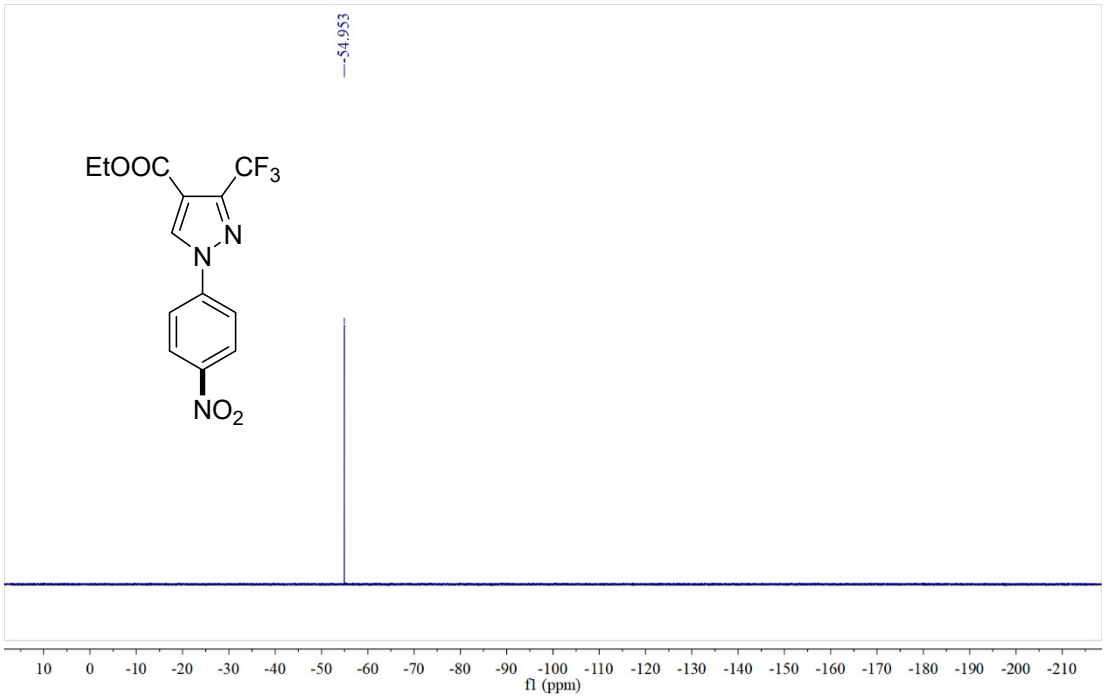
^{1}H NMR Spectrum of **1x**



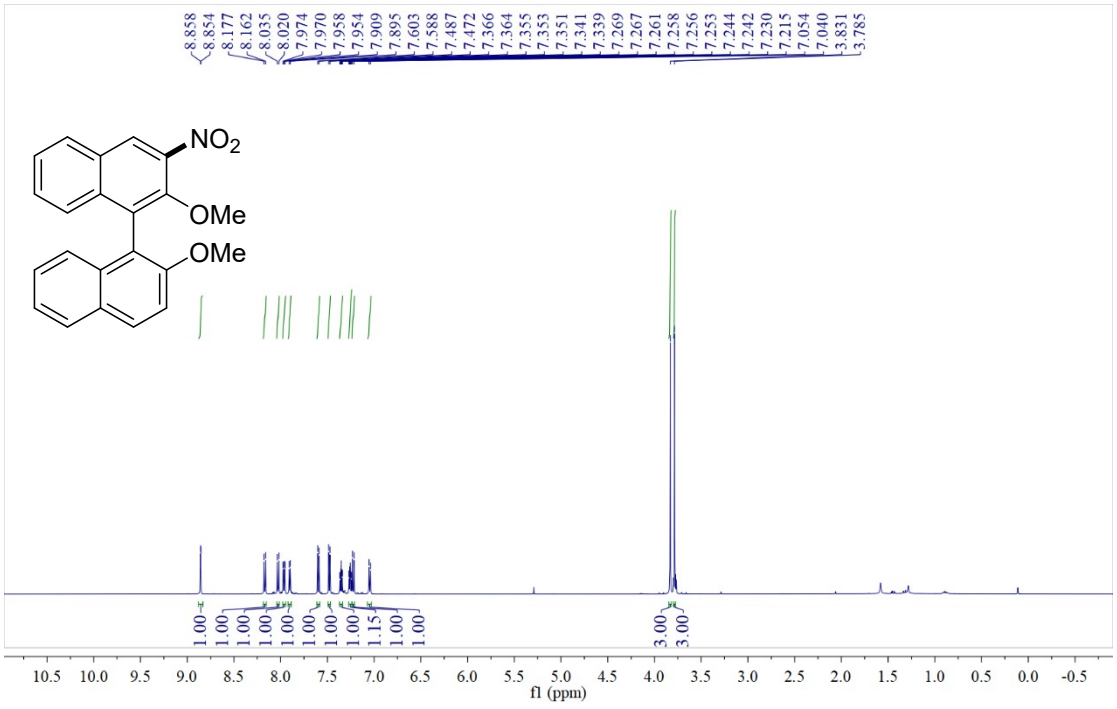
^{13}C NMR Spectrum of **1x**



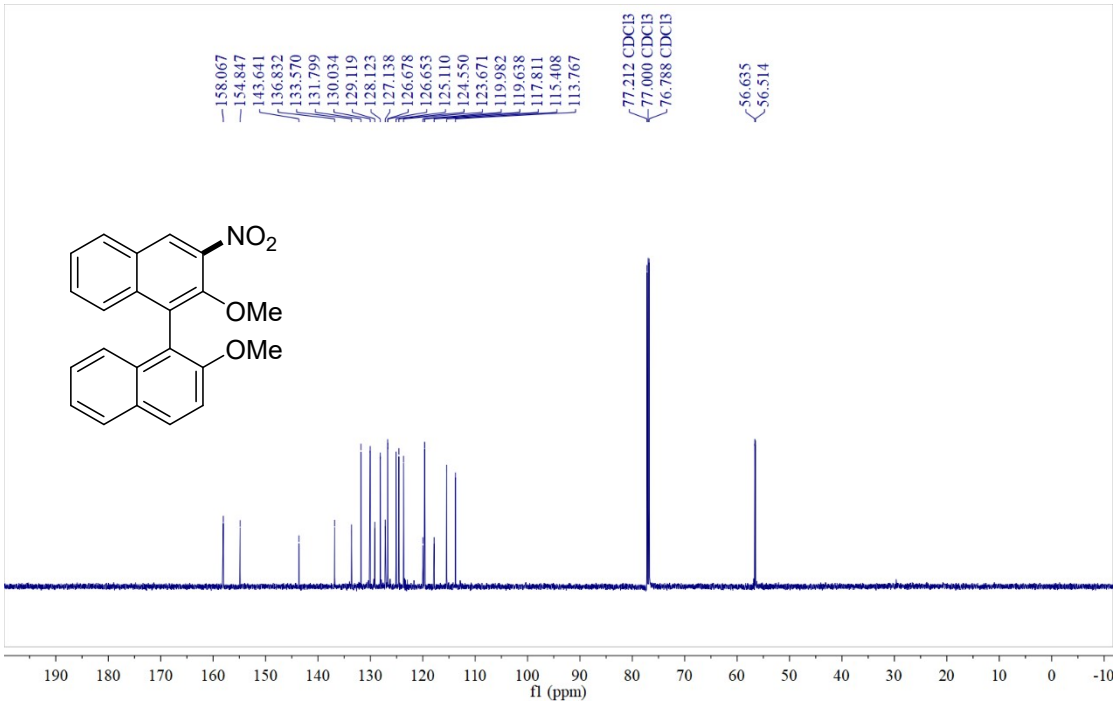
^{19}F NMR Spectrum of **1x**



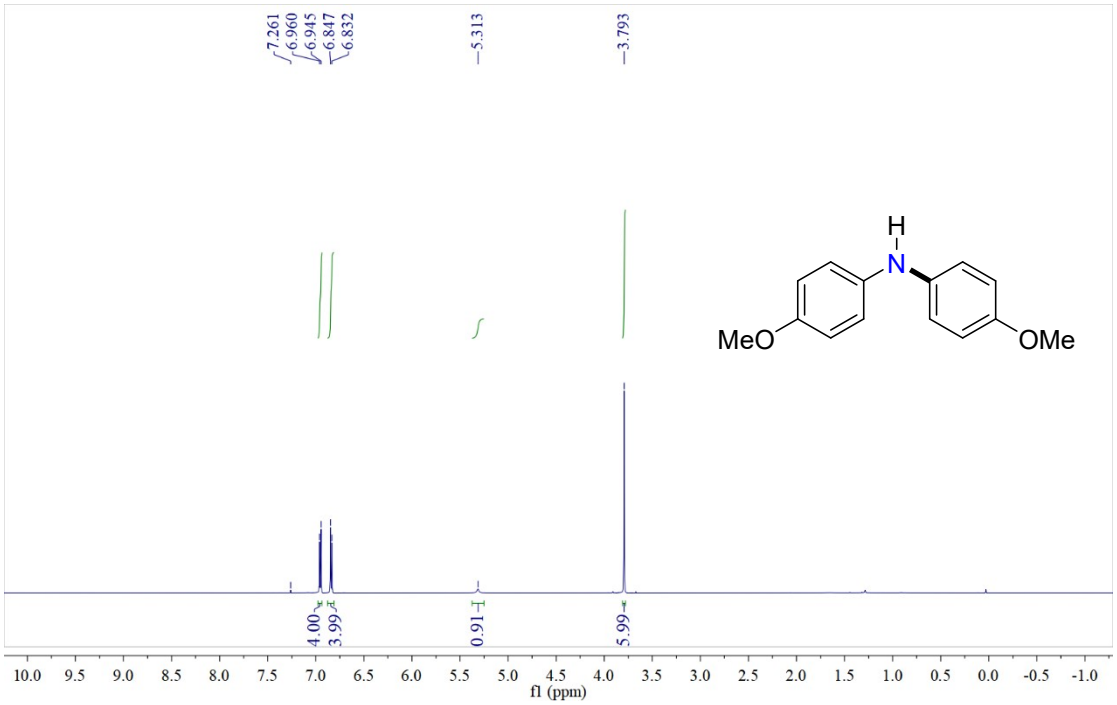
^{1}H NMR Spectrum of **1y**



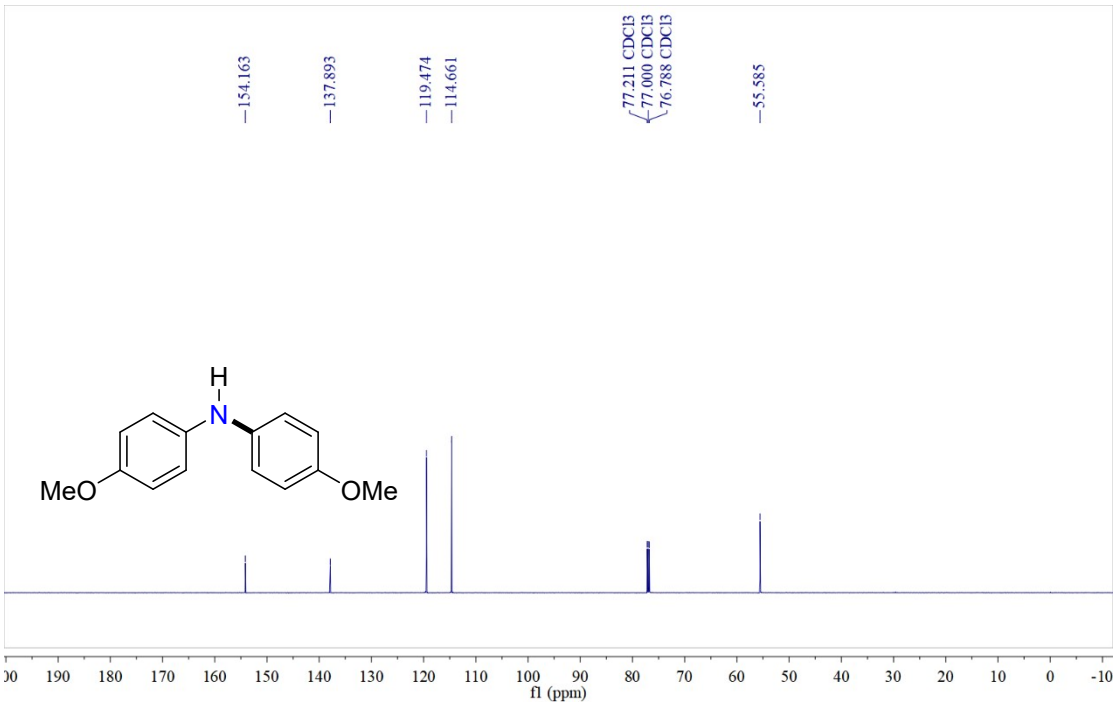
^{13}C NMR Spectrum of **1y**



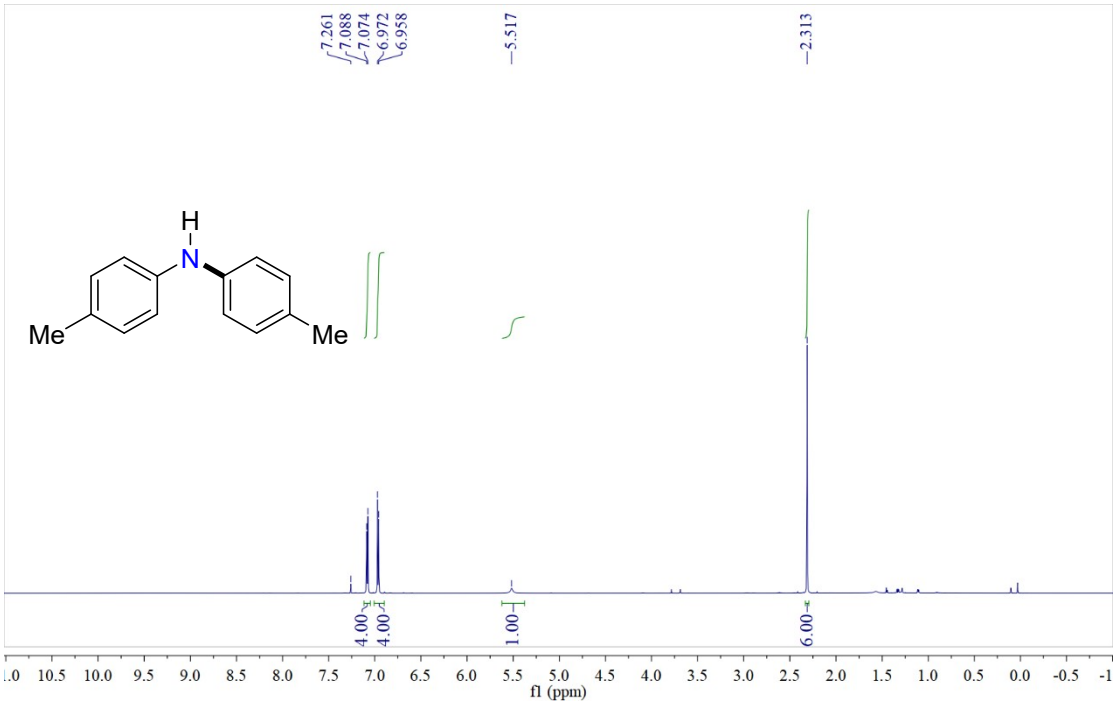
^{1}H NMR Spectrum of **2a**



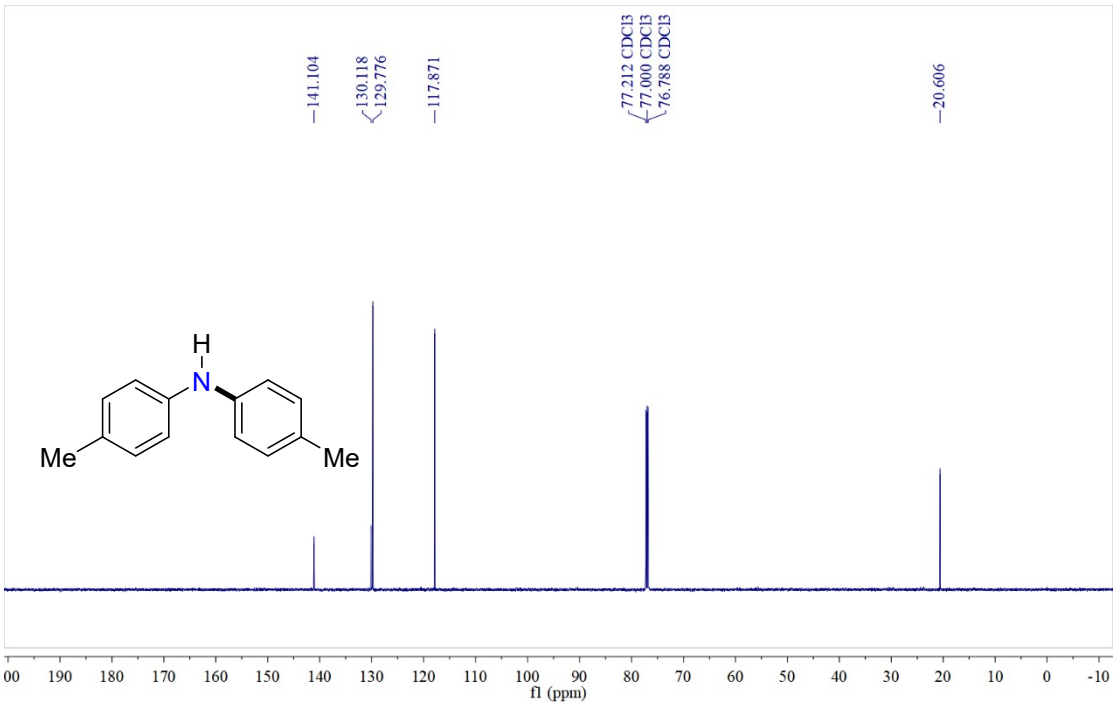
^{13}C NMR Spectrum of **2a**



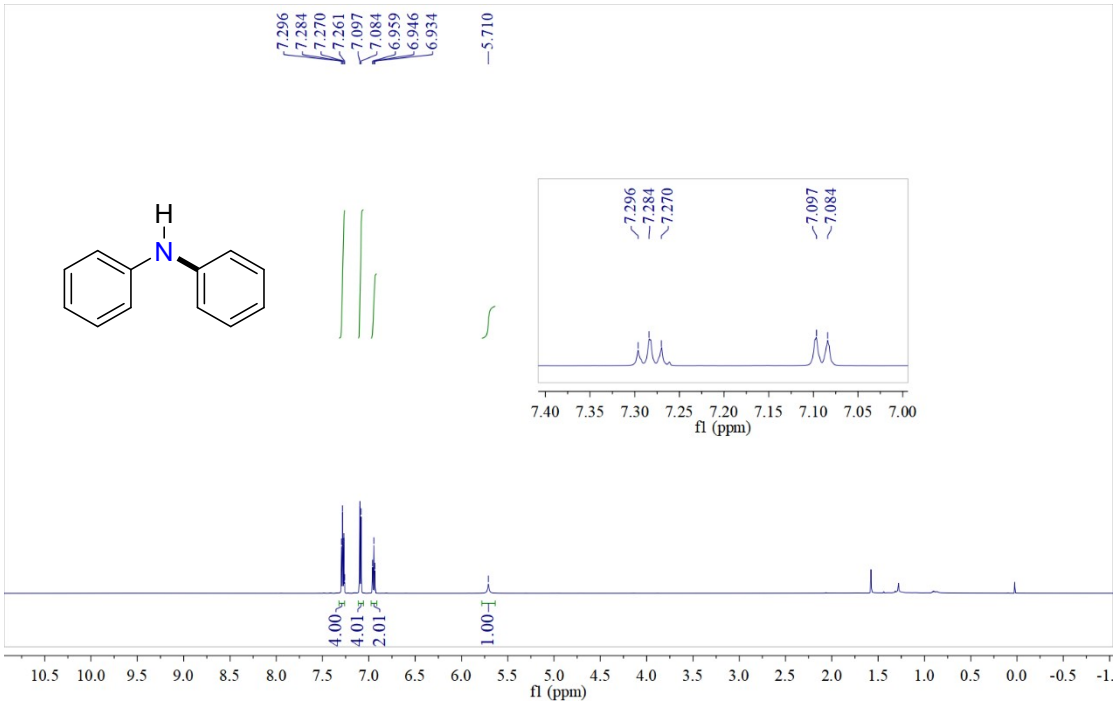
^{1}H NMR Spectrum of **2b**



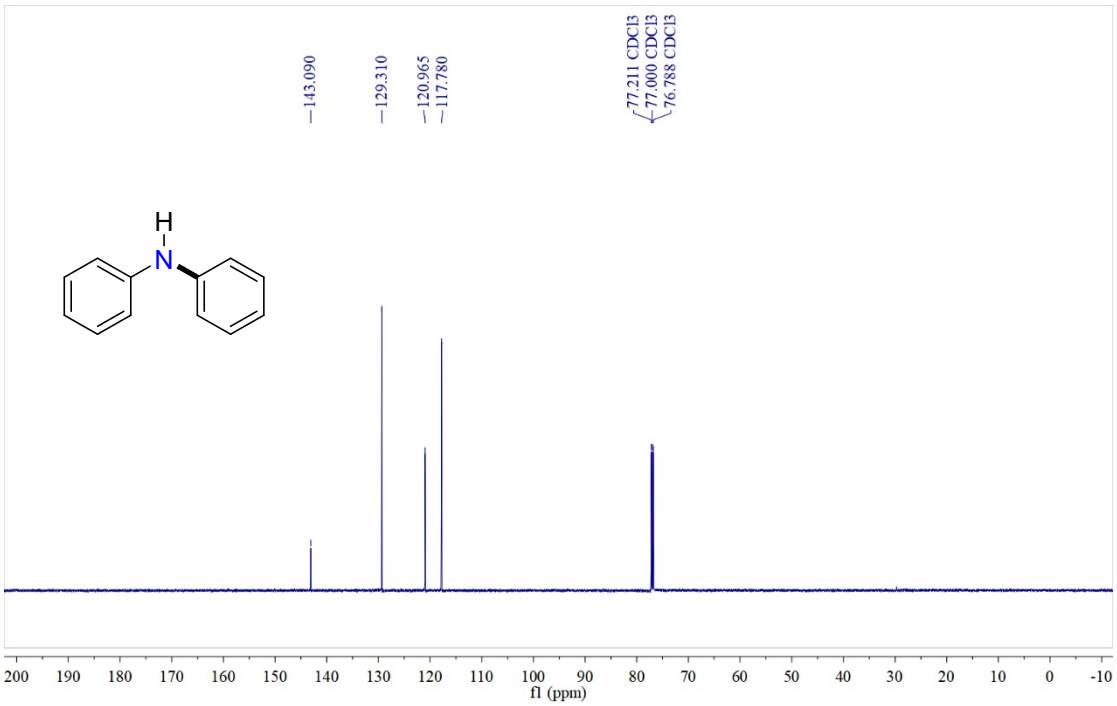
^{13}C NMR Spectrum of **2b**



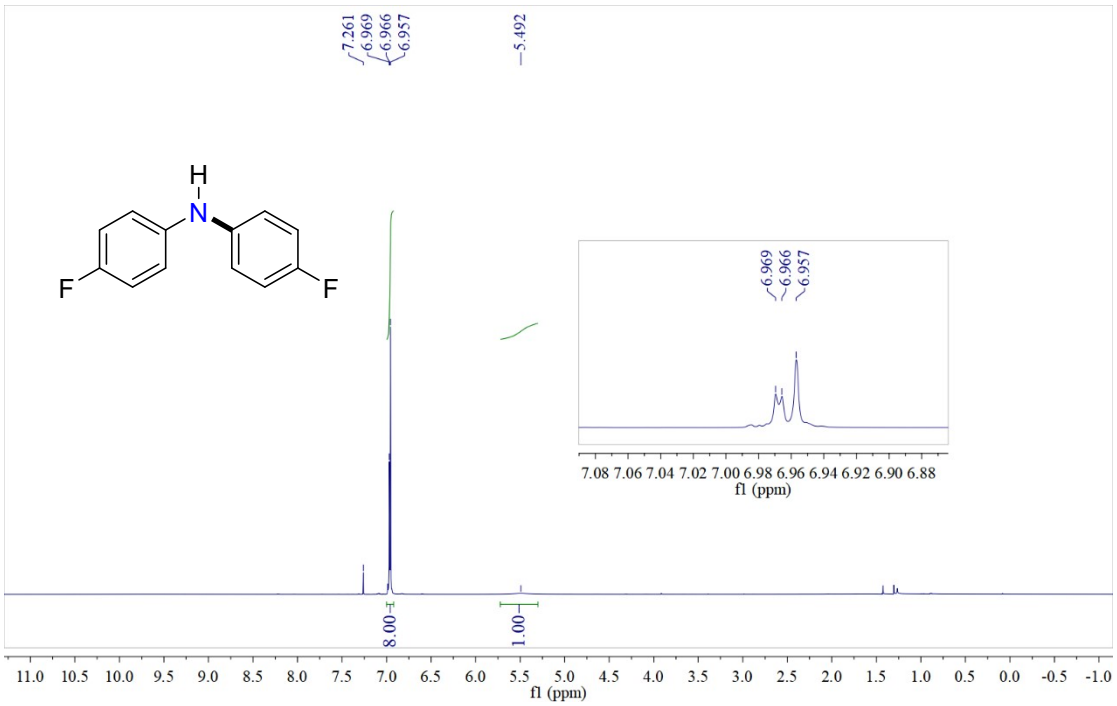
^{1}H NMR Spectrum of **2c**



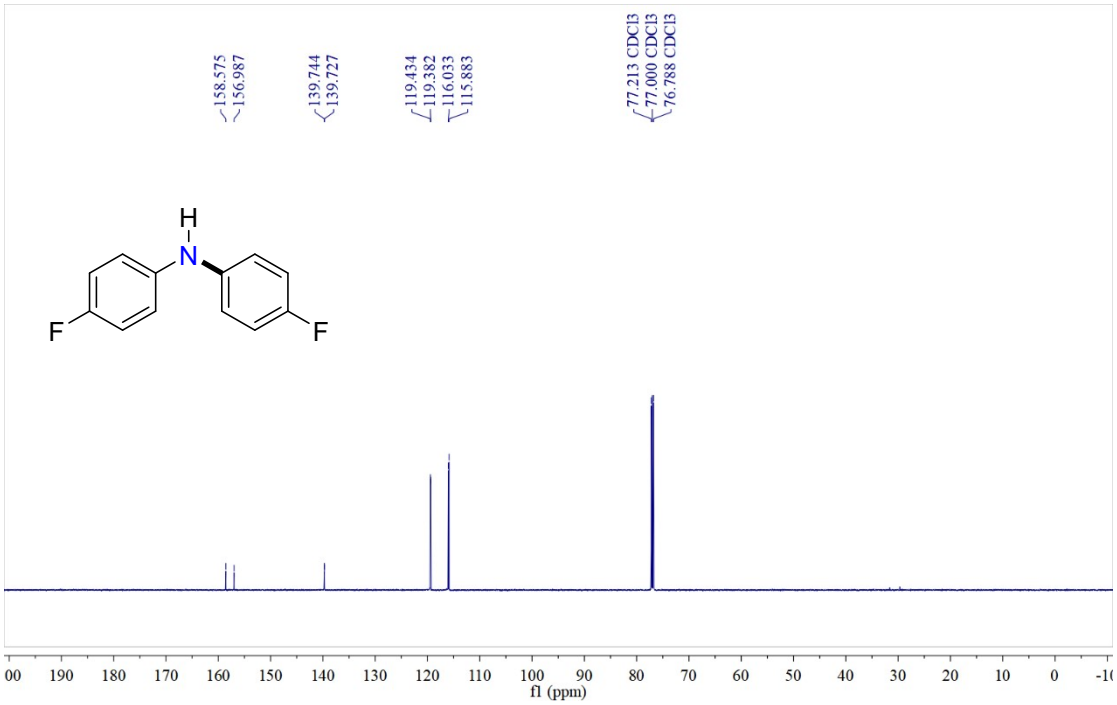
^{13}C NMR Spectrum of **2c**



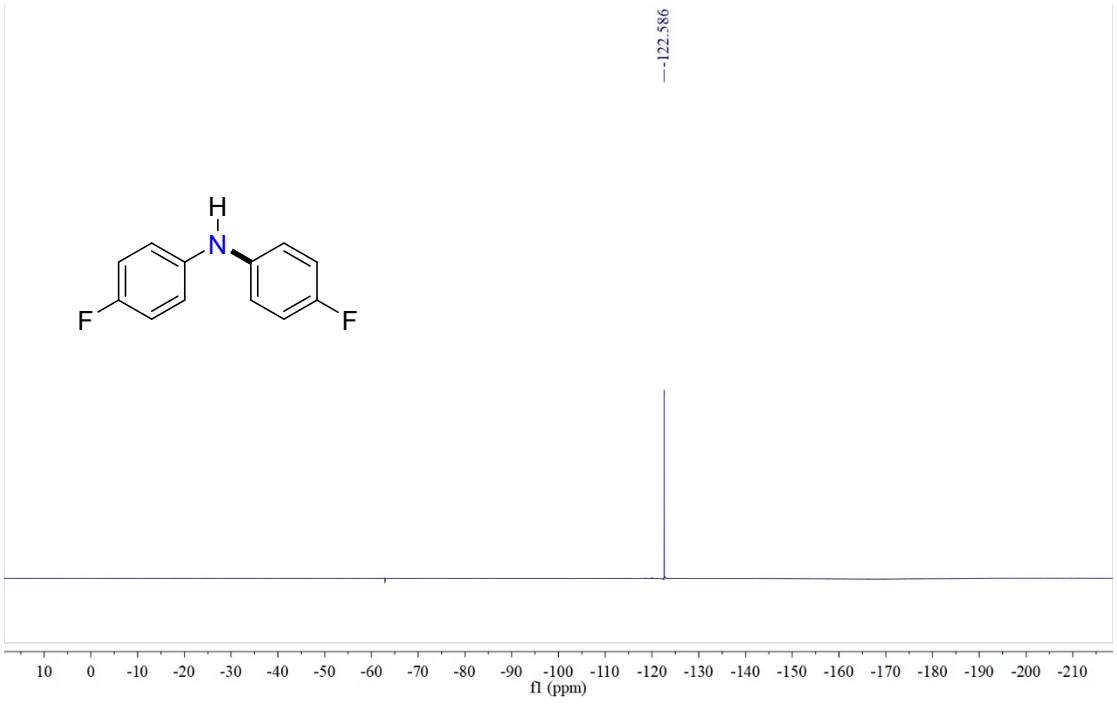
^{1}H NMR Spectrum of **2d**



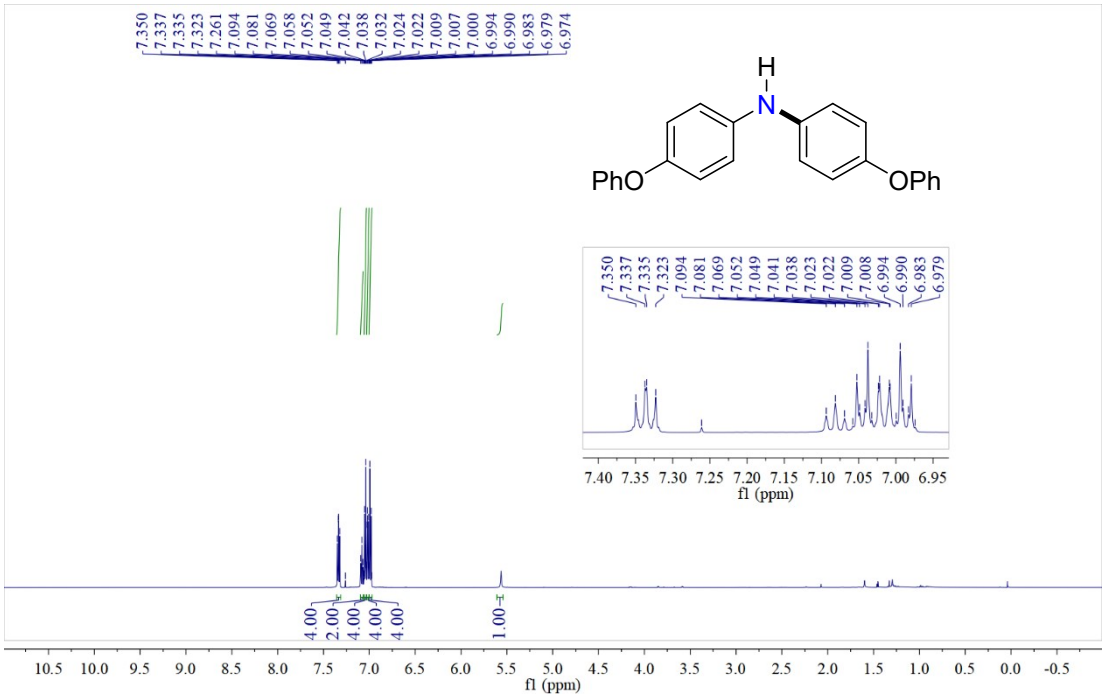
^{13}C NMR Spectrum of **2d**



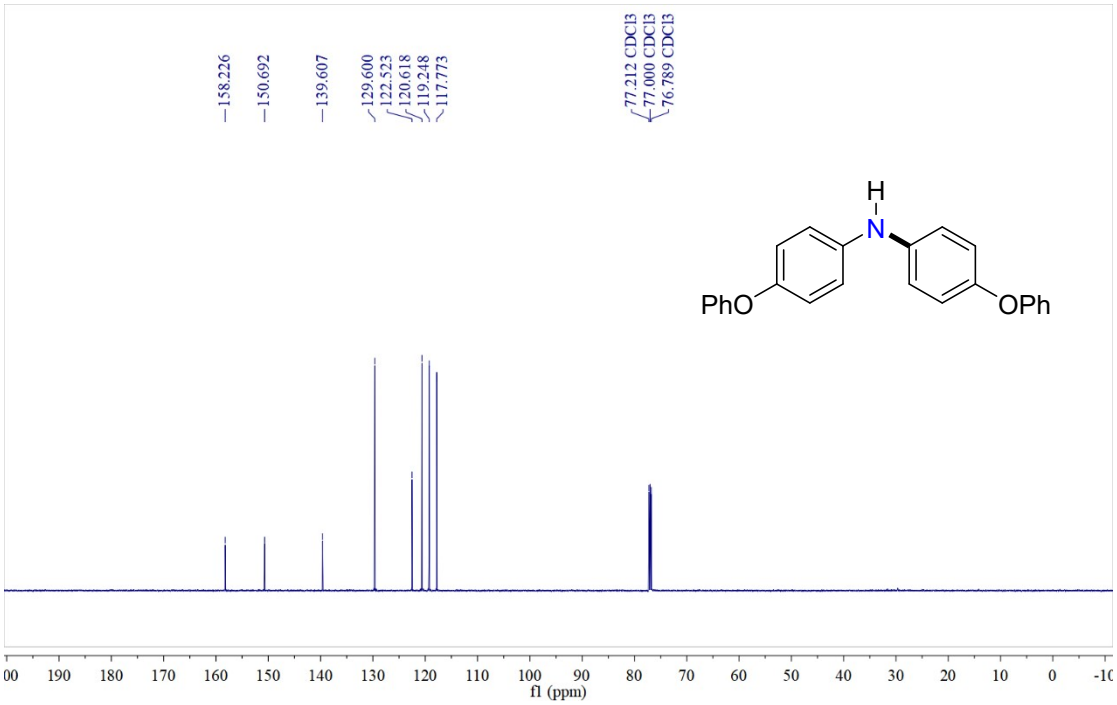
^{19}F NMR Spectrum of **2d**



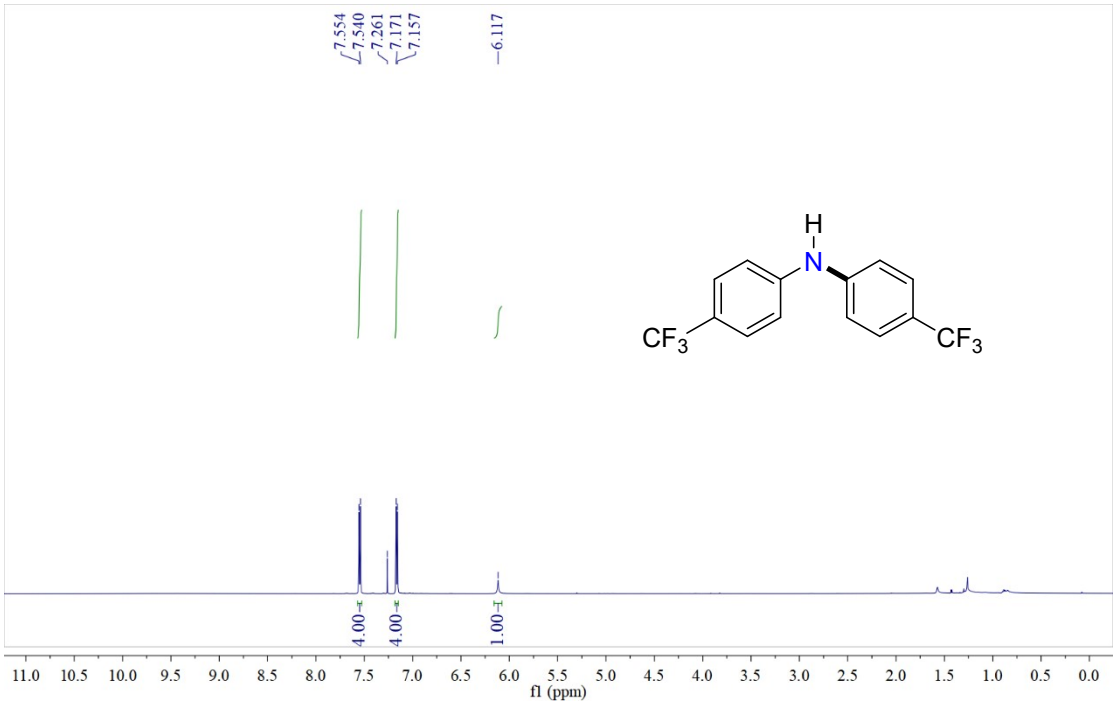
[1]H NMR Spectrum of **2e**



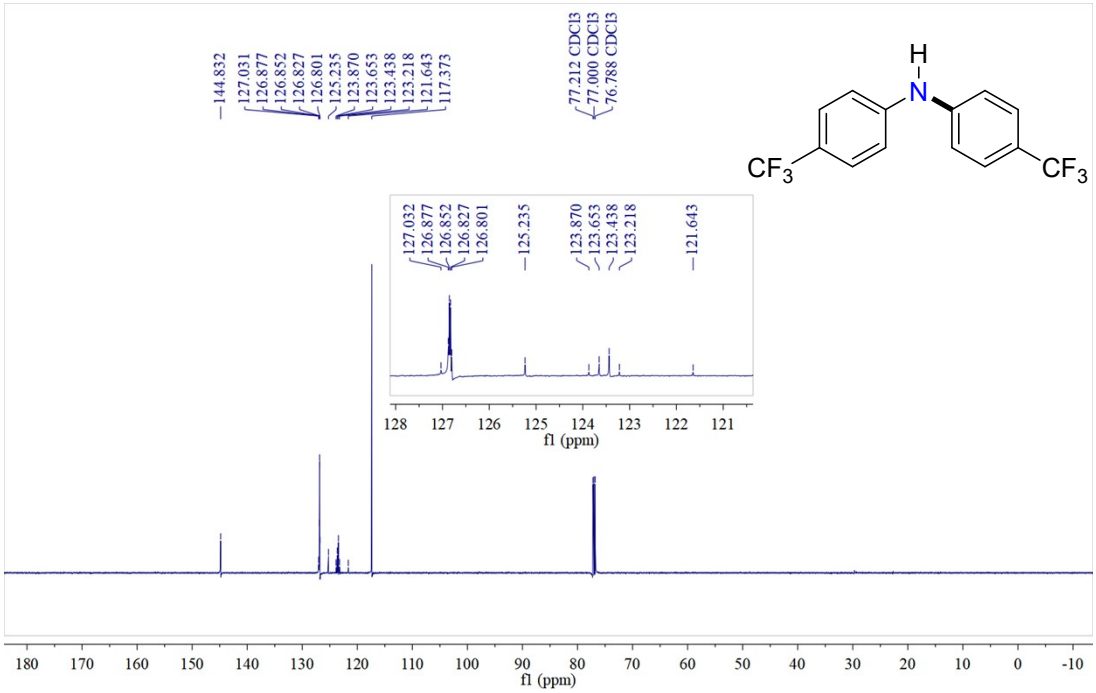
[13]C NMR Spectrum of **2e**



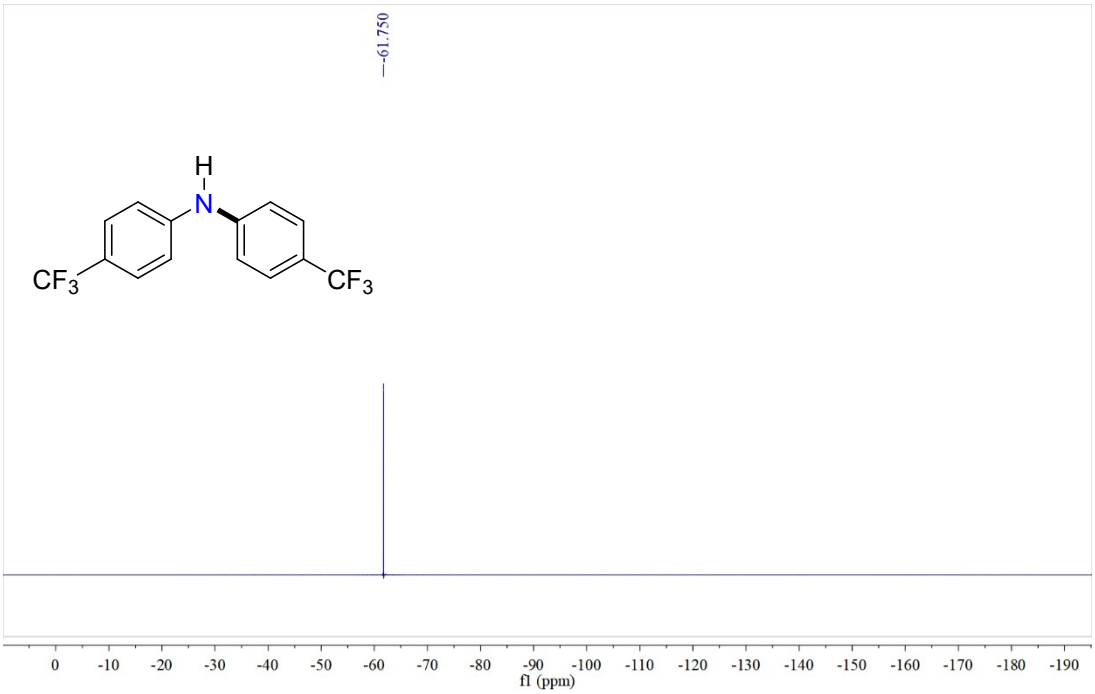
^{1}H NMR Spectrum of **2f**



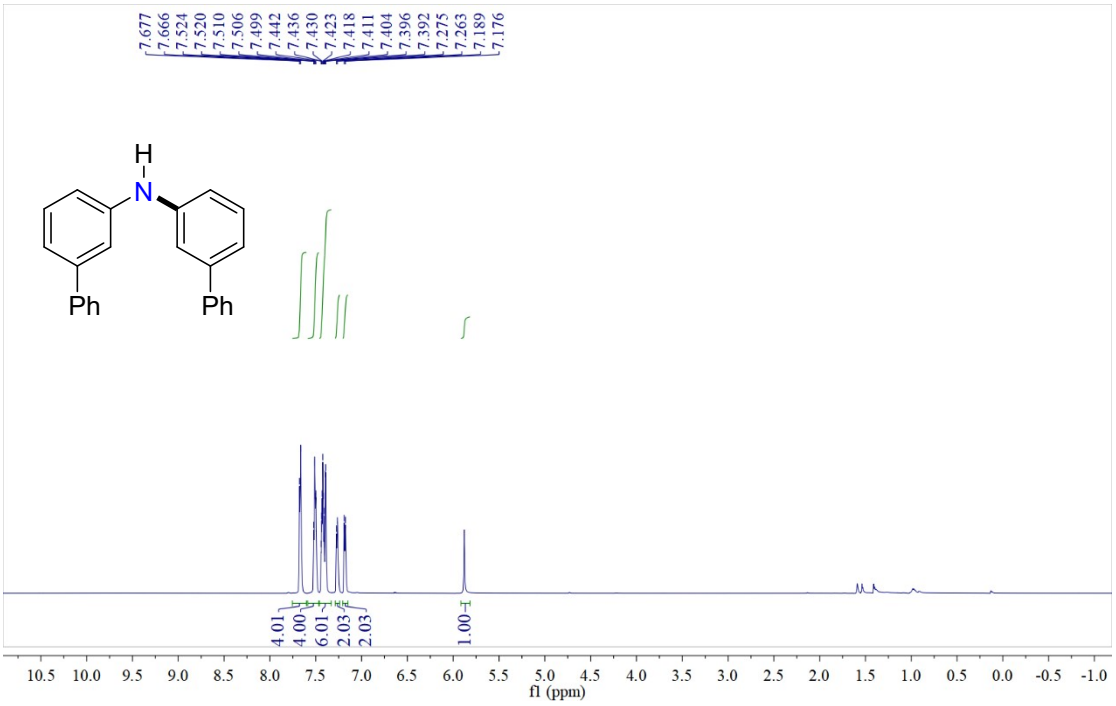
^{13}C NMR Spectrum of **2f**



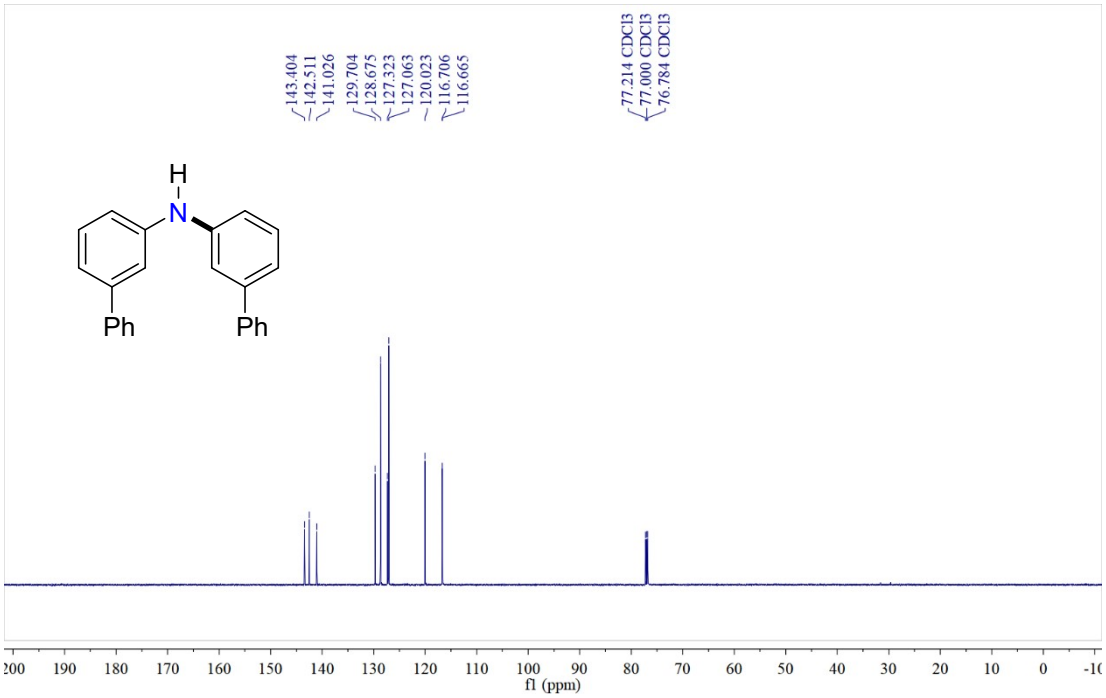
^{19}F NMR Spectrum of **2f**



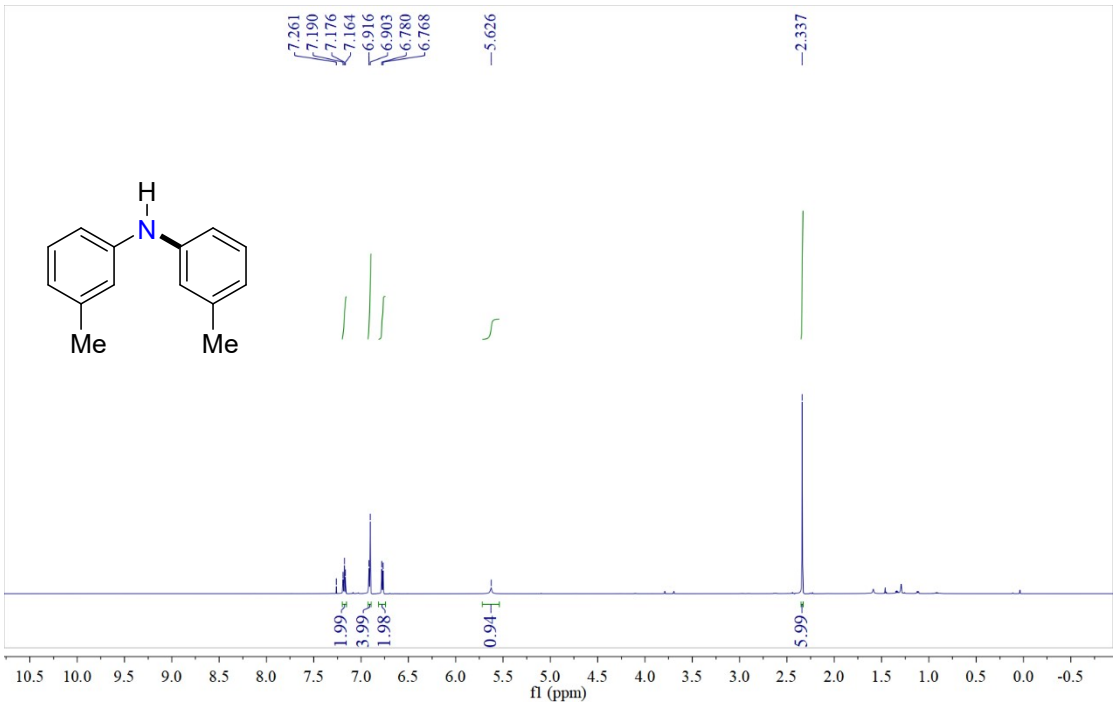
^{1}H NMR Spectrum of **2g**



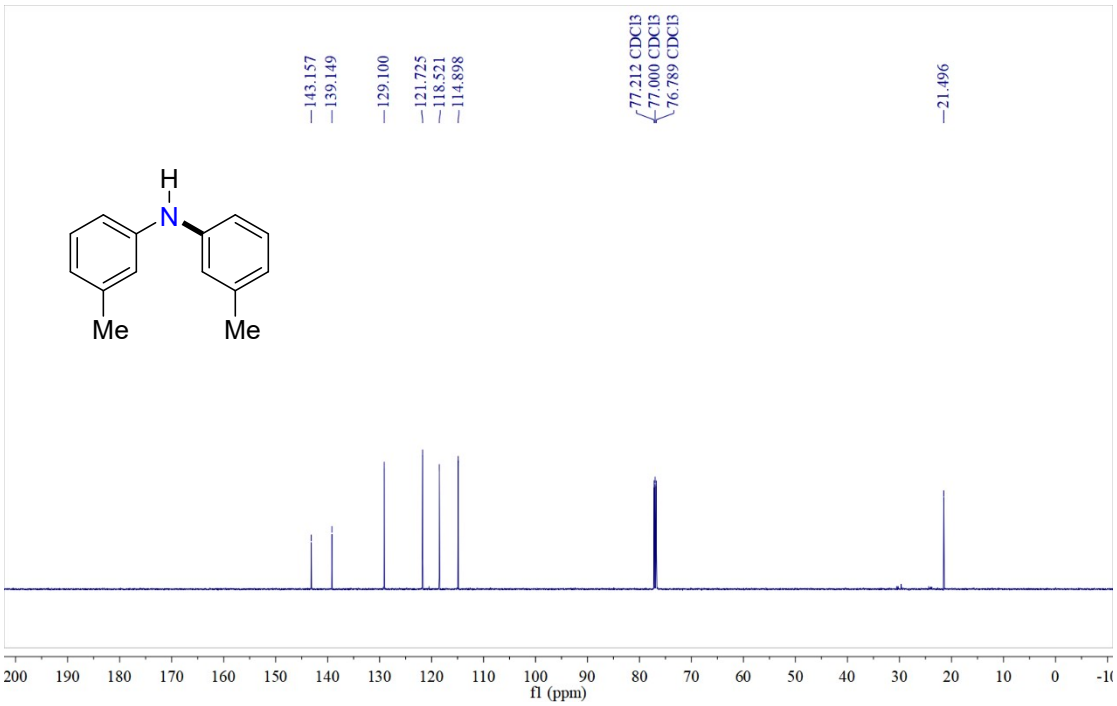
^{13}C NMR Spectrum of **2g**



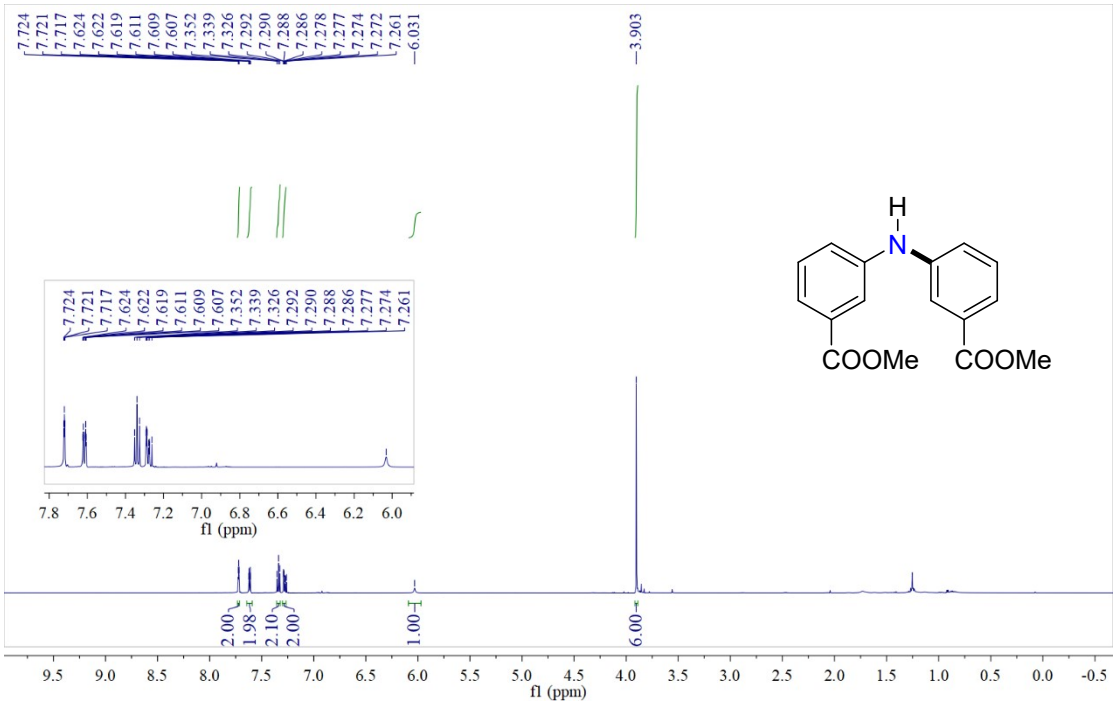
^{1}H NMR Spectrum of **2h**



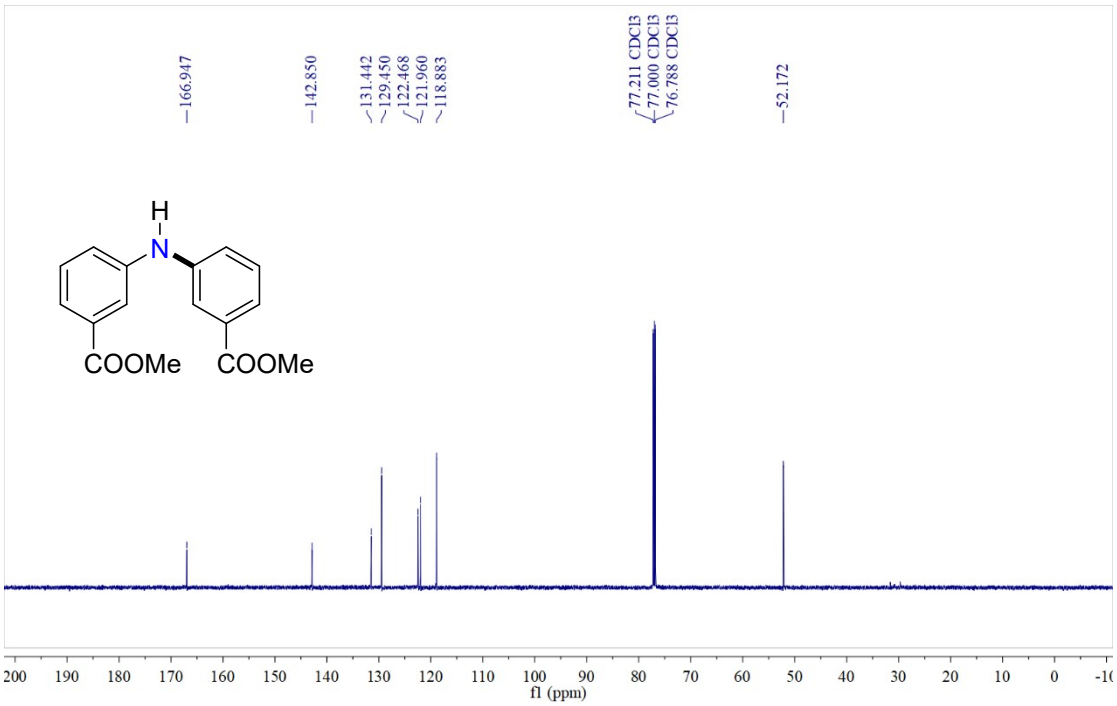
^{13}C NMR Spectrum of **2h**



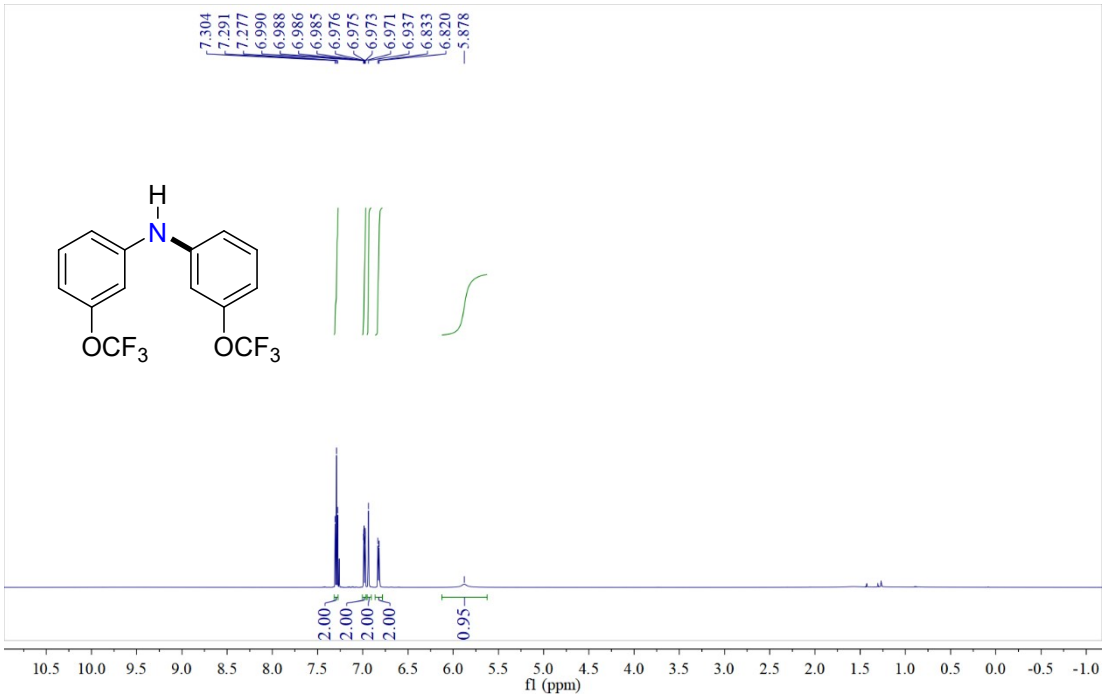
^{1}H NMR Spectrum of **2i**



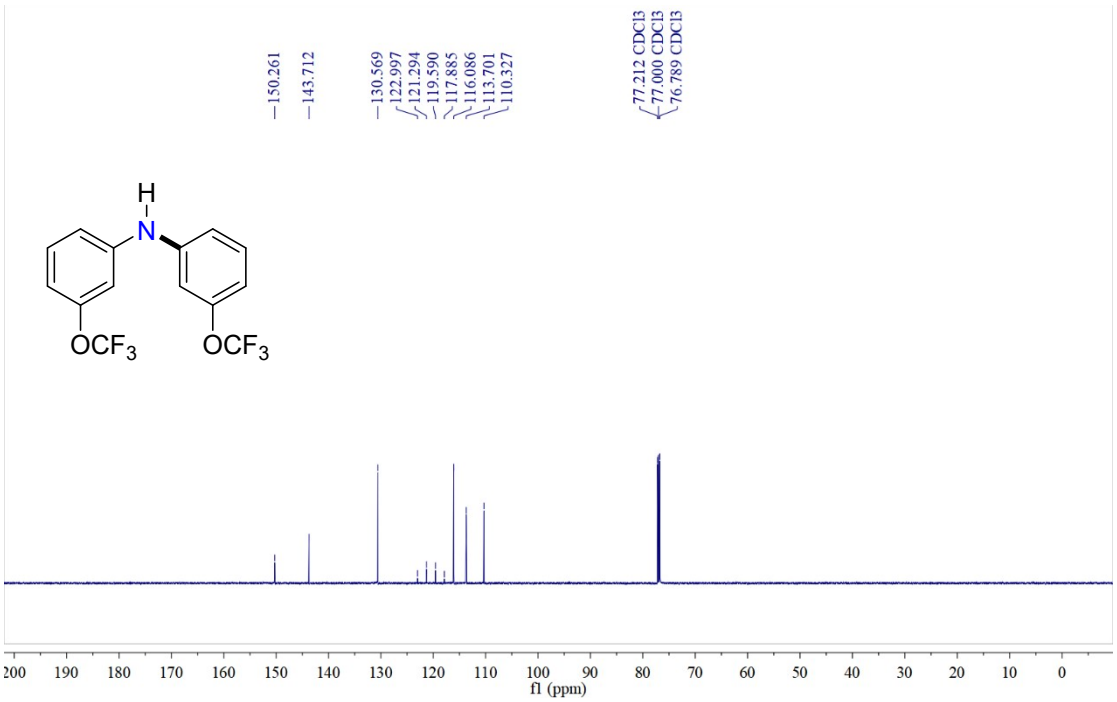
^{13}C NMR Spectrum of **2i**



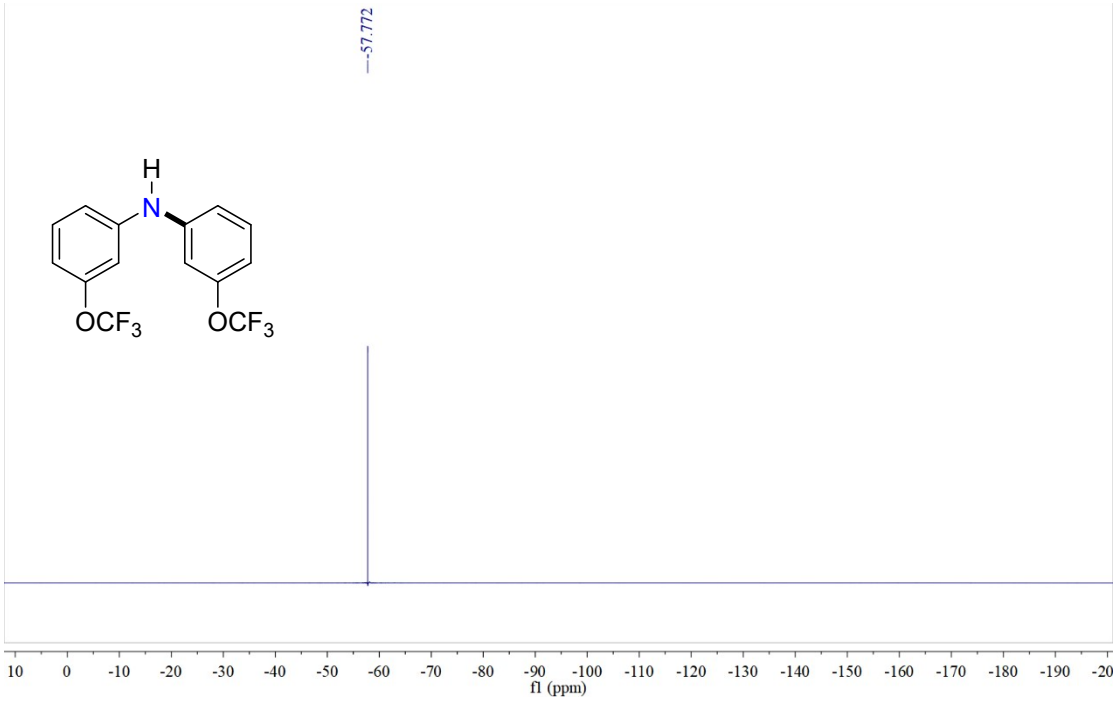
^{1}H NMR Spectrum of **2j**



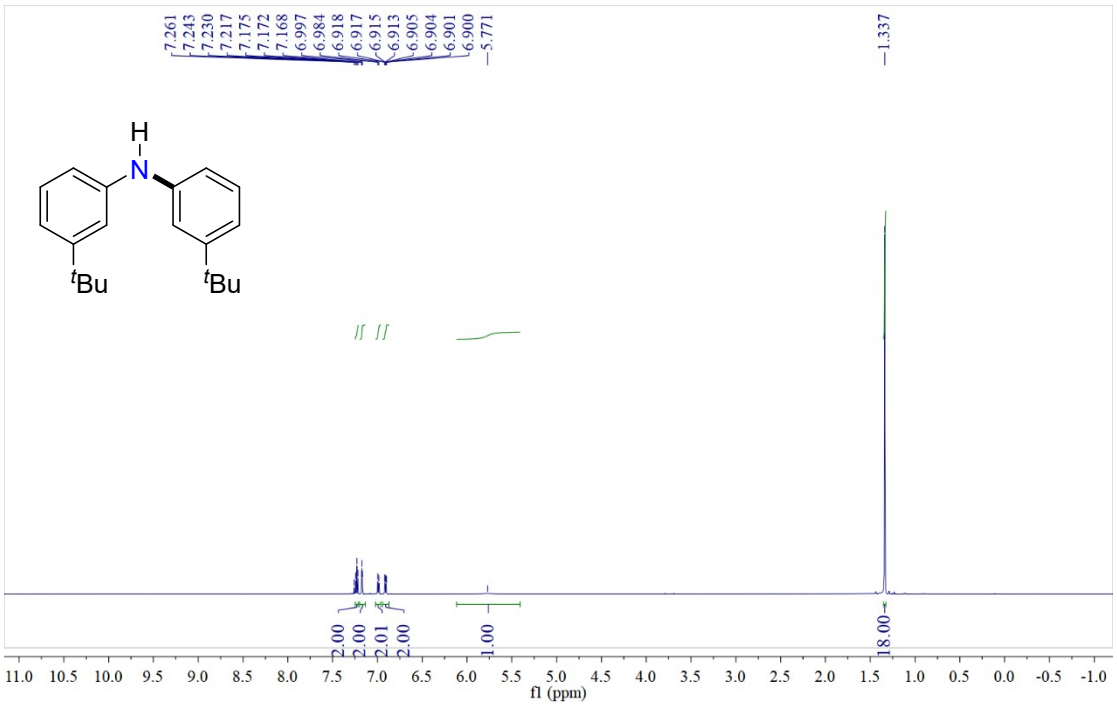
^{13}C NMR Spectrum of **2j**



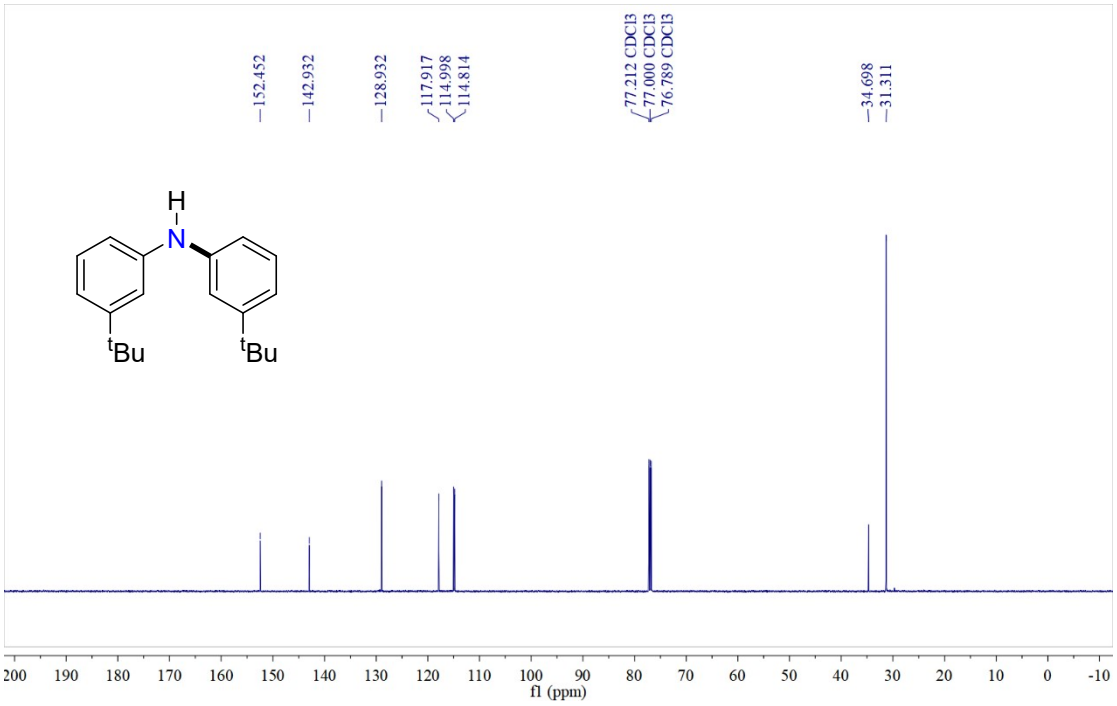
^{19}F NMR Spectrum of **2j**



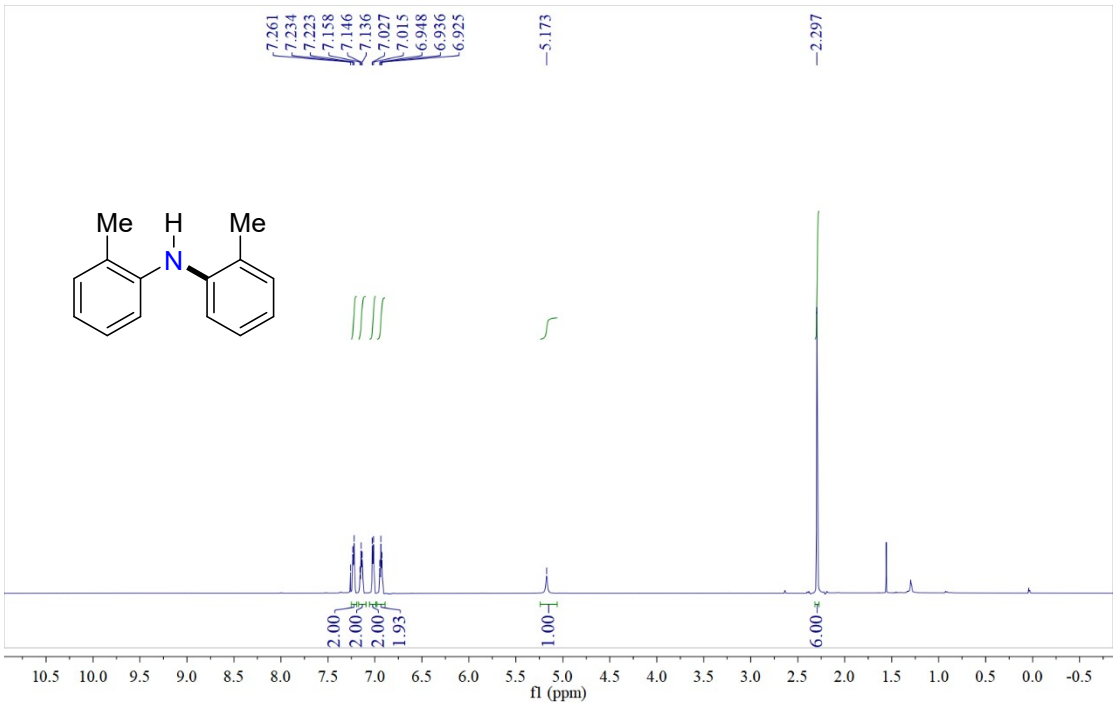
^{1}H NMR Spectrum of **2k**



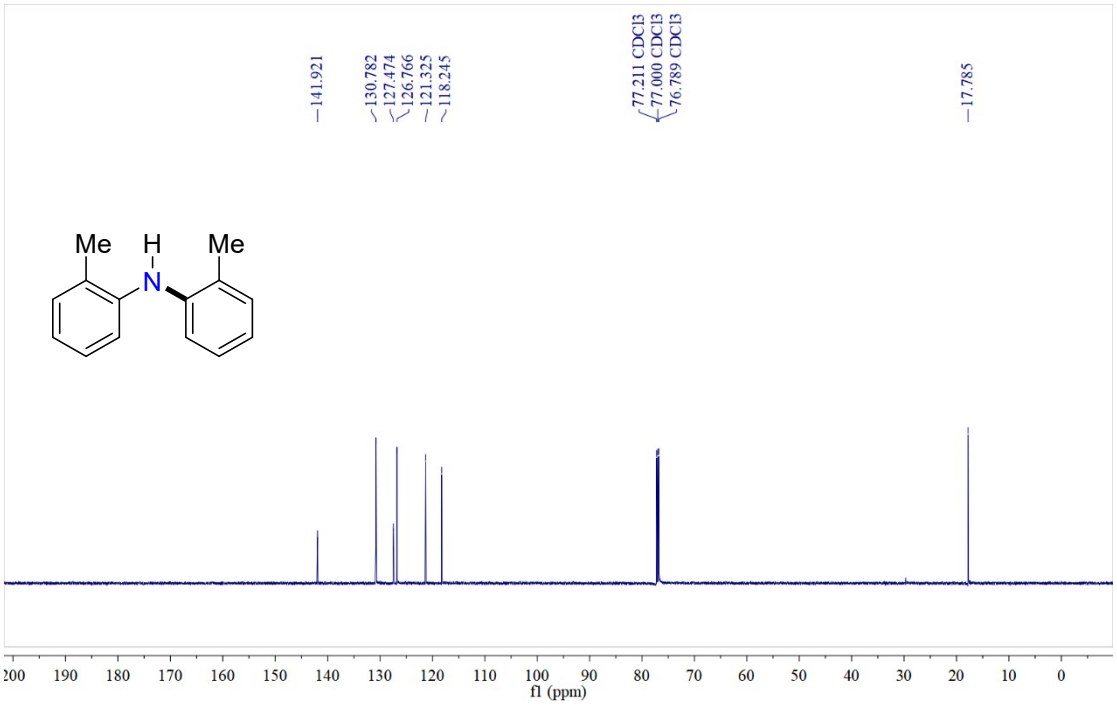
^{13}C NMR Spectrum of **2k**



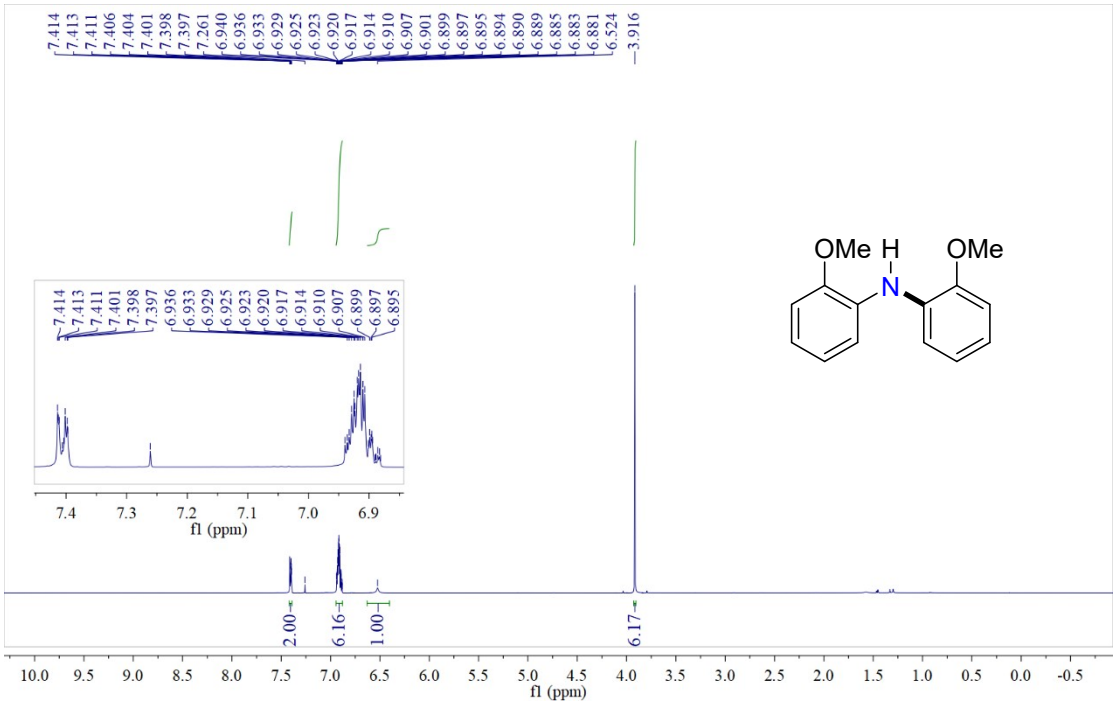
^{1}H NMR Spectrum of **2l**



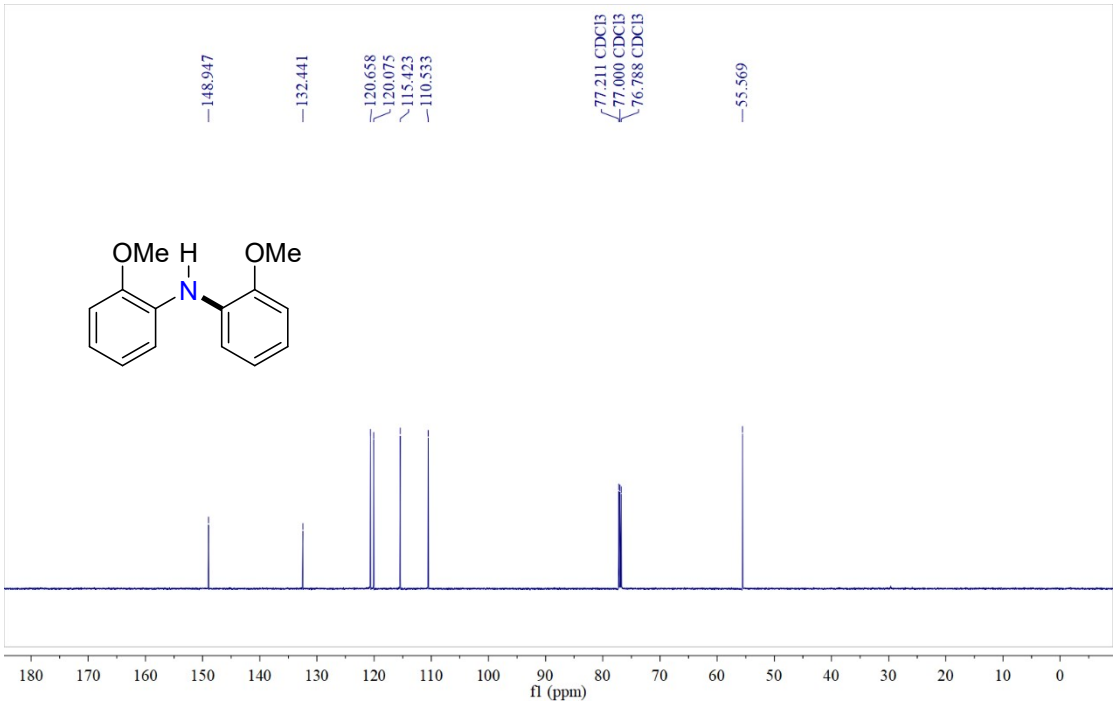
^{13}C NMR Spectrum of **2l**



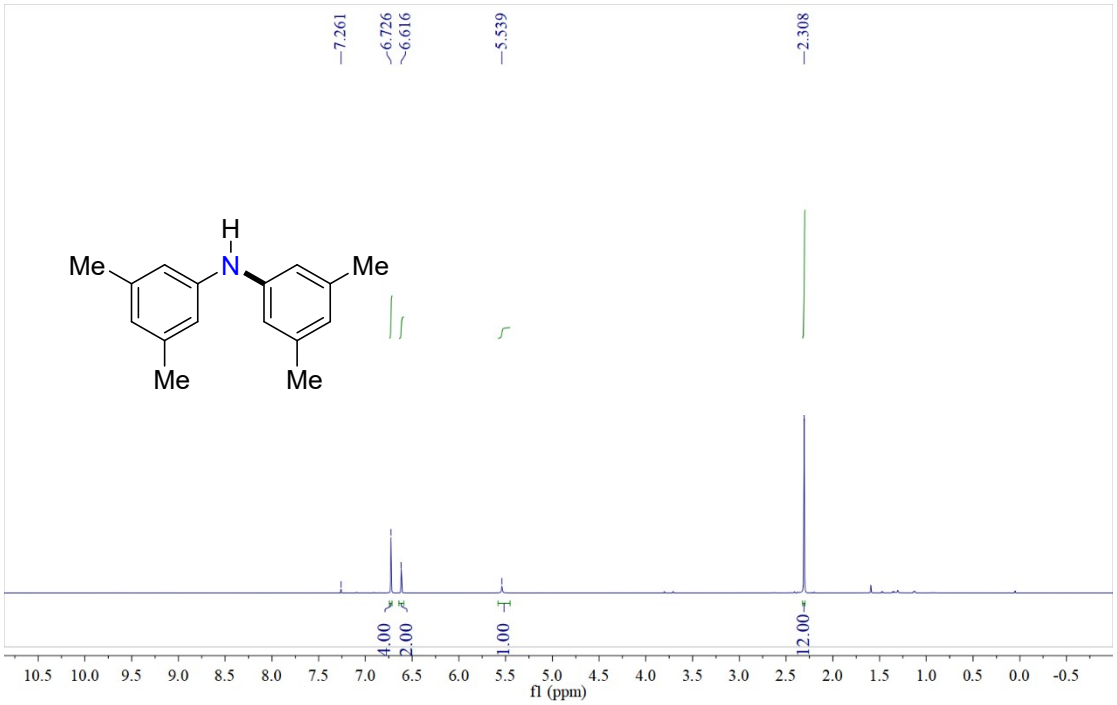
^{1}H NMR Spectrum of **2m**



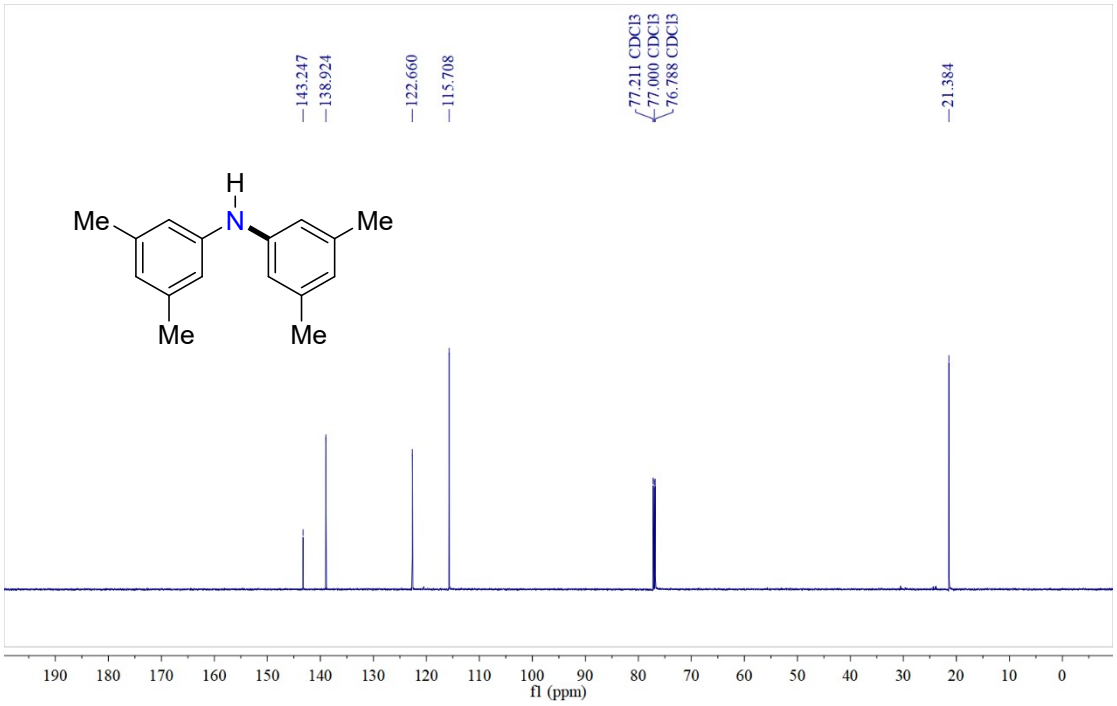
^{13}C NMR Spectrum of **2m**



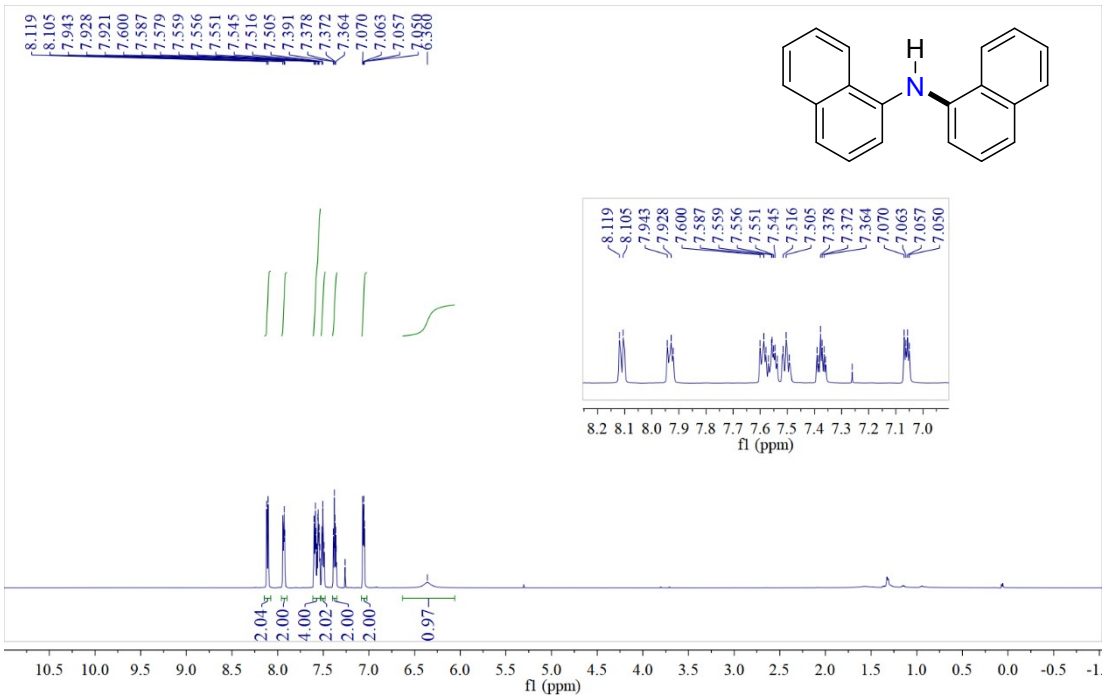
[1]H NMR Spectrum of **2n**



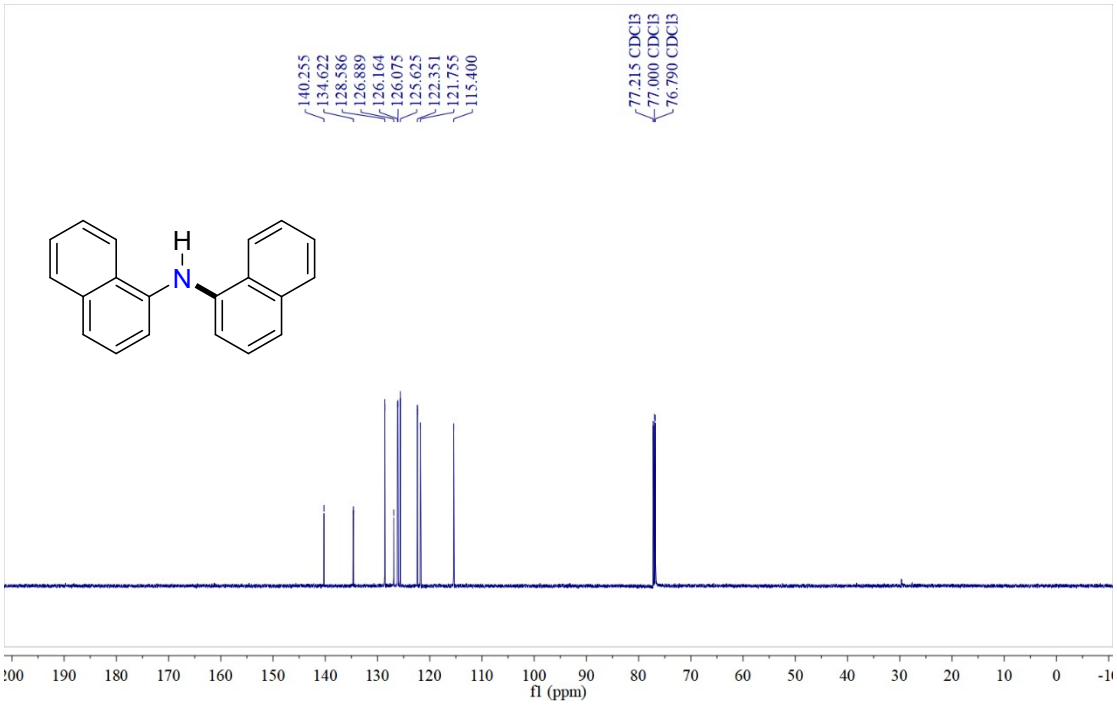
[13]C NMR Spectrum of **2n**



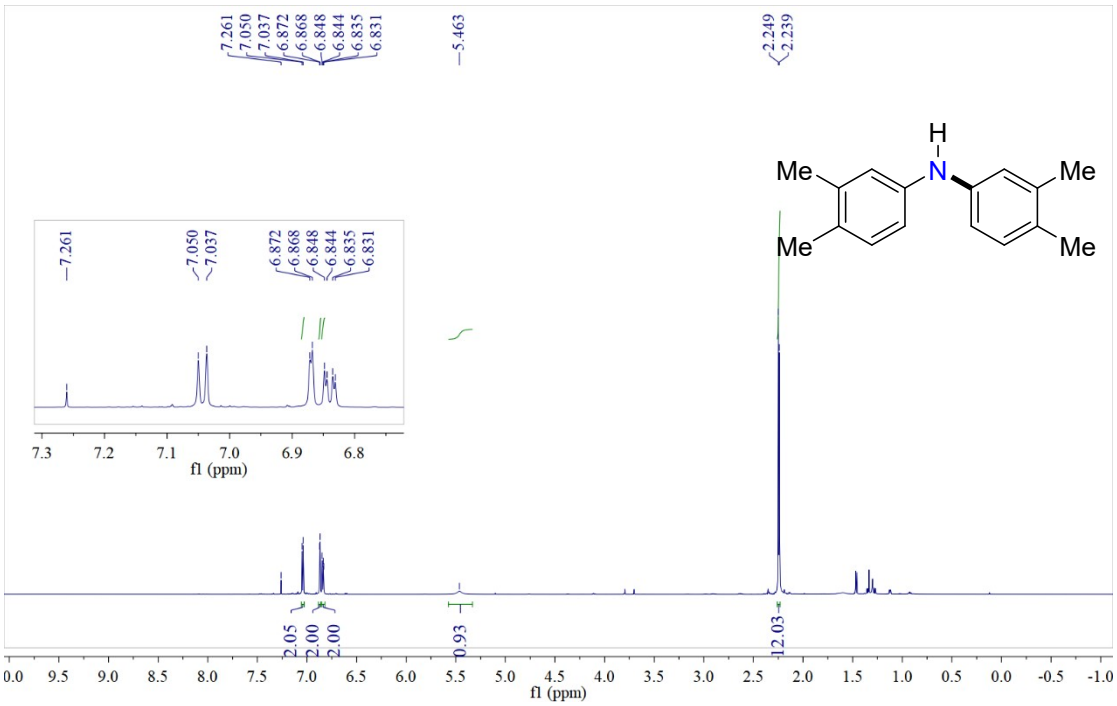
[1]H NMR Spectrum of **2o**



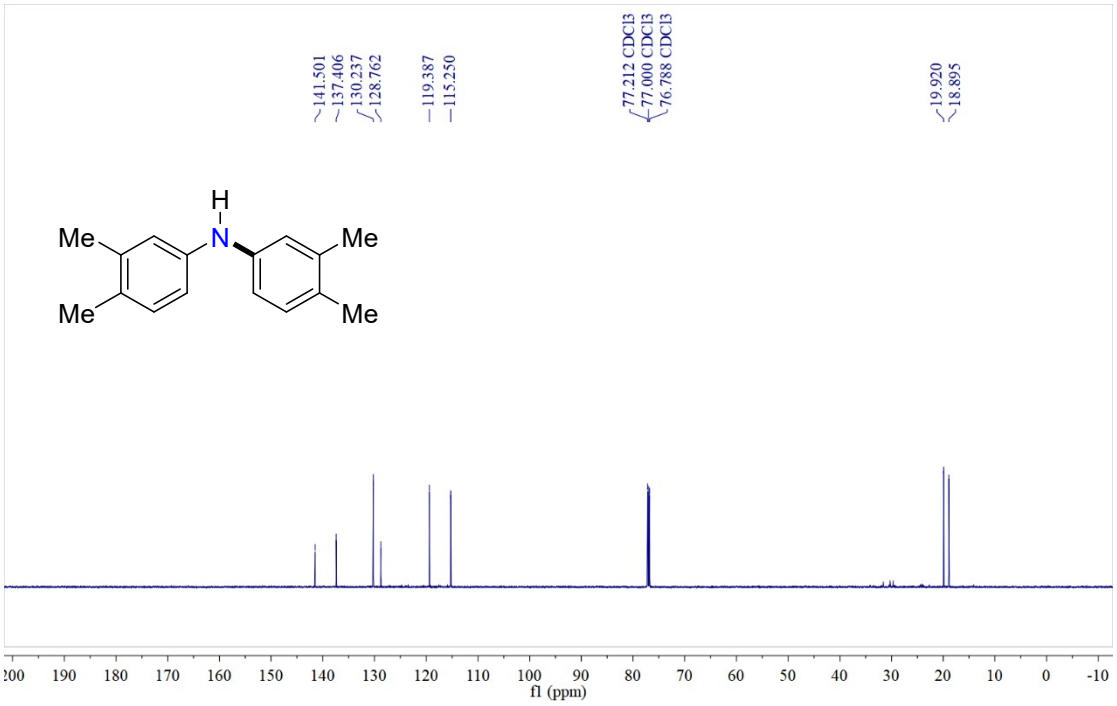
[13]C NMR Spectrum of **2o**



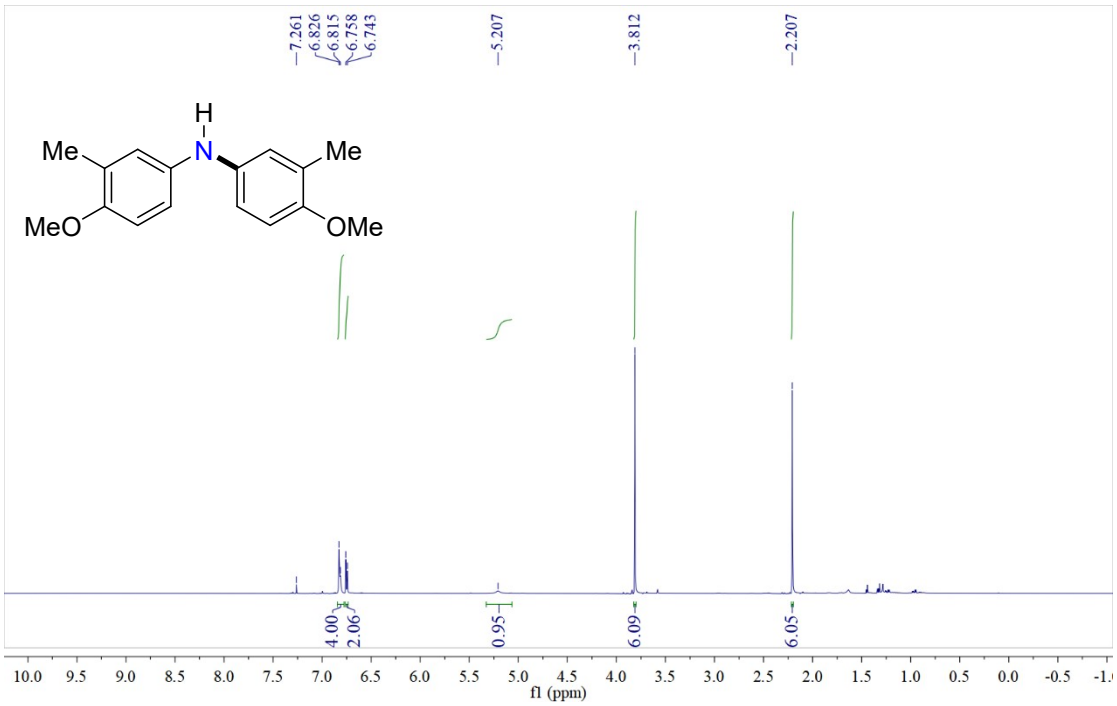
[1]H NMR Spectrum of **2p**



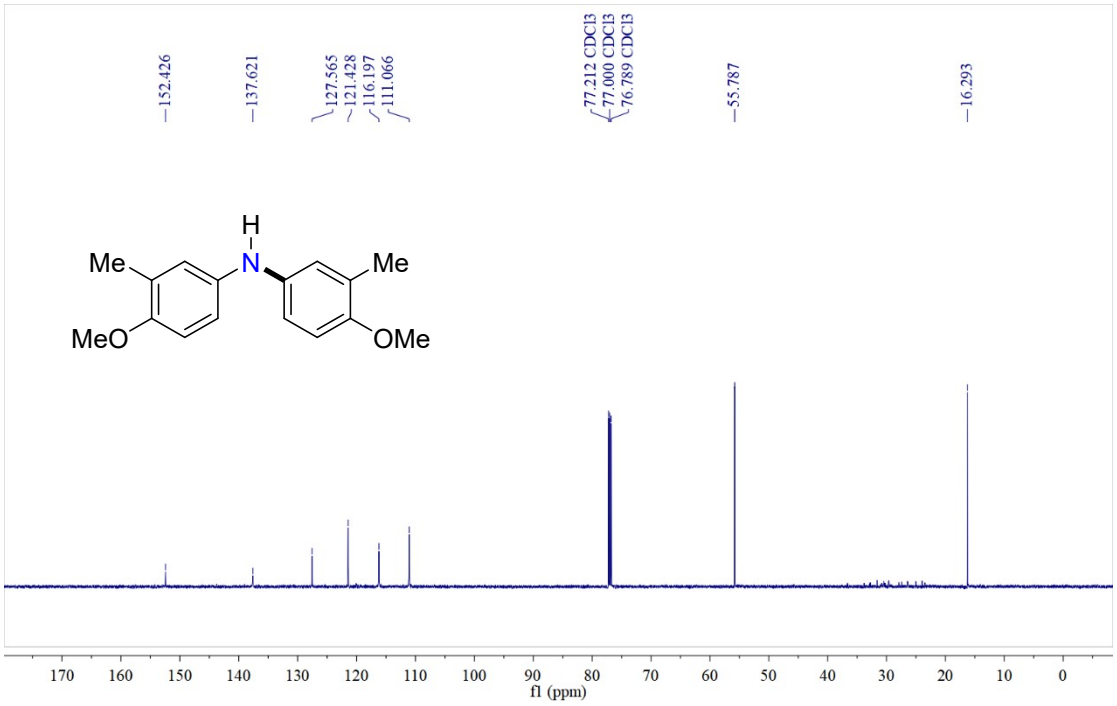
[13]C NMR Spectrum of **2p**



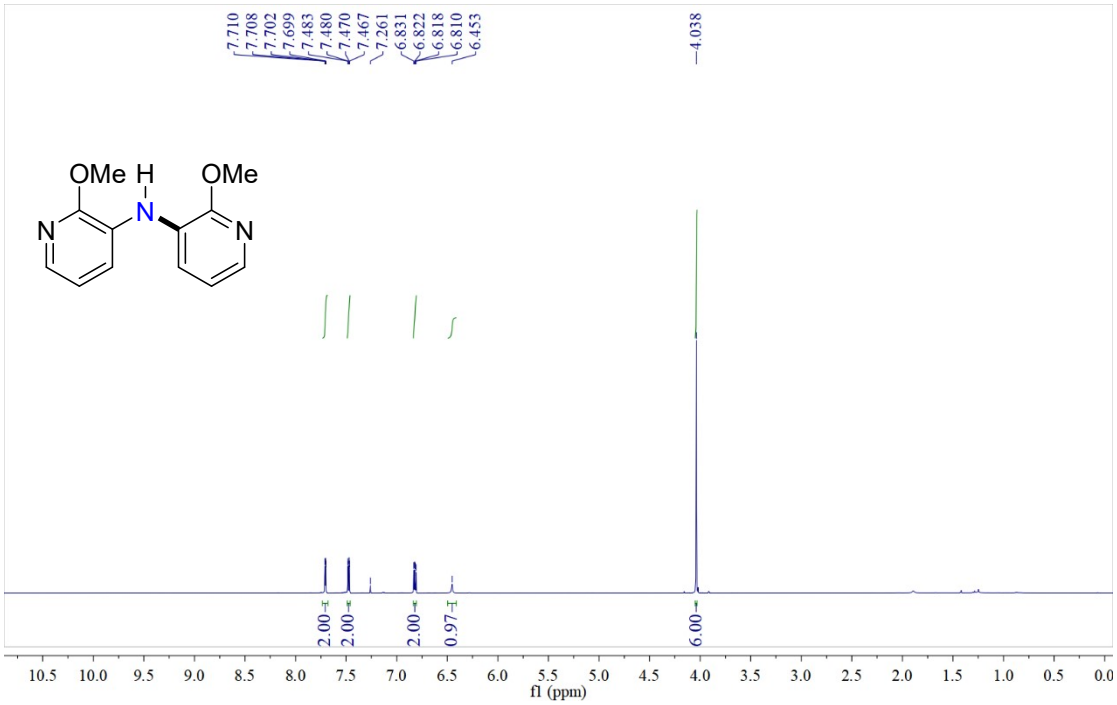
^{1}H NMR Spectrum of **2q**



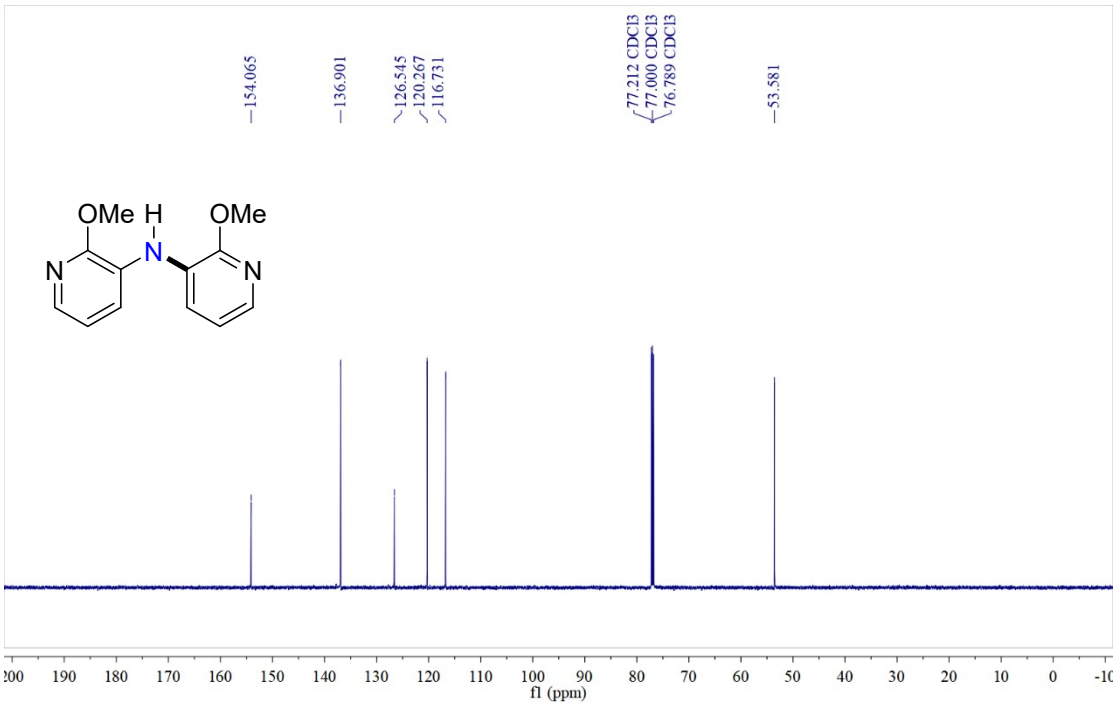
^{13}C NMR Spectrum of **2q**



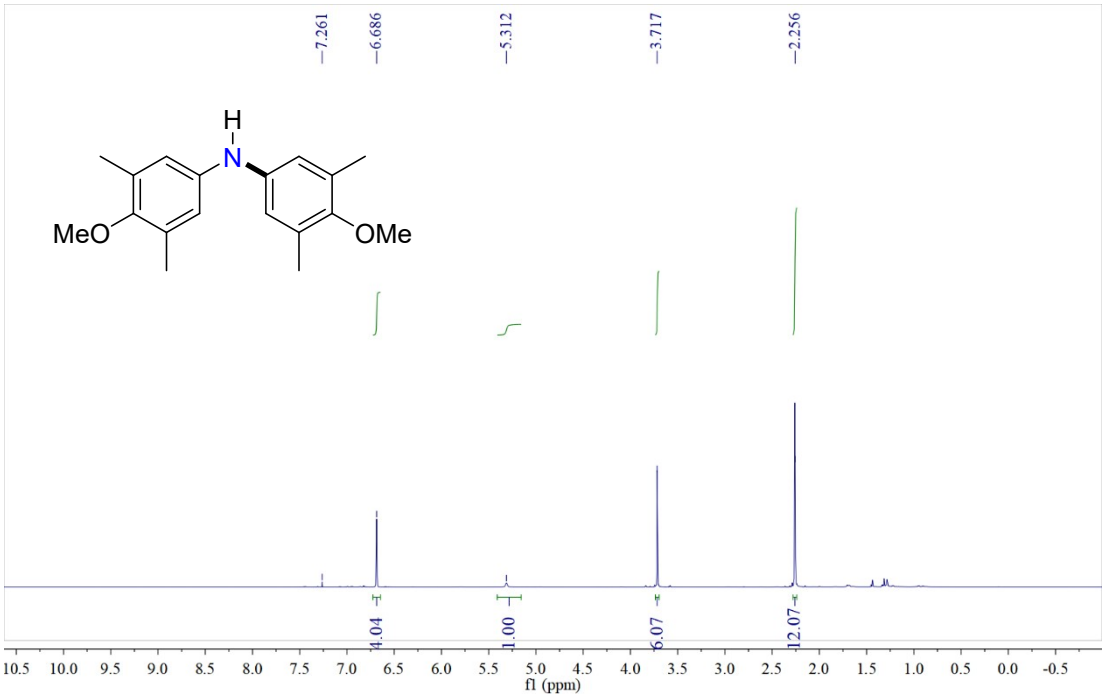
^{1}H NMR Spectrum of **2r**



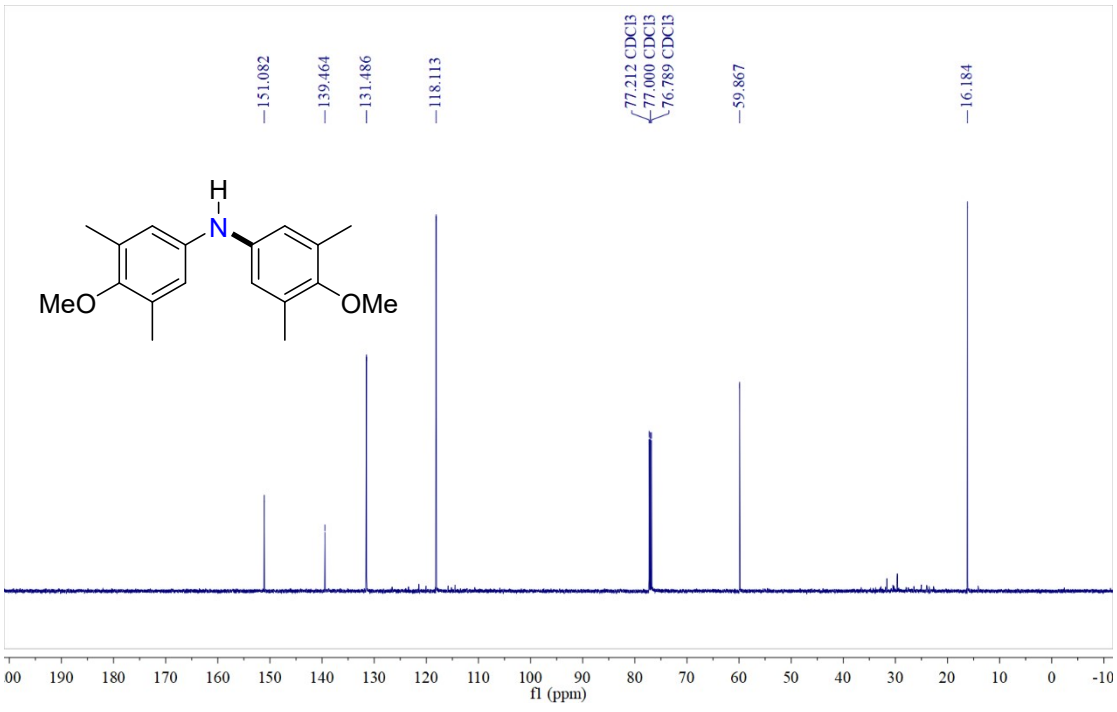
^{13}C NMR Spectrum of **2r**



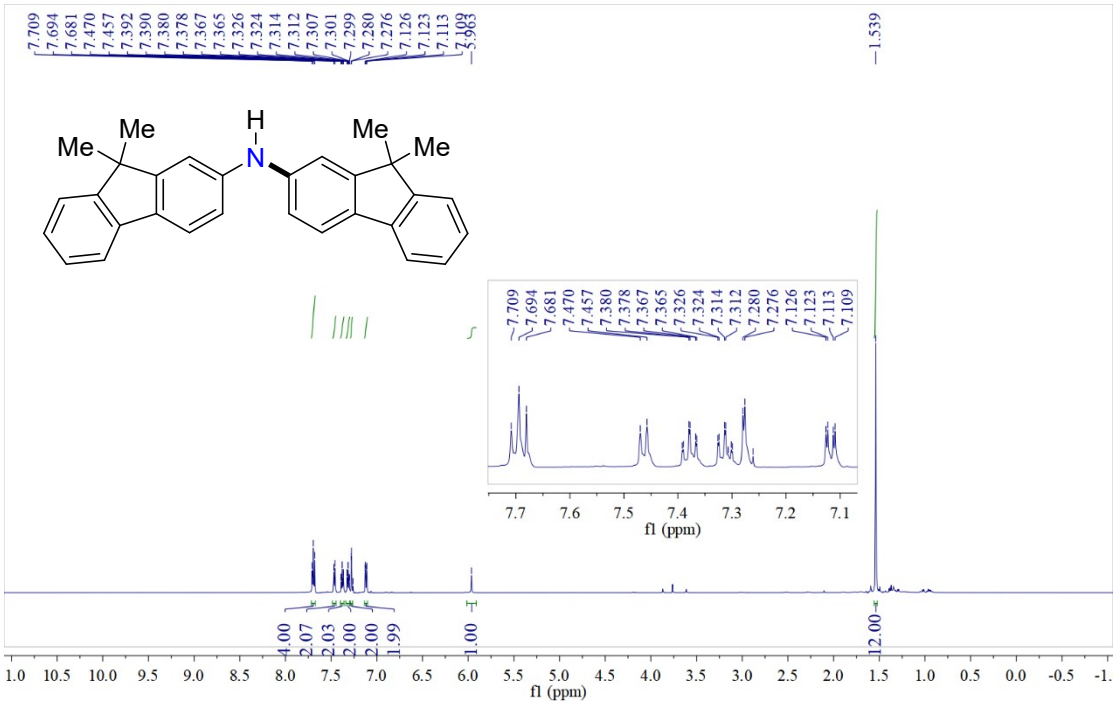
^{1}H NMR Spectrum of **2s**



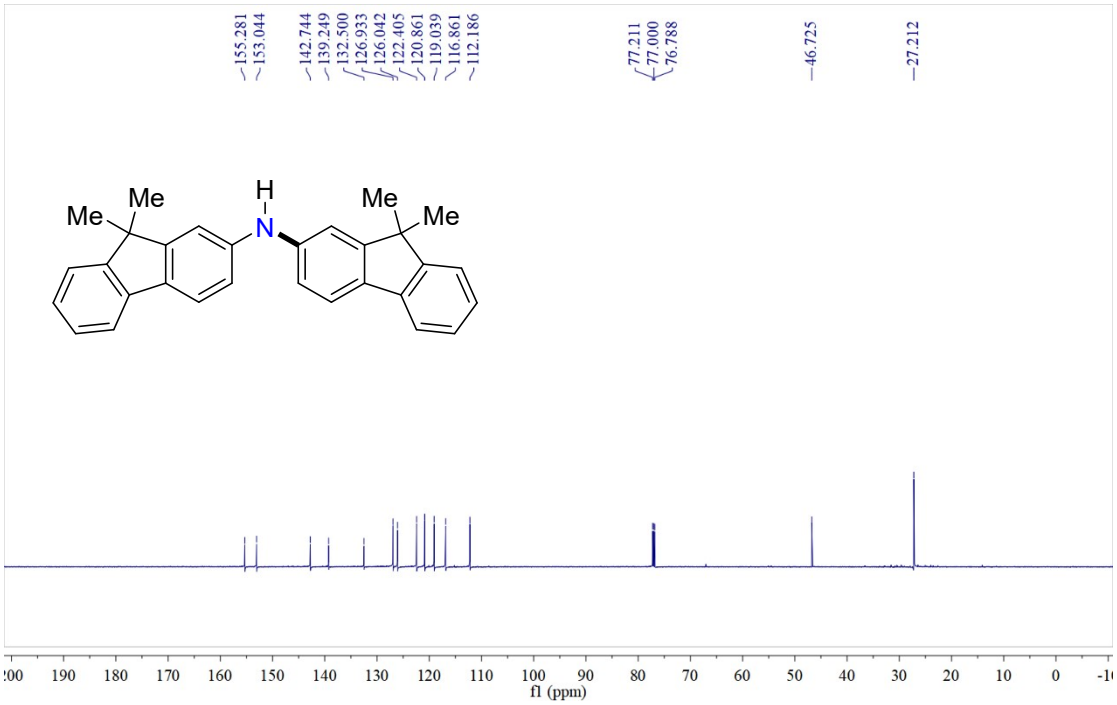
^{13}C NMR Spectrum of **2s**



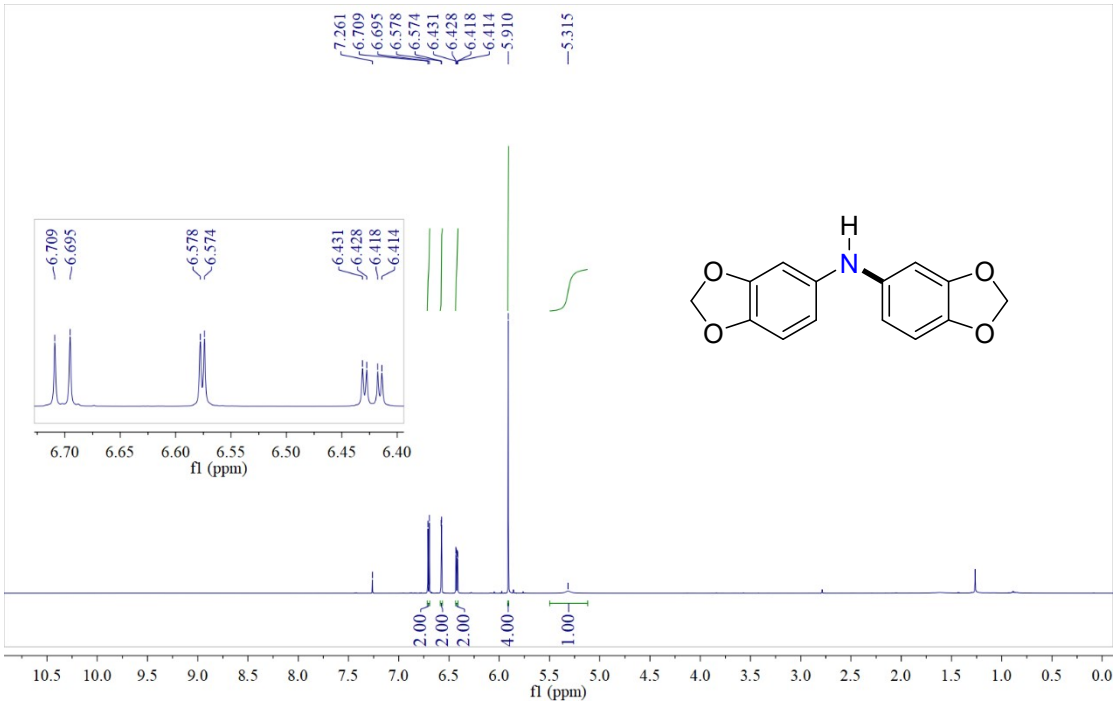
^{1}H NMR Spectrum of **2t**



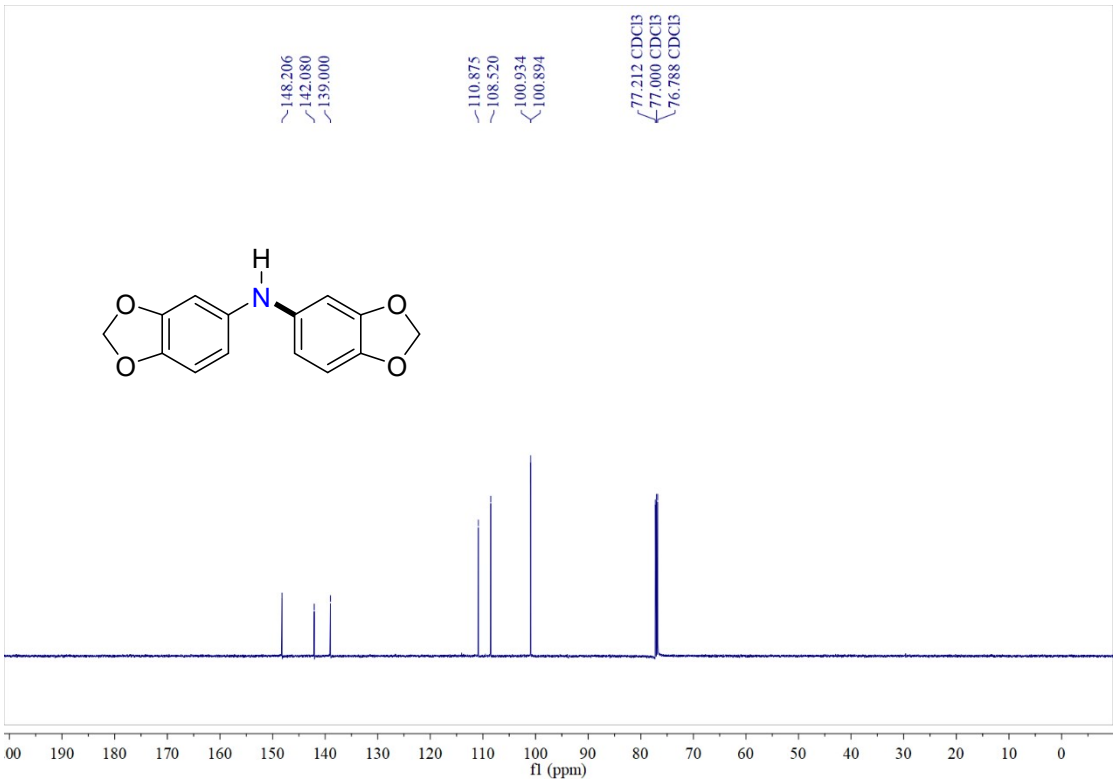
^{13}C NMR Spectrum of **2t**



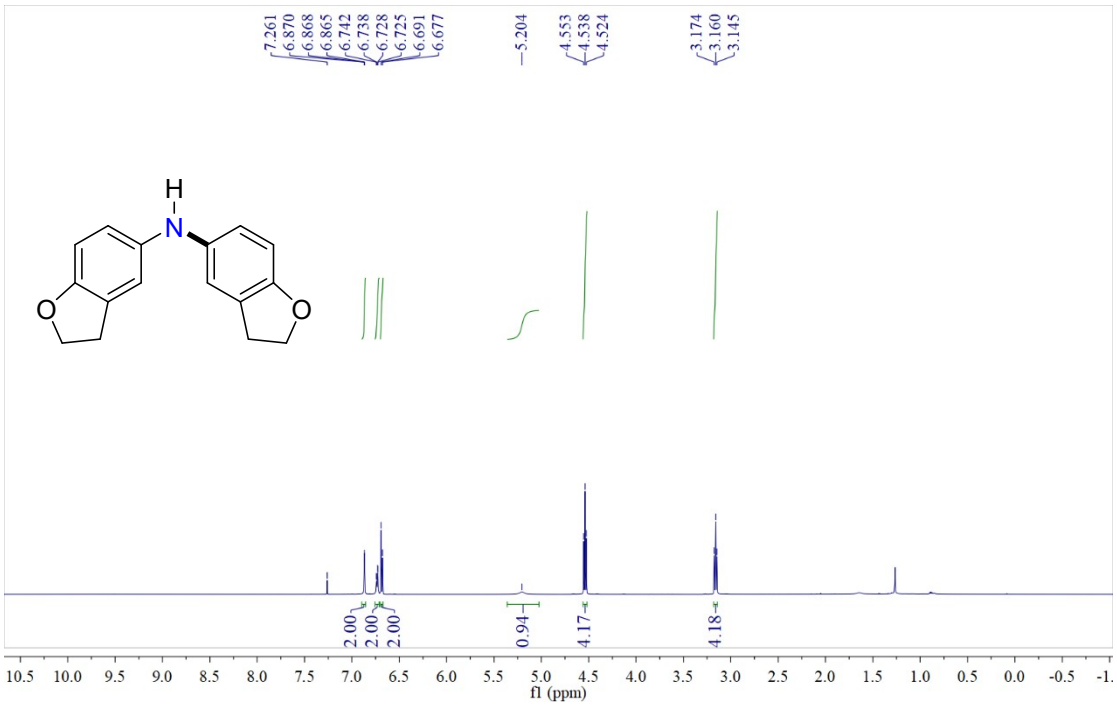
[1]H NMR Spectrum of **2u**



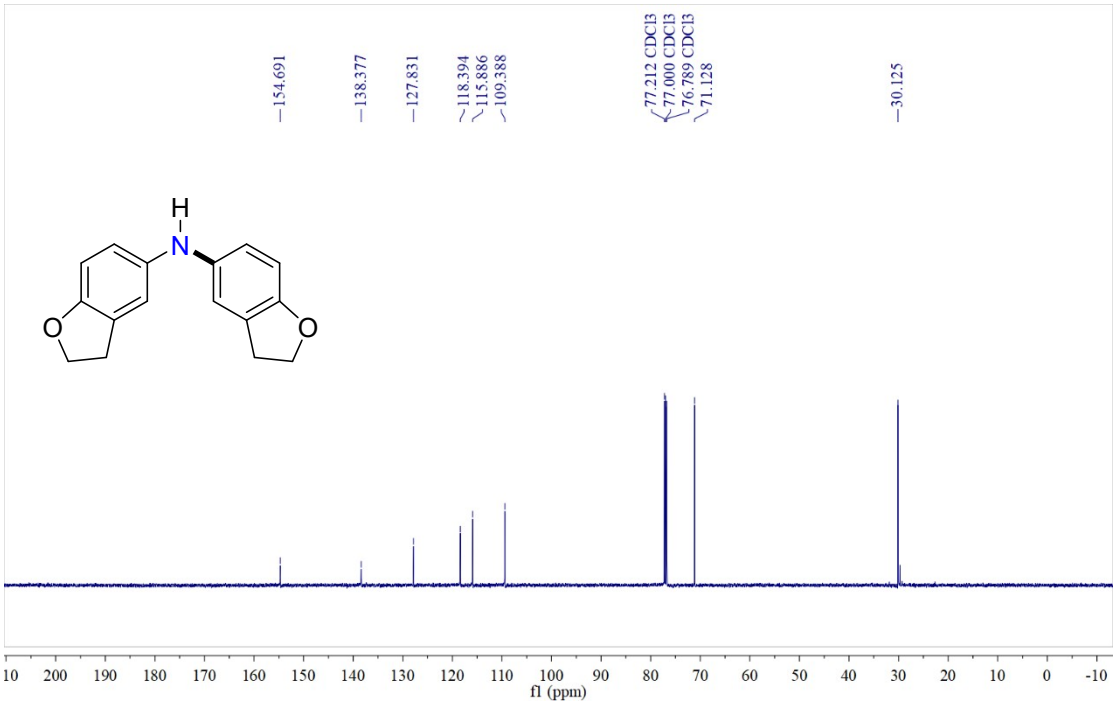
[13]C NMR Spectrum of **2u**



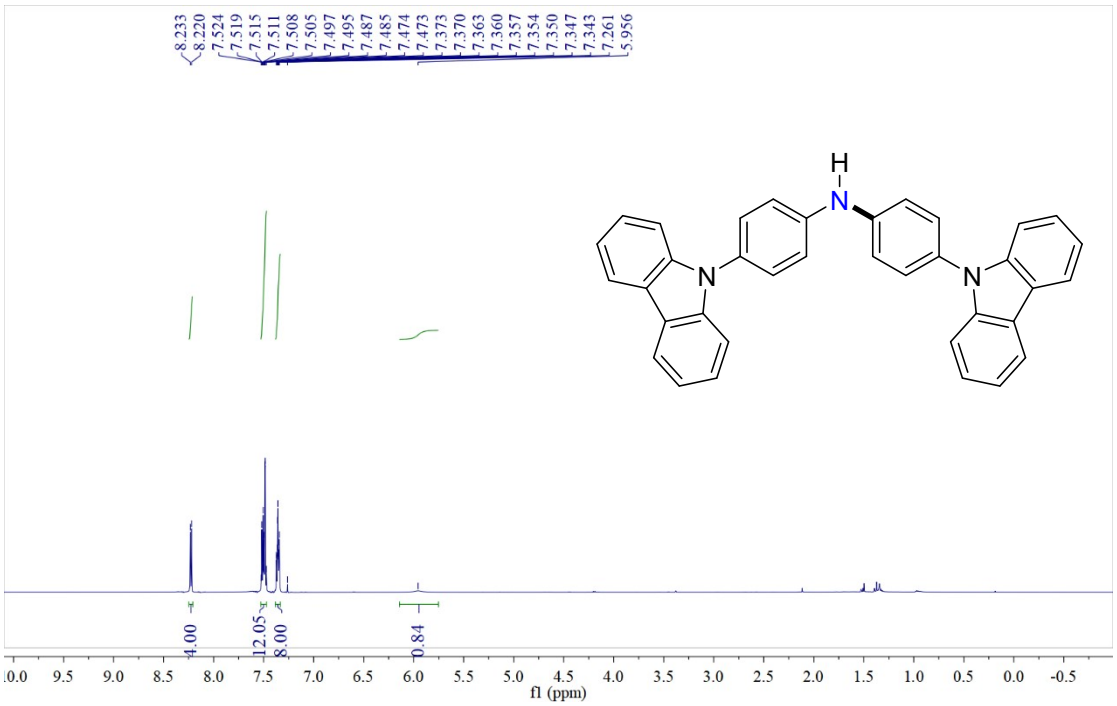
^{1}H NMR Spectrum of **2v**



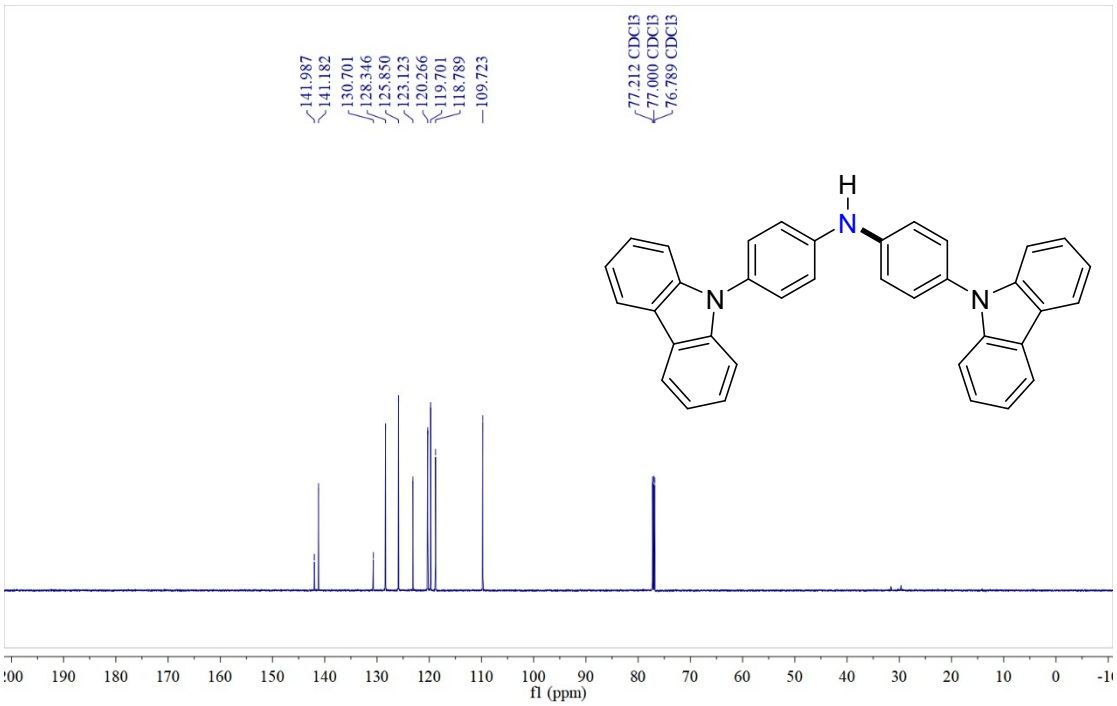
^{13}C NMR Spectrum of **2v**



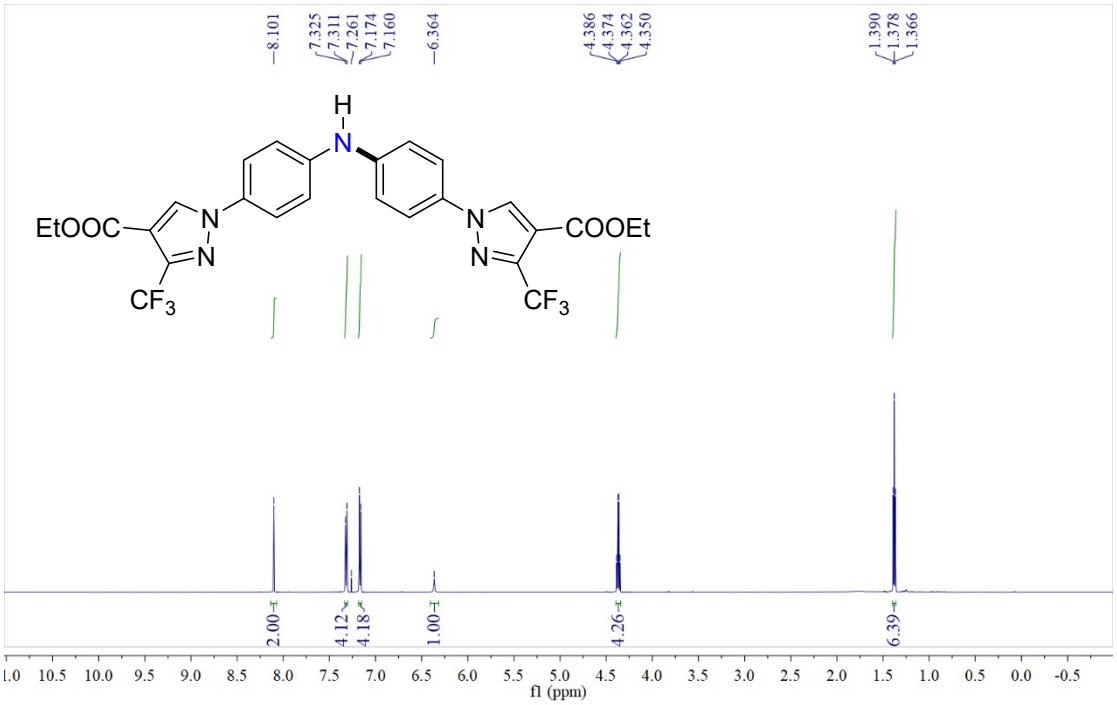
[1]H NMR Spectrum of **2w**



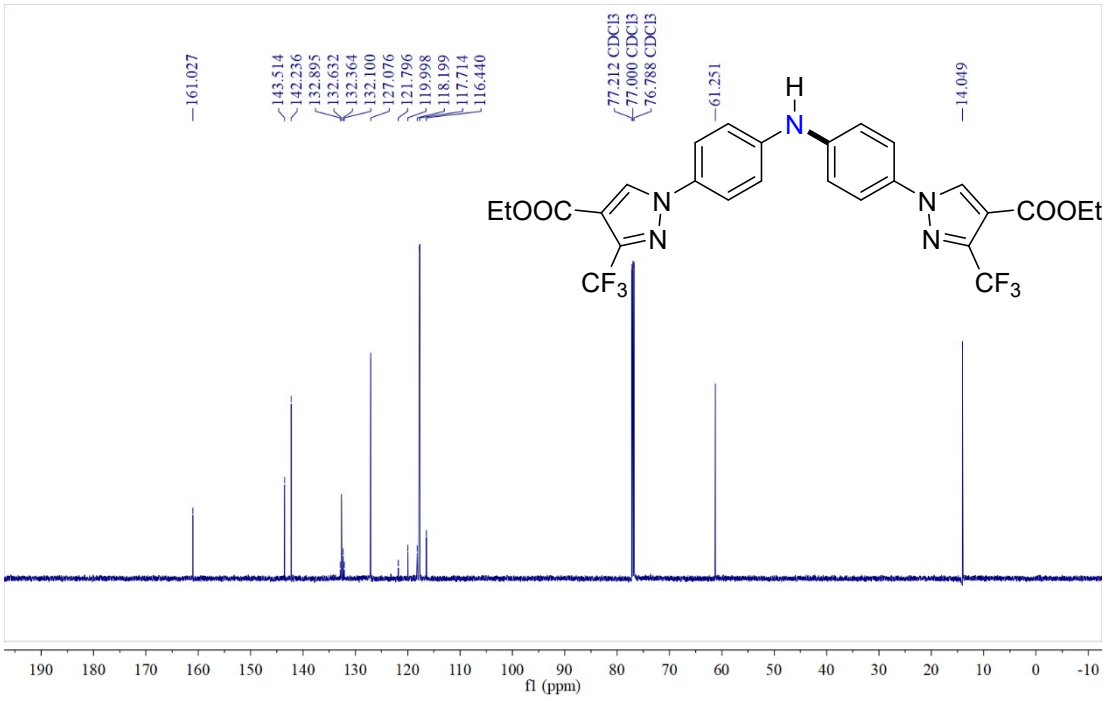
[13]C NMR Spectrum of **2w**



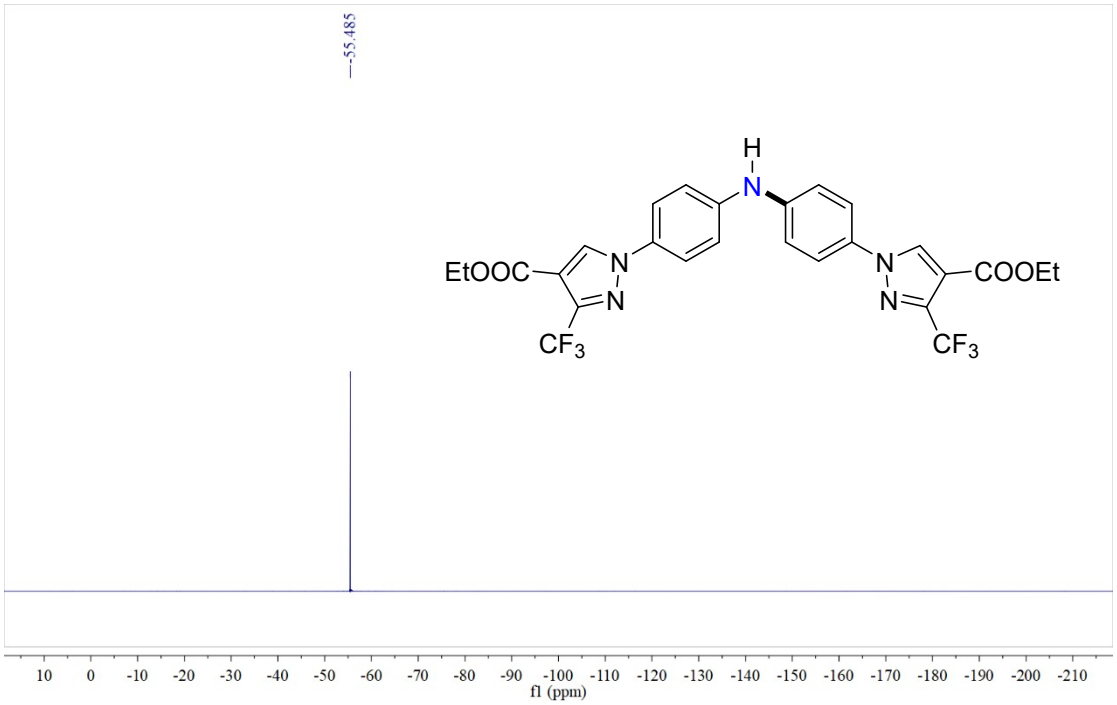
^{1}H NMR Spectrum of **2x**



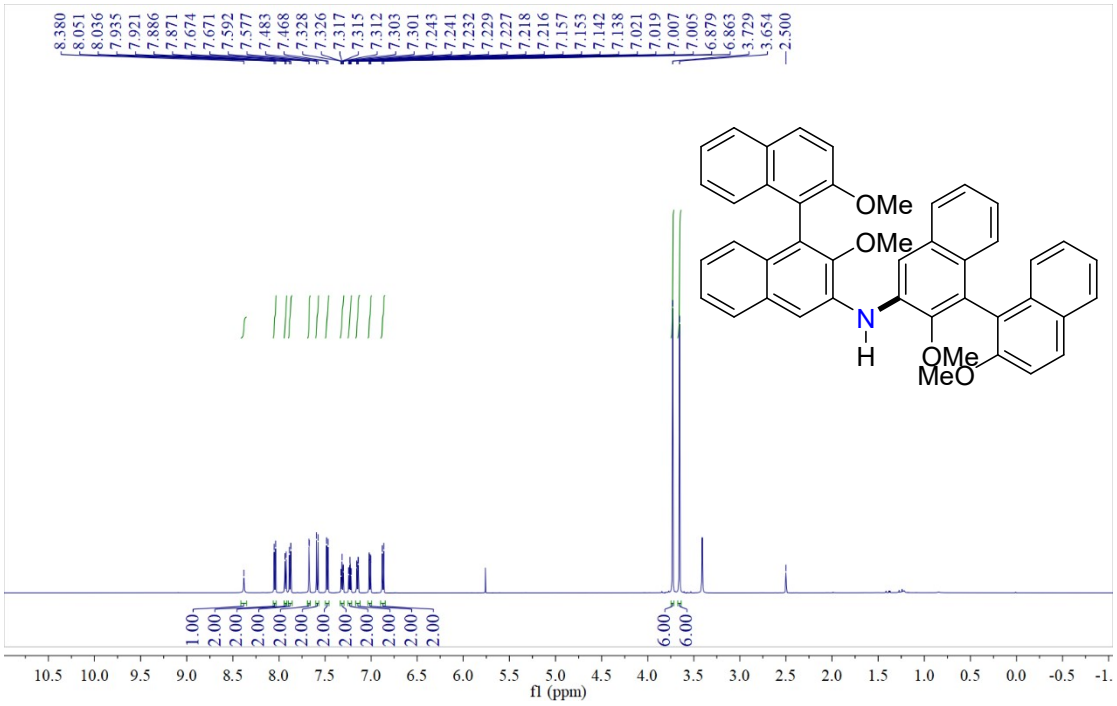
^{13}C NMR Spectrum of **2x**



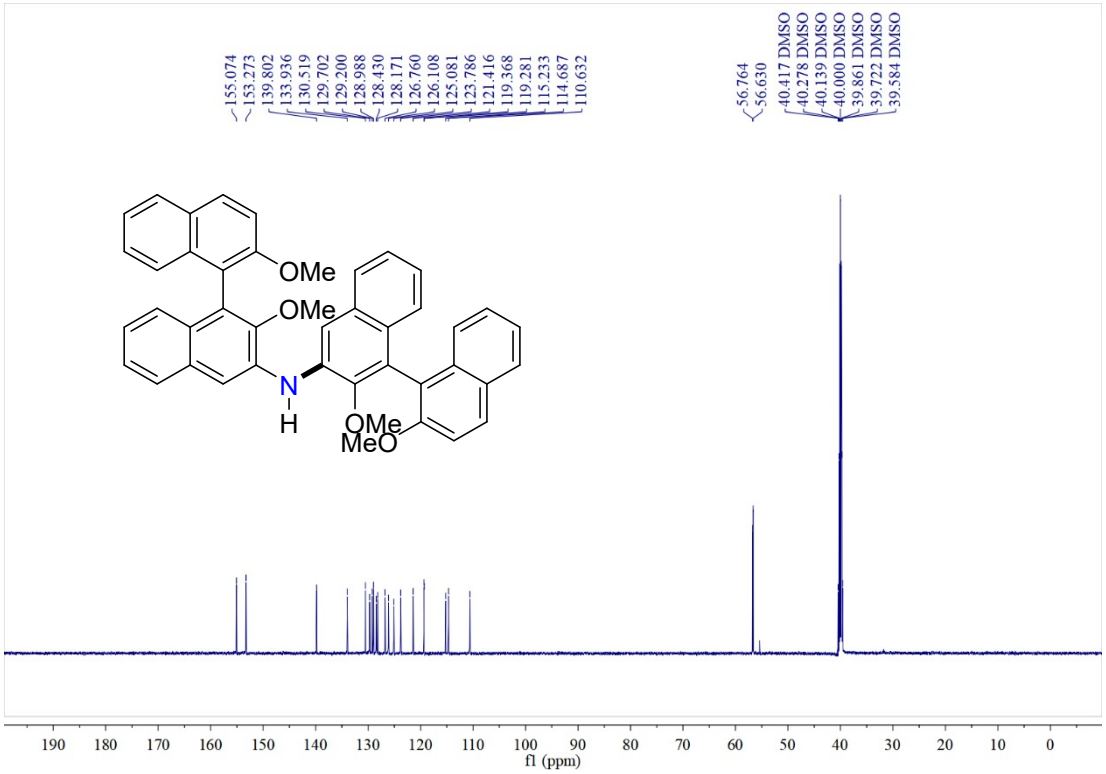
^{19}F NMR Spectrum of **2x**



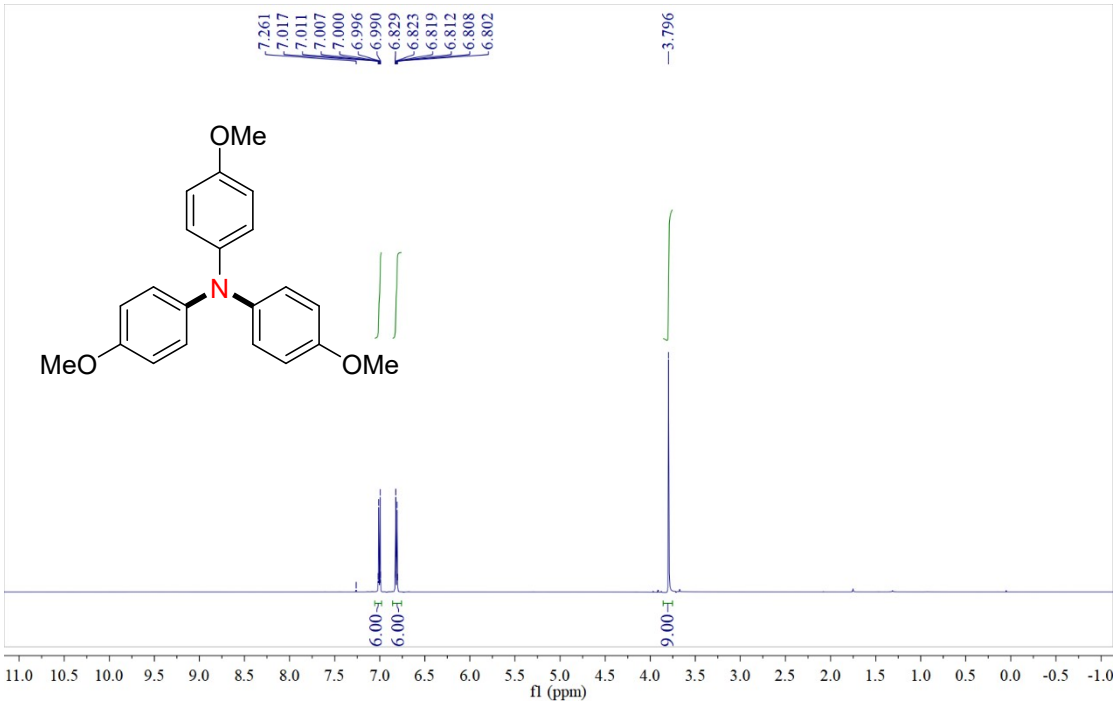
^{1}H NMR Spectrum of **2y**



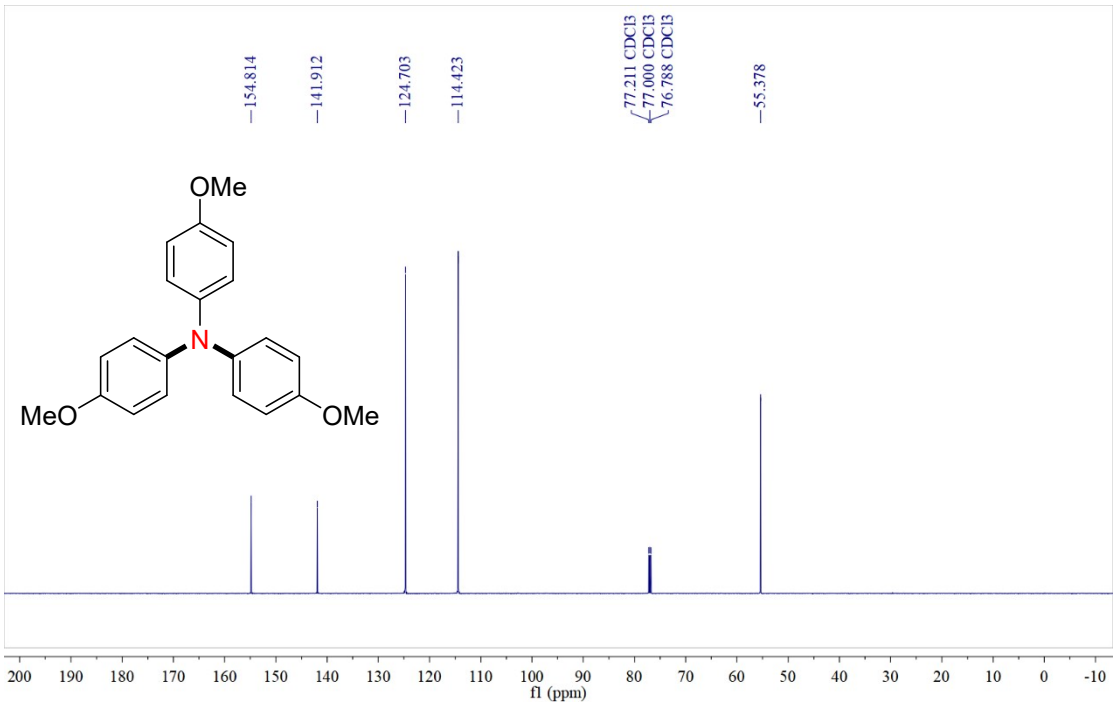
^{13}C NMR Spectrum of **2y**



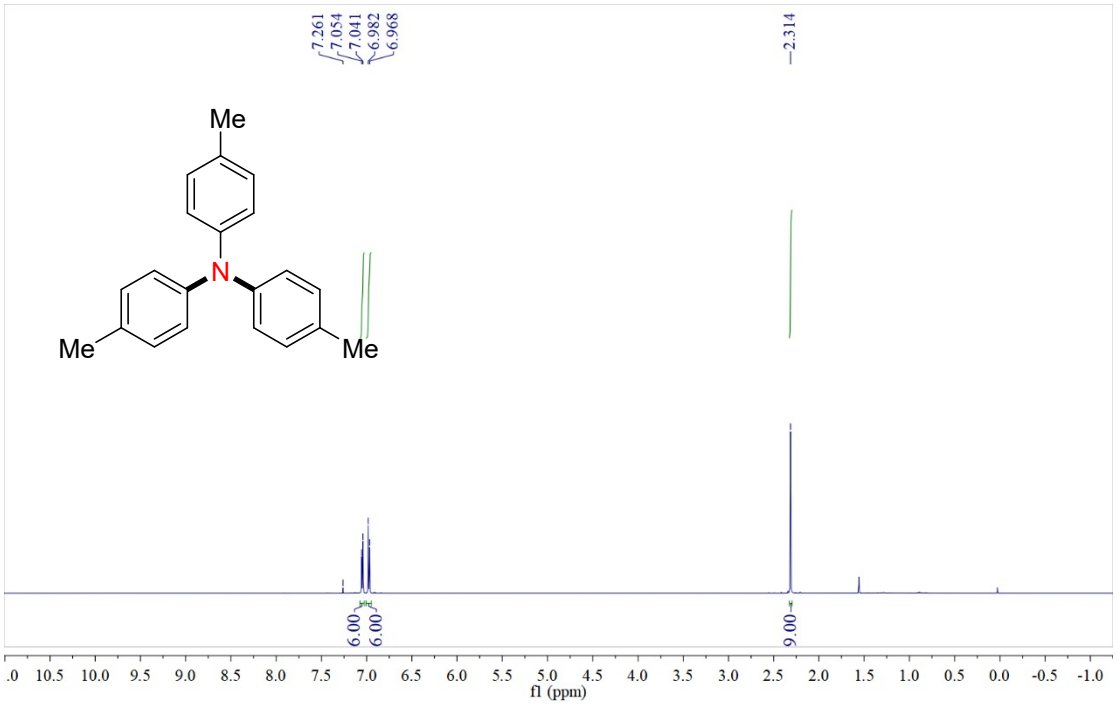
^{1}H NMR Spectrum of **3a**



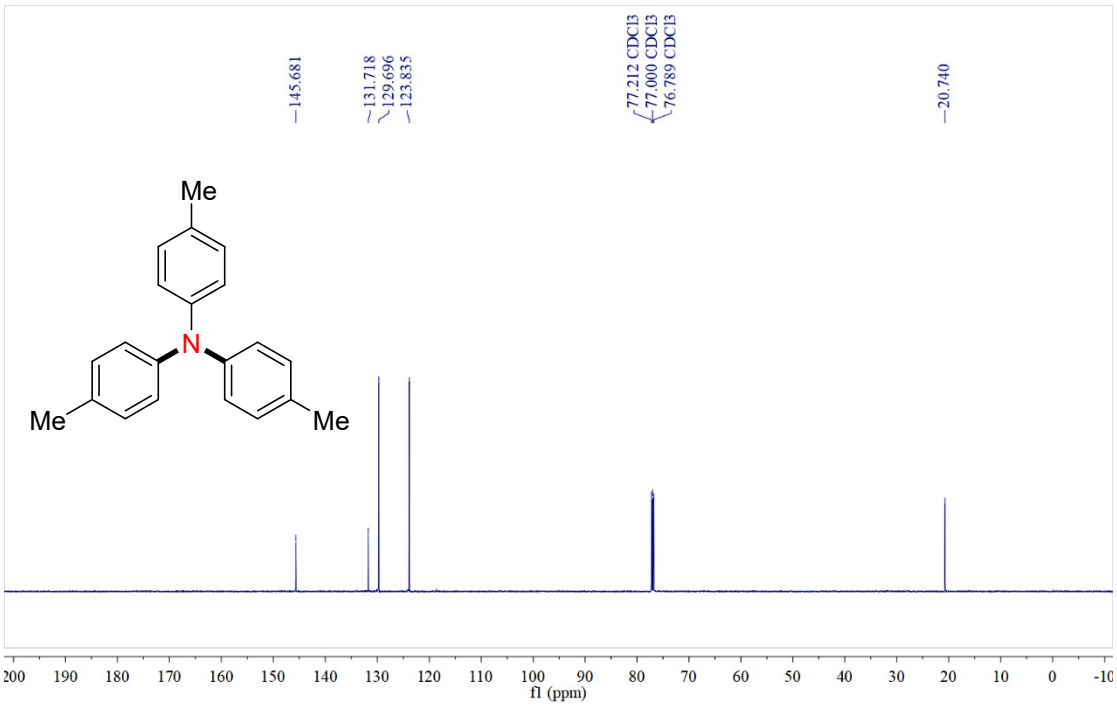
^{13}C NMR Spectrum of **3a**



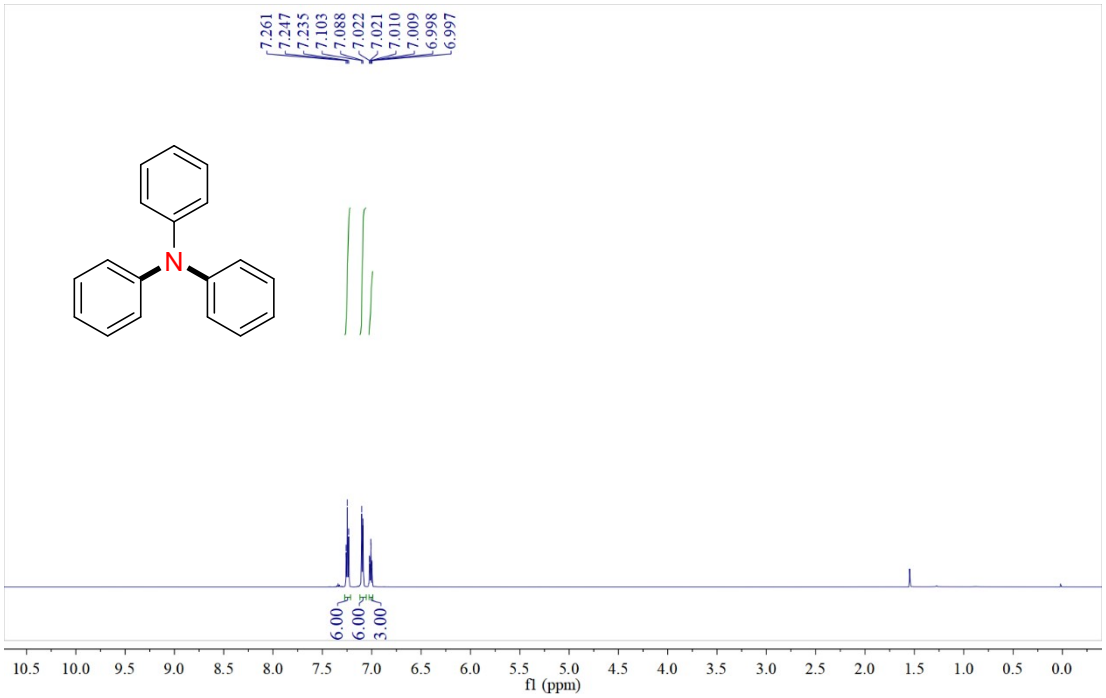
^{1}H NMR Spectrum of **3b**



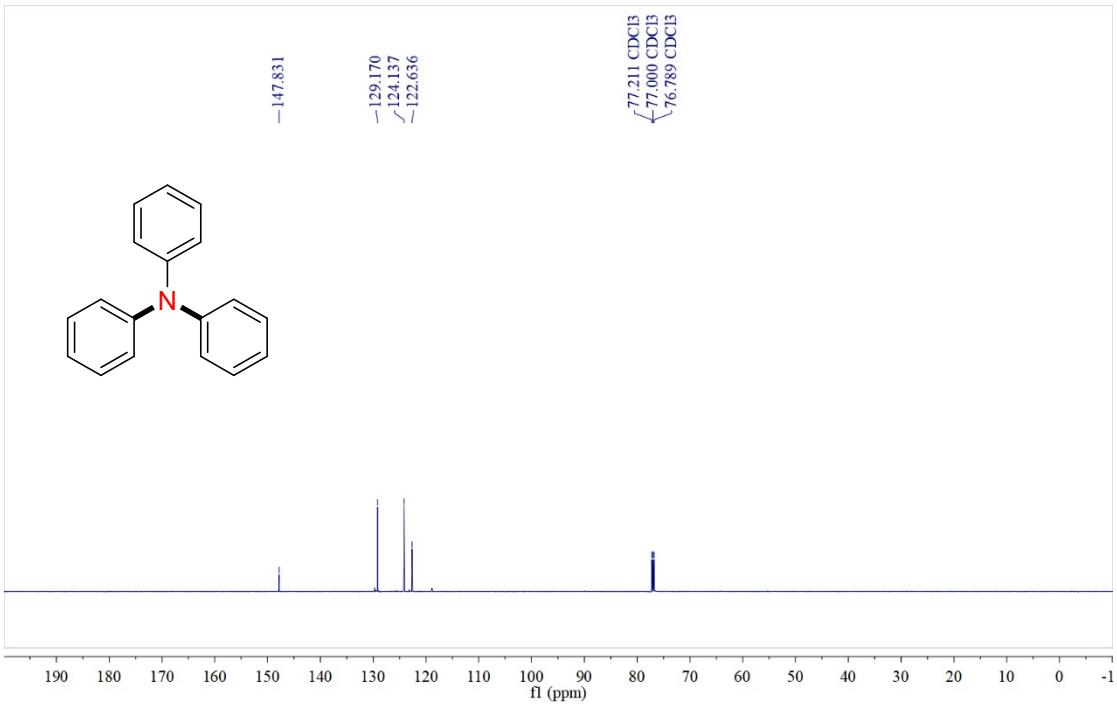
^{13}C NMR Spectrum of **3b**



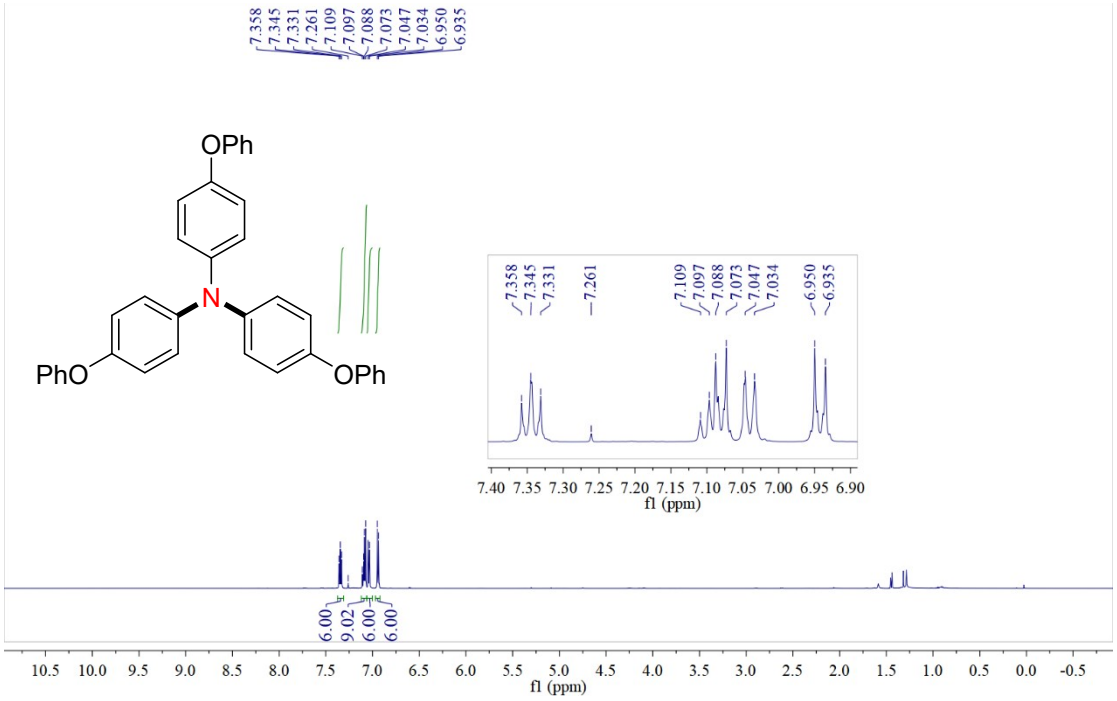
^{1}H NMR Spectrum of **3c**



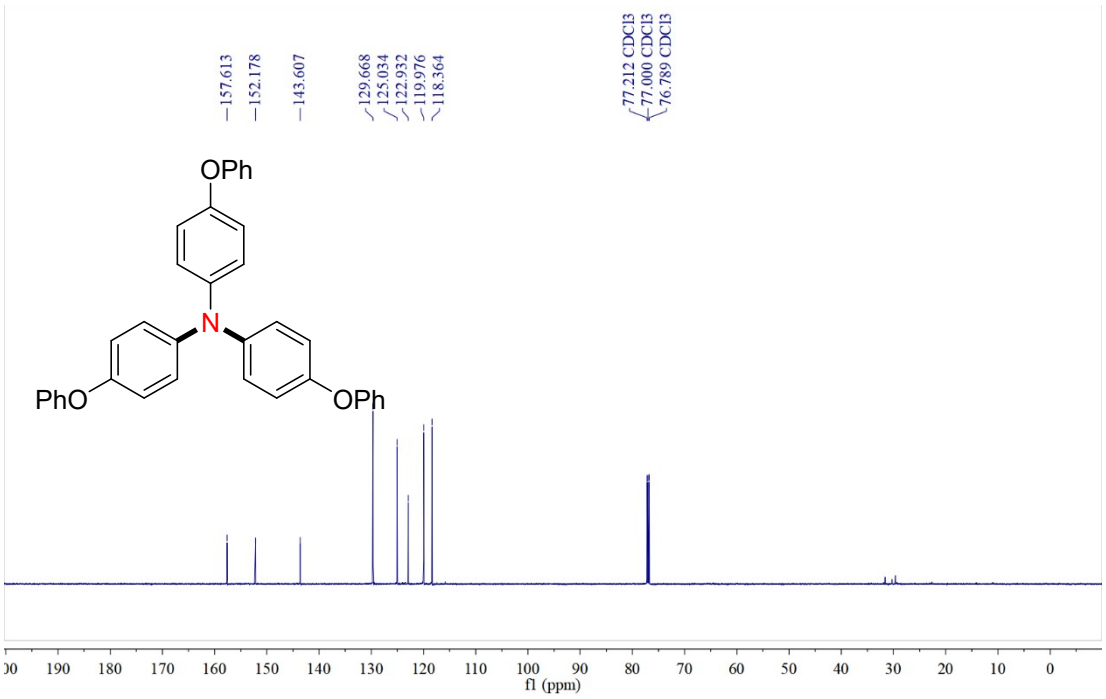
^{13}C NMR Spectrum of **3c**



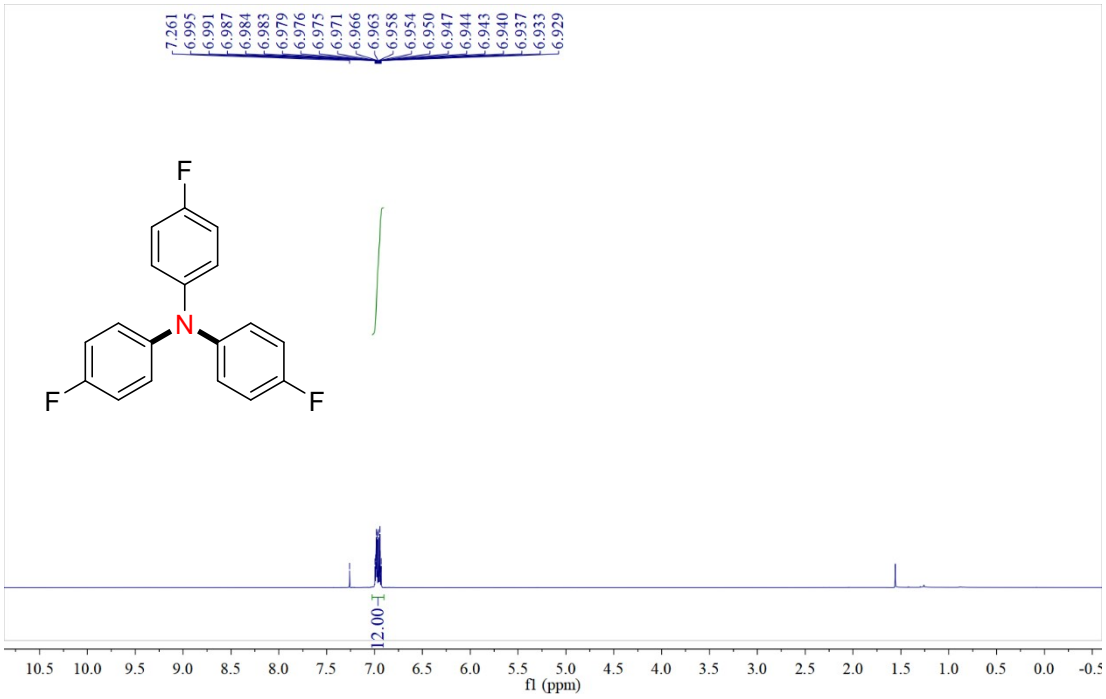
^{1}H NMR Spectrum of **3d**



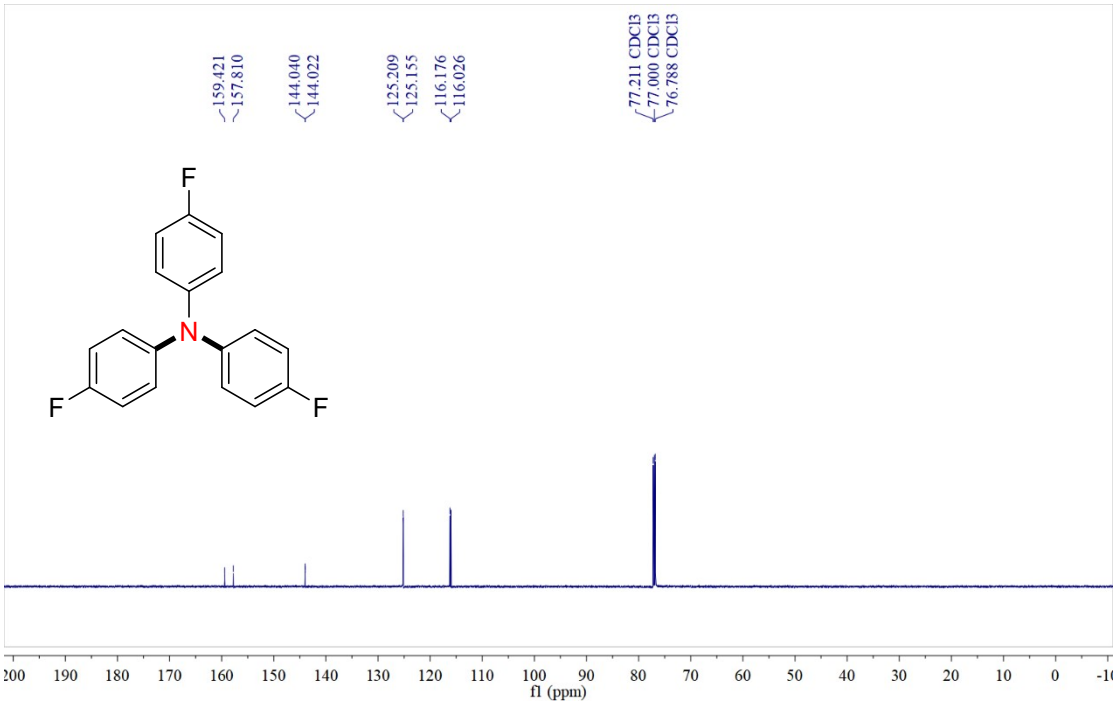
^{13}C NMR Spectrum of **3d**



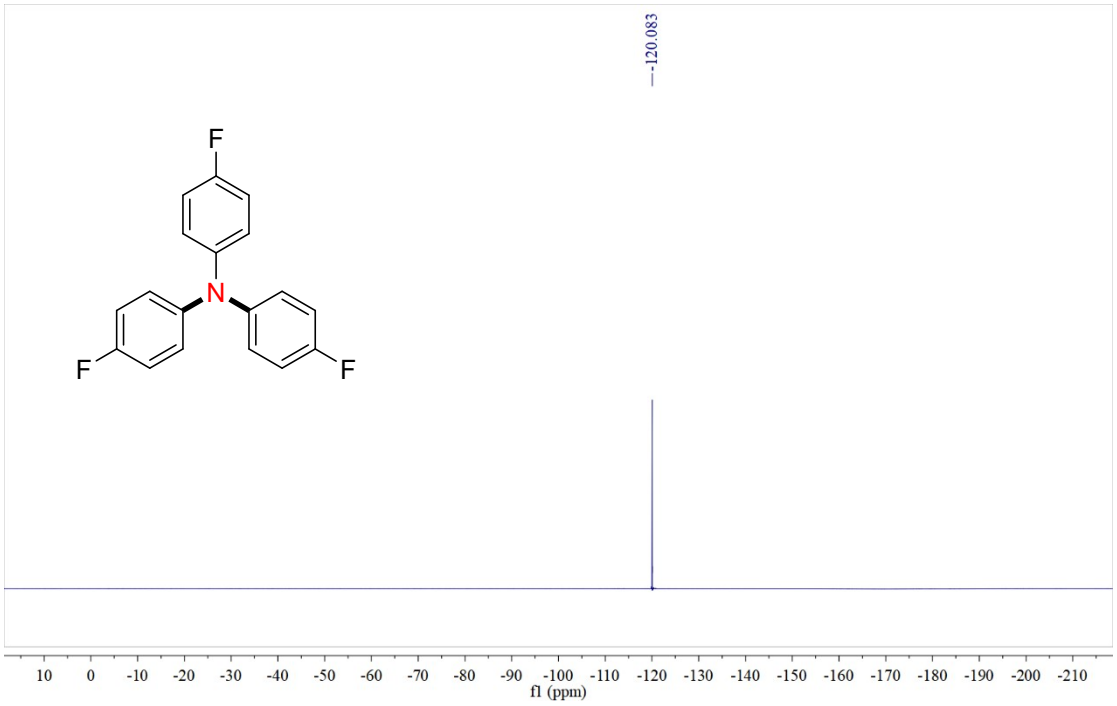
^{1}H NMR Spectrum of **3e**



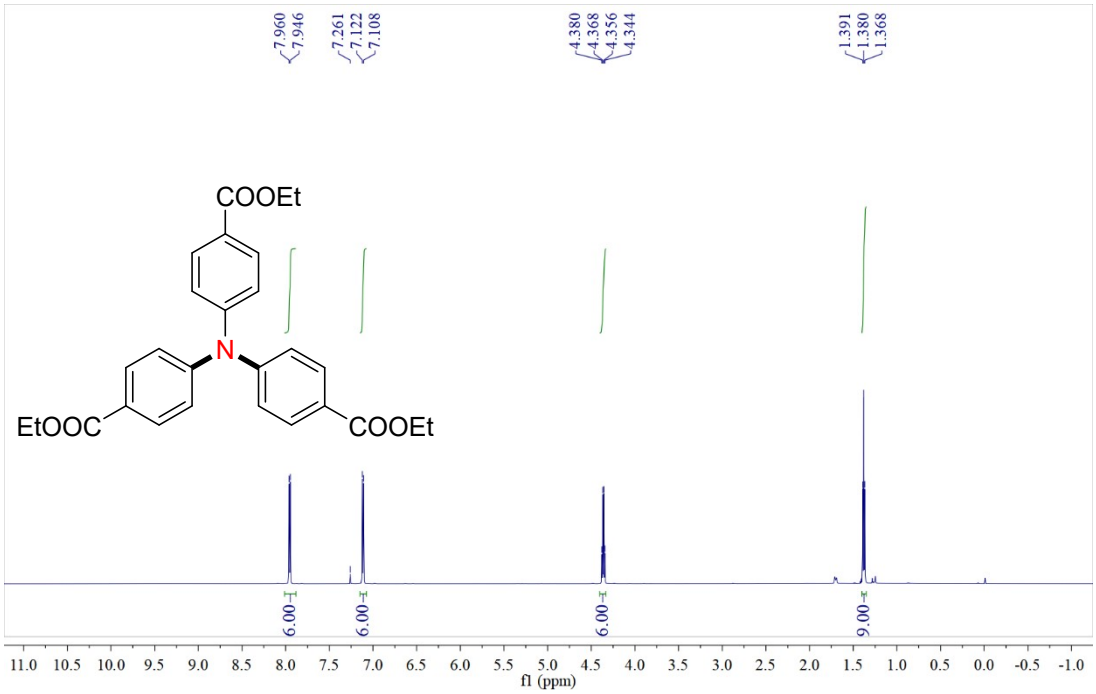
^{13}C NMR Spectrum of **3e**



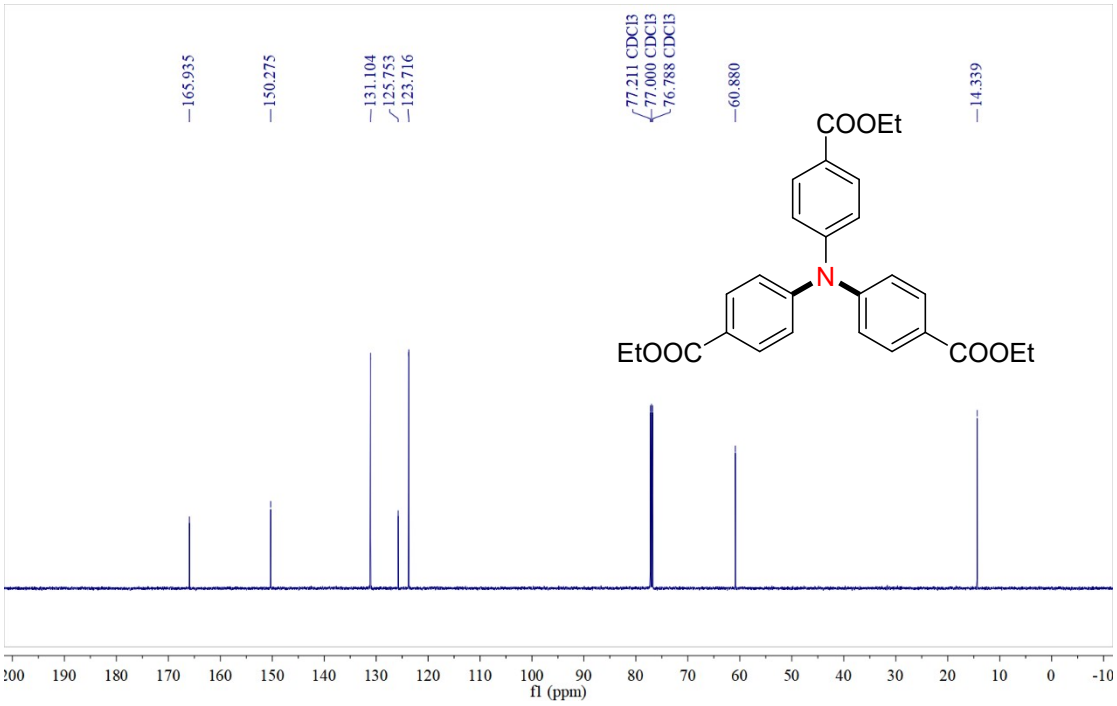
^{19}F NMR Spectrum of **3e**



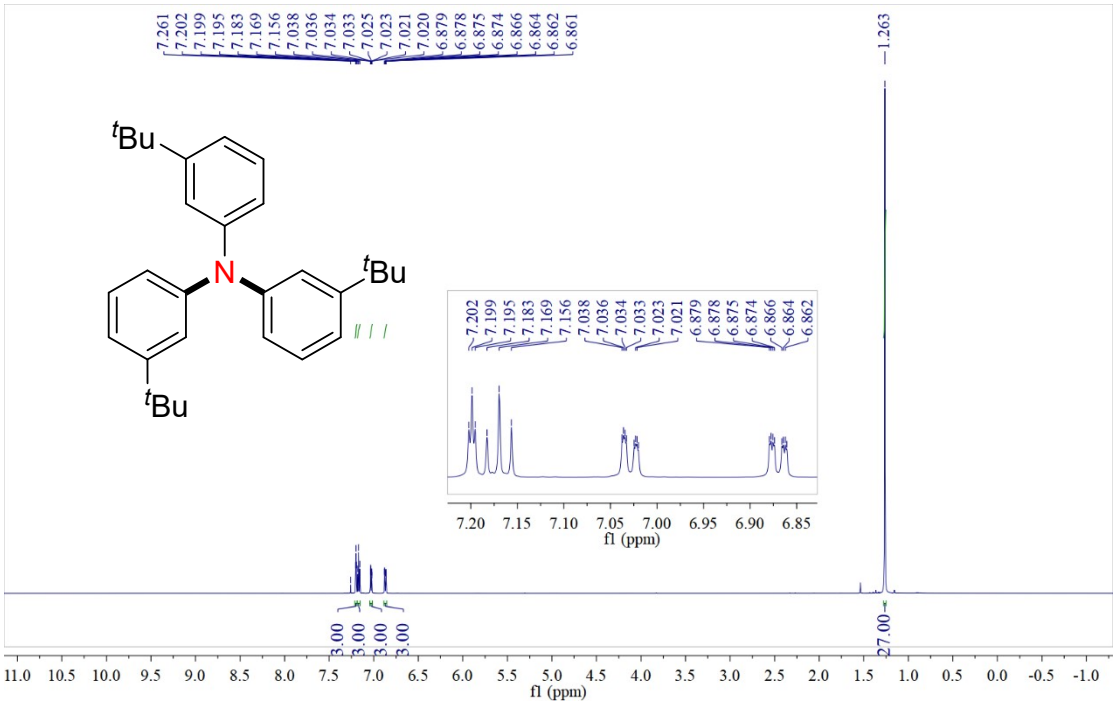
^{1}H NMR Spectrum of **3f**



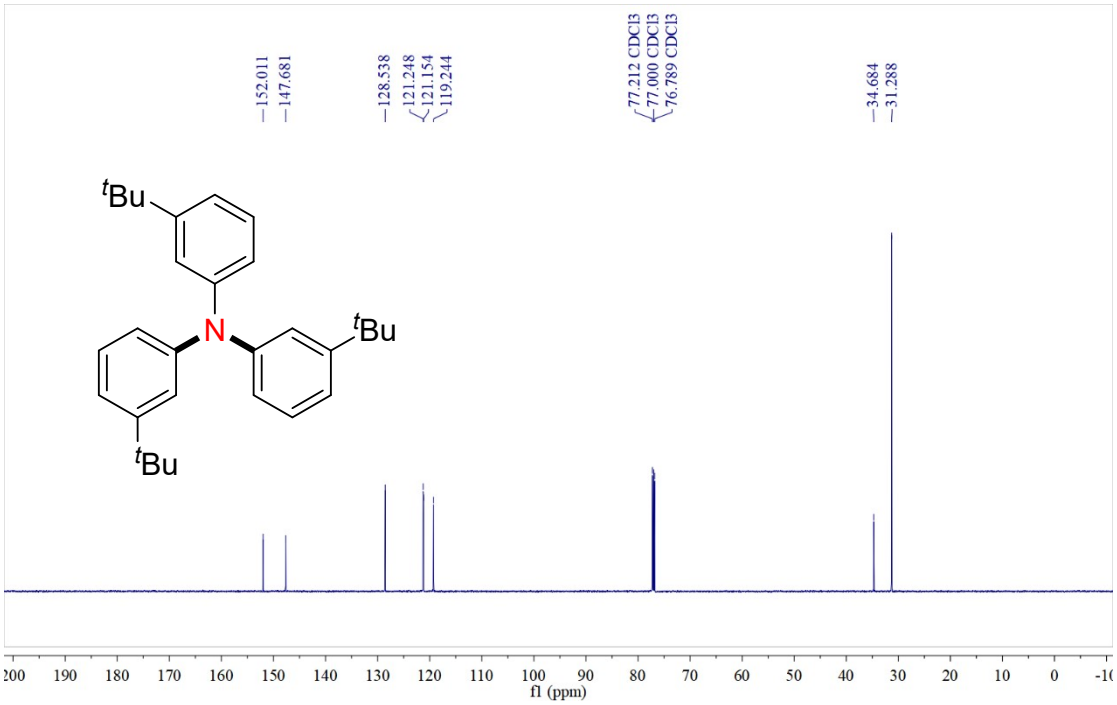
^{13}C NMR Spectrum of **3f**



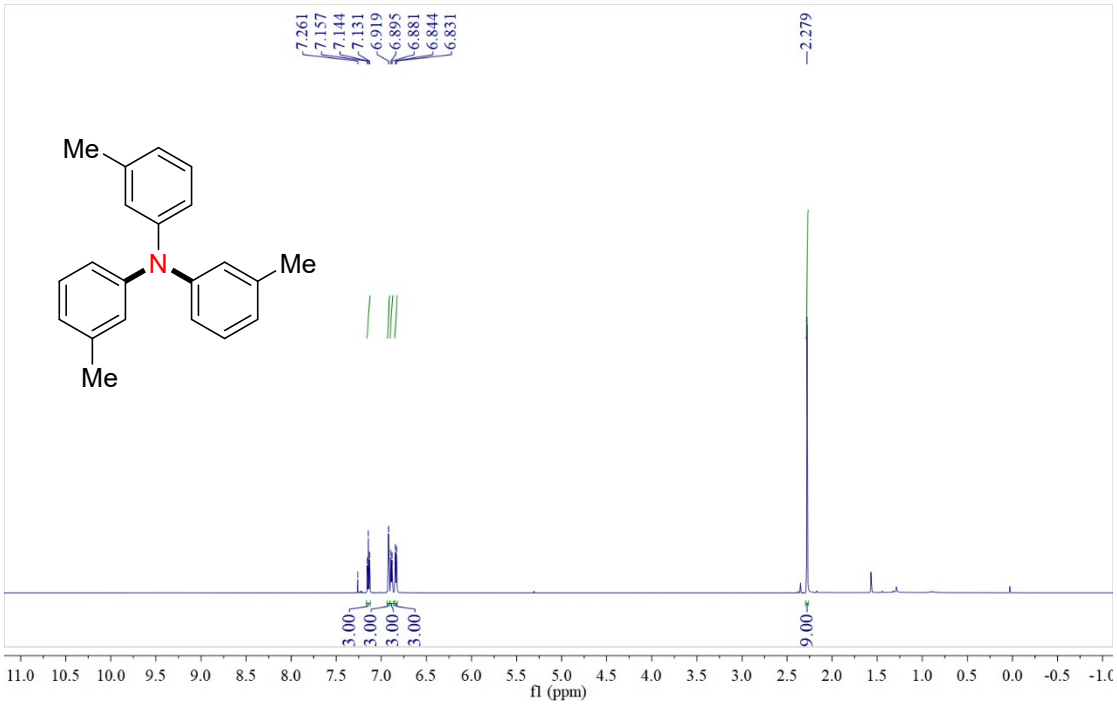
^{1}H NMR Spectrum of **3g**



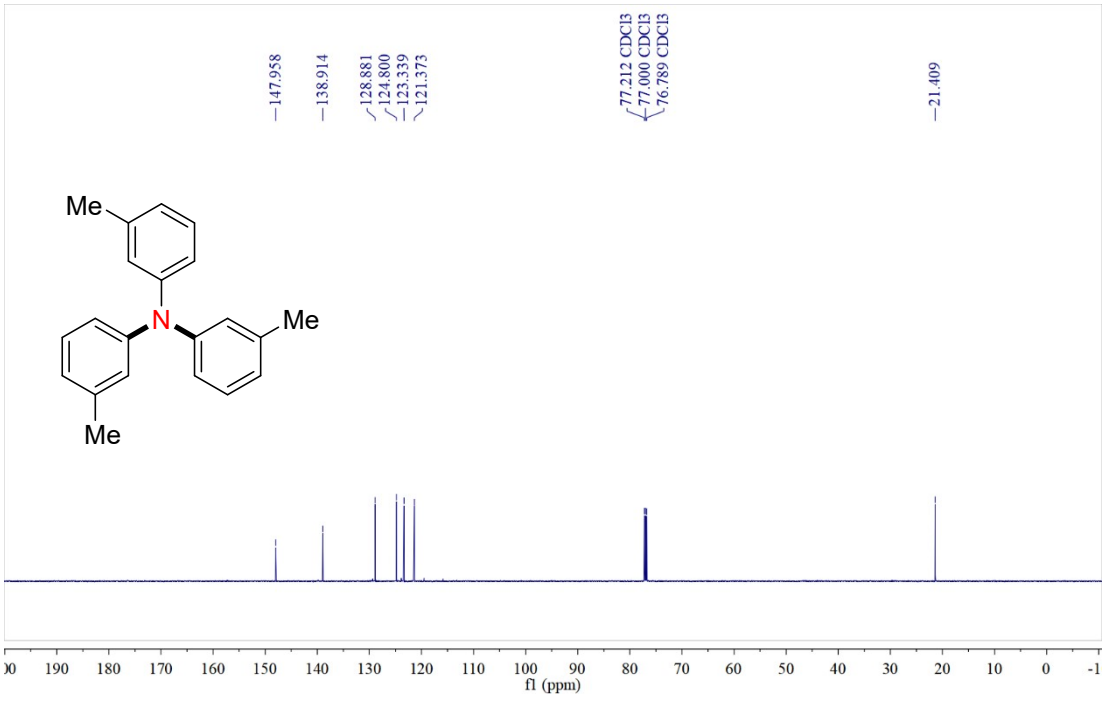
^{13}C NMR Spectrum of **3g**



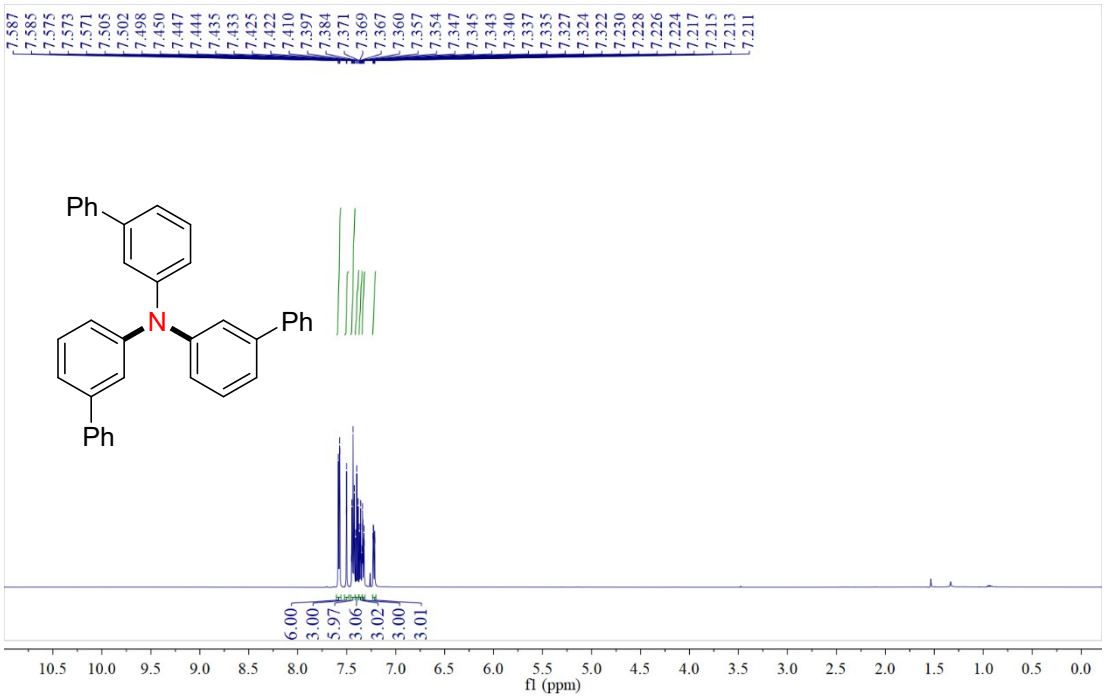
[1]H NMR Spectrum of **3h**



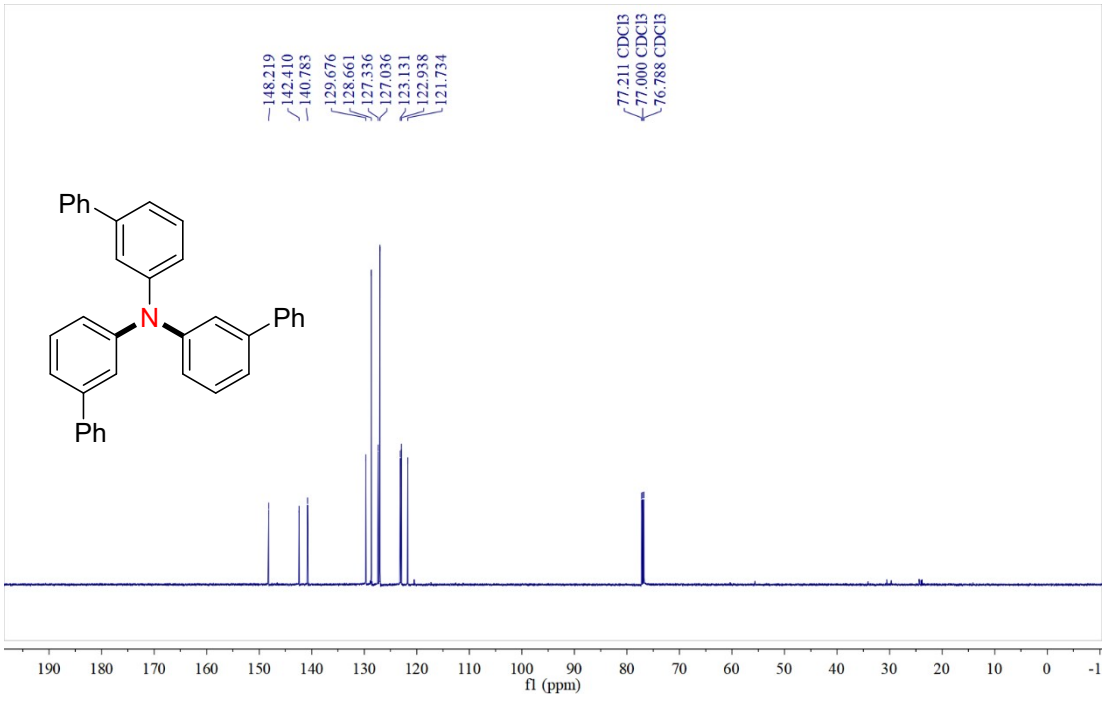
[13]C NMR Spectrum of **3h**



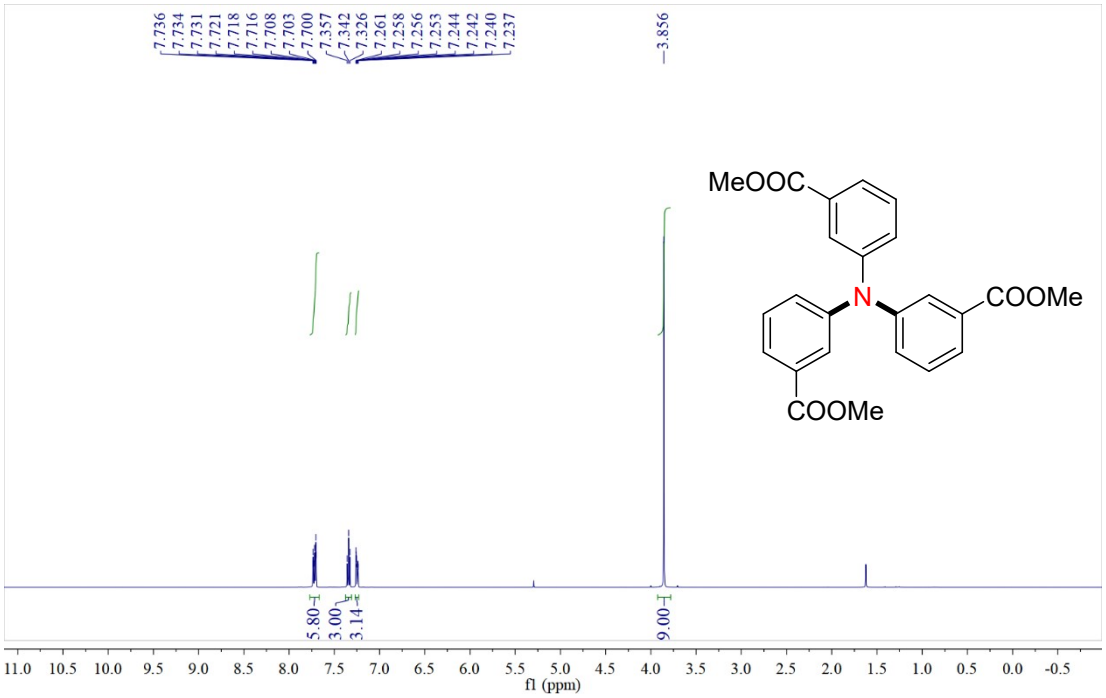
^{1}H NMR Spectrum of **3i**



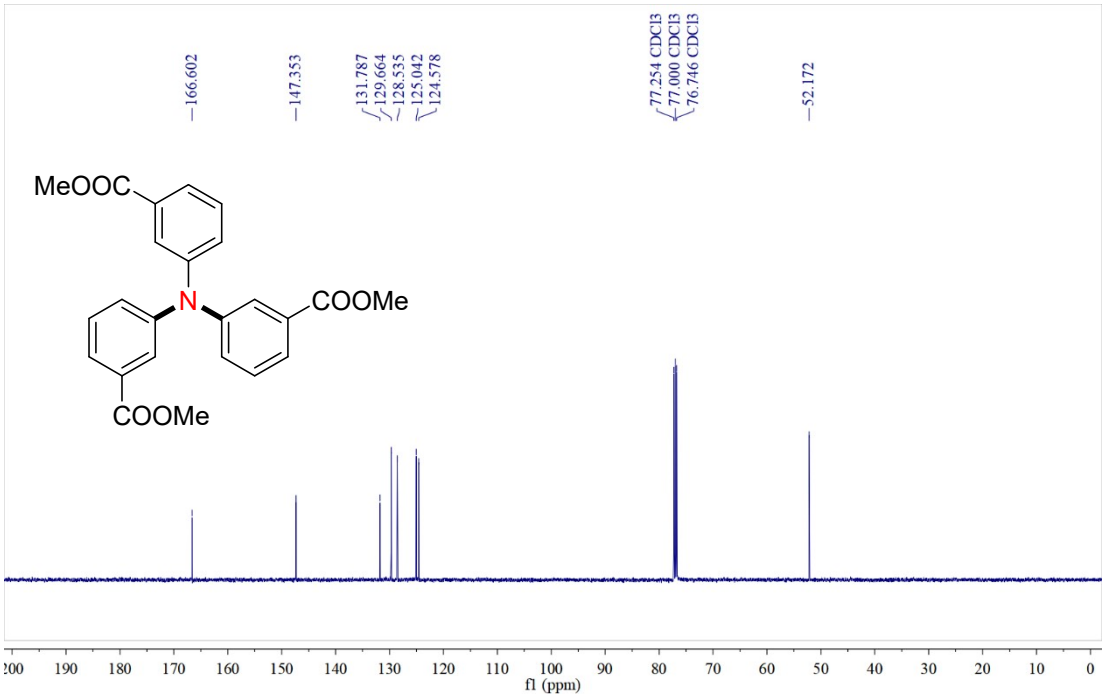
^{13}C NMR Spectrum of **3i**



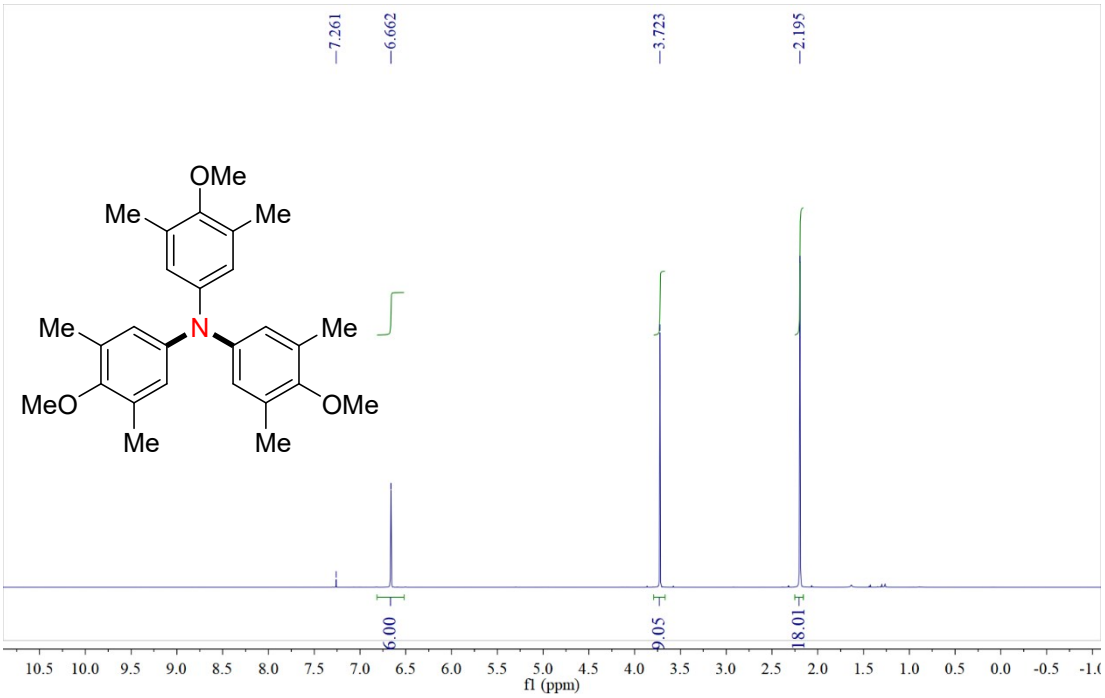
^{1}H NMR Spectrum of **3j**



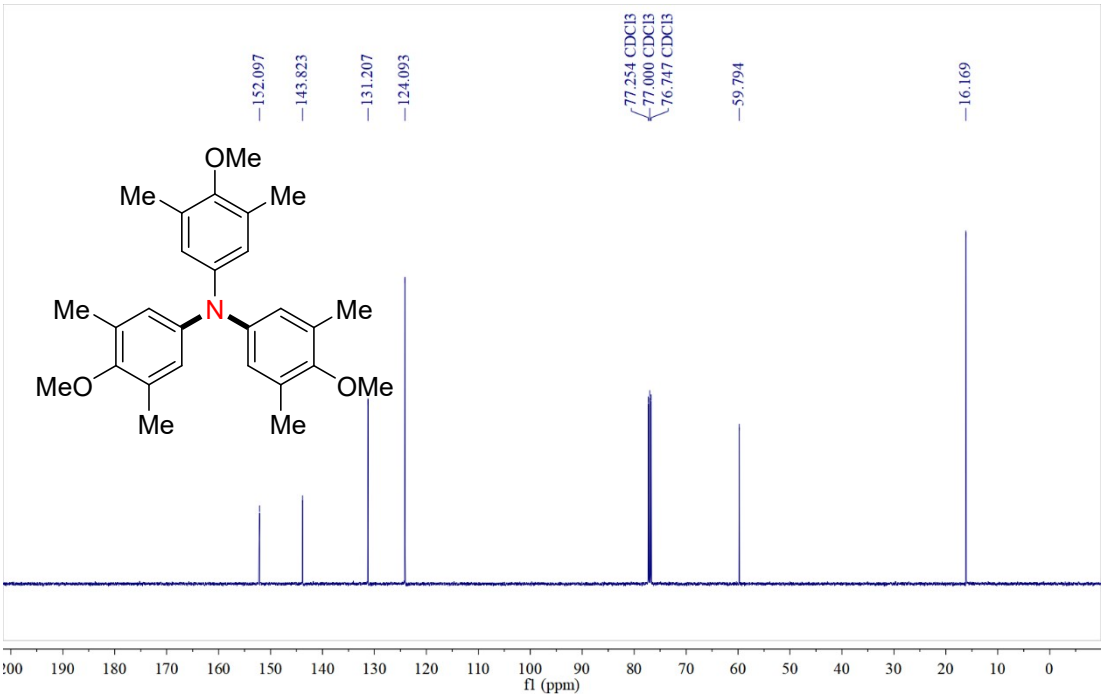
^{13}C NMR Spectrum of **3j**



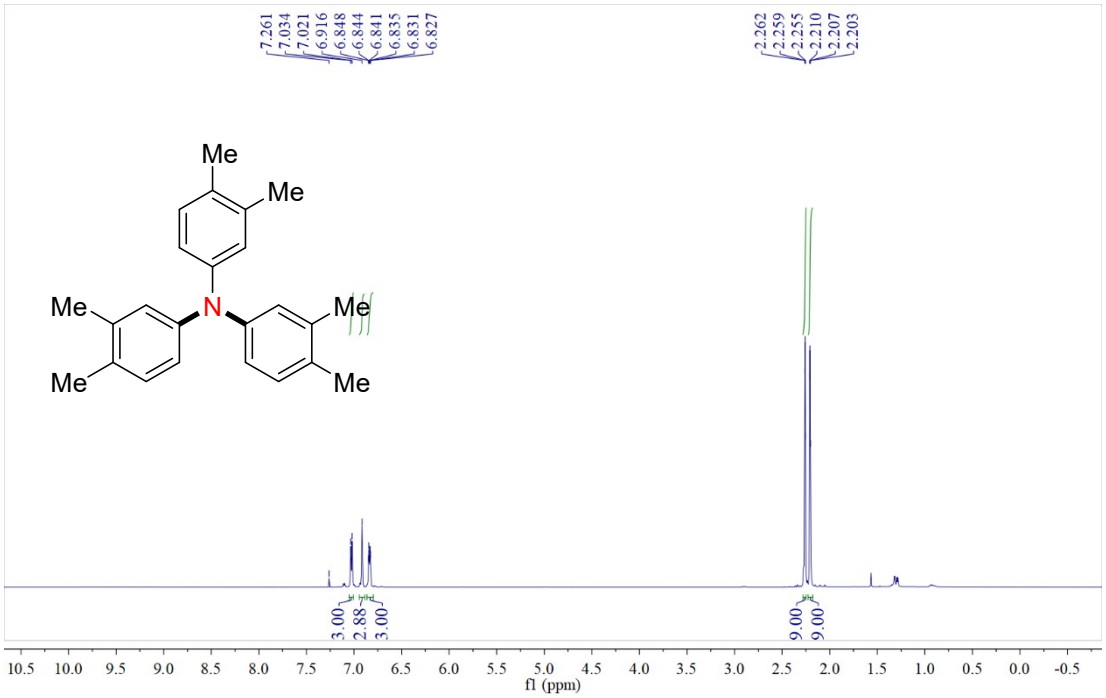
^{1}H NMR Spectrum of **3k**



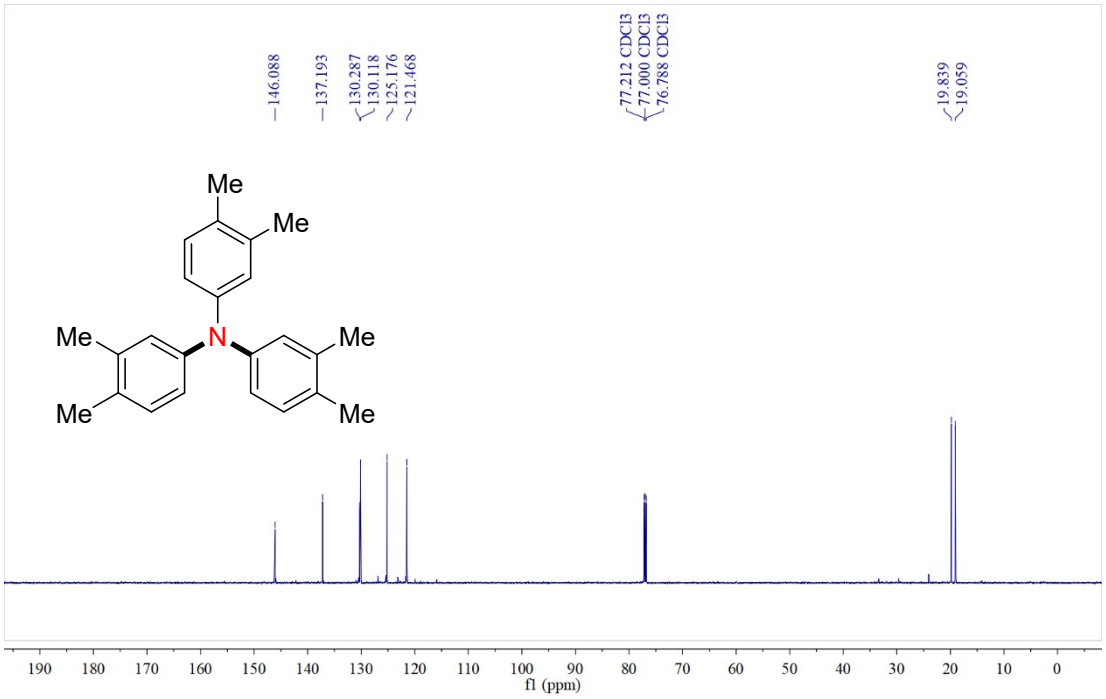
^{13}C NMR Spectrum of **3k**



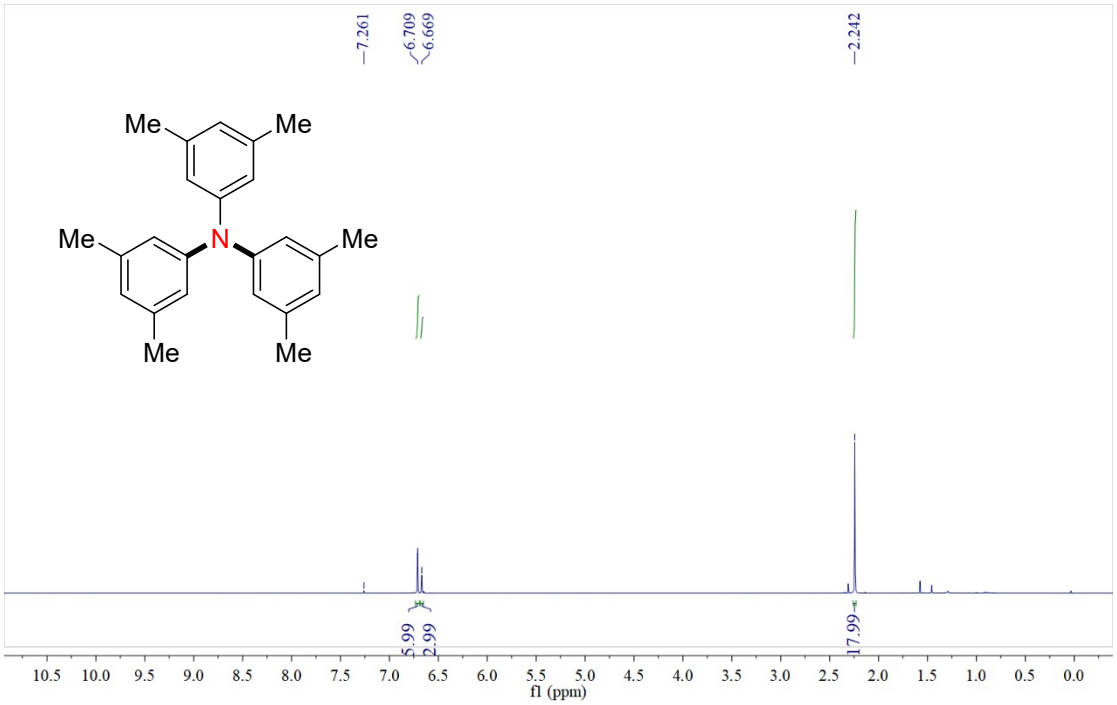
^{1}H NMR Spectrum of **3l**



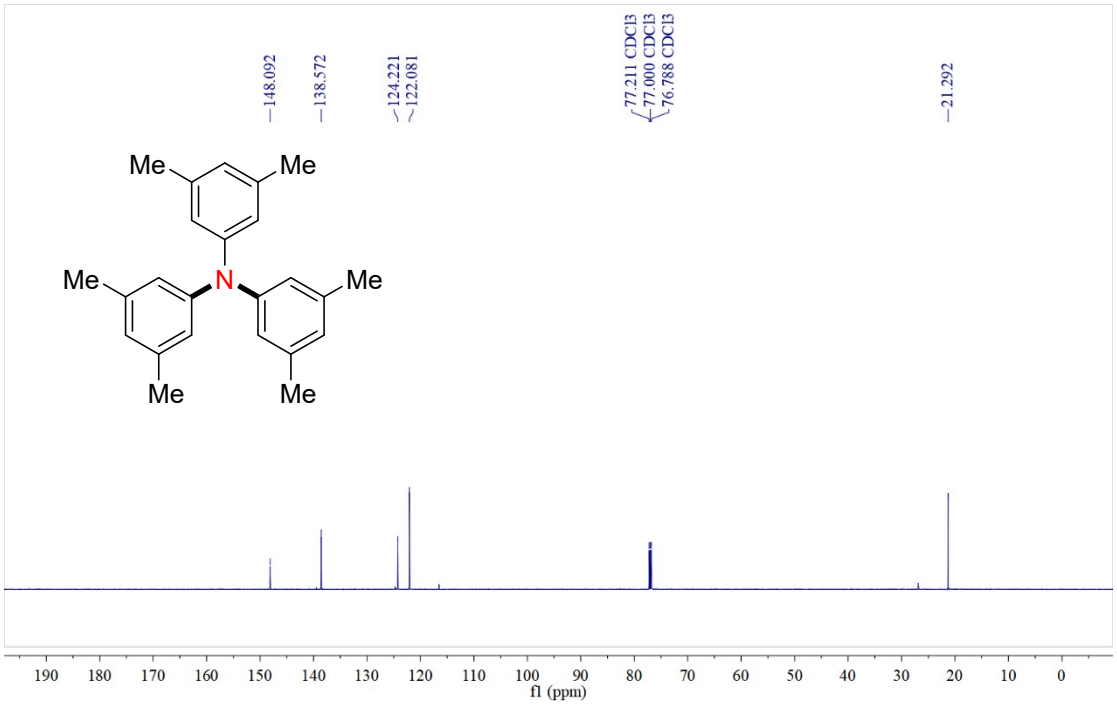
^{13}C NMR Spectrum of **3l**



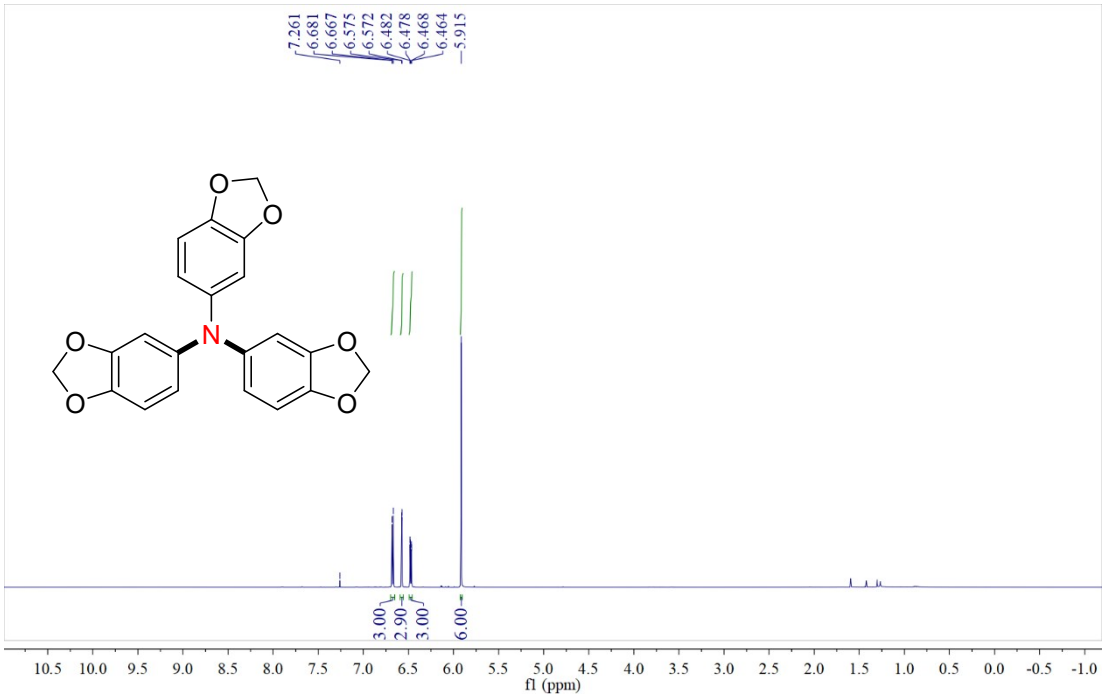
^{1}H NMR Spectrum of **3m**



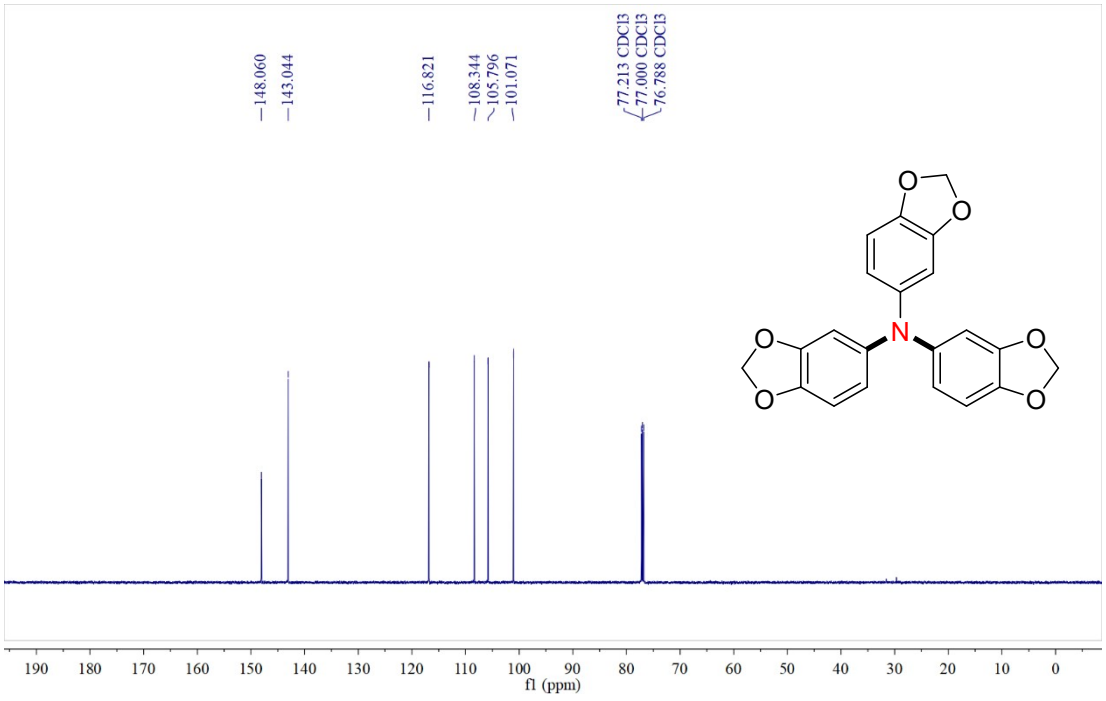
^{13}C NMR Spectrum of **3m**



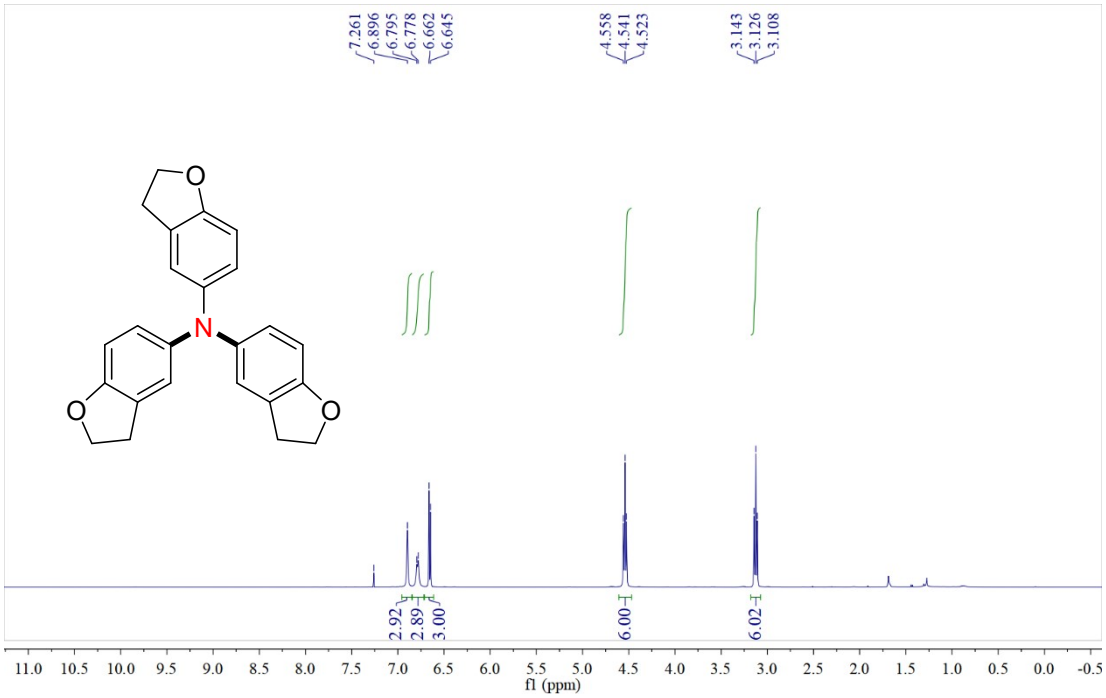
^{1}H NMR Spectrum of **3n**



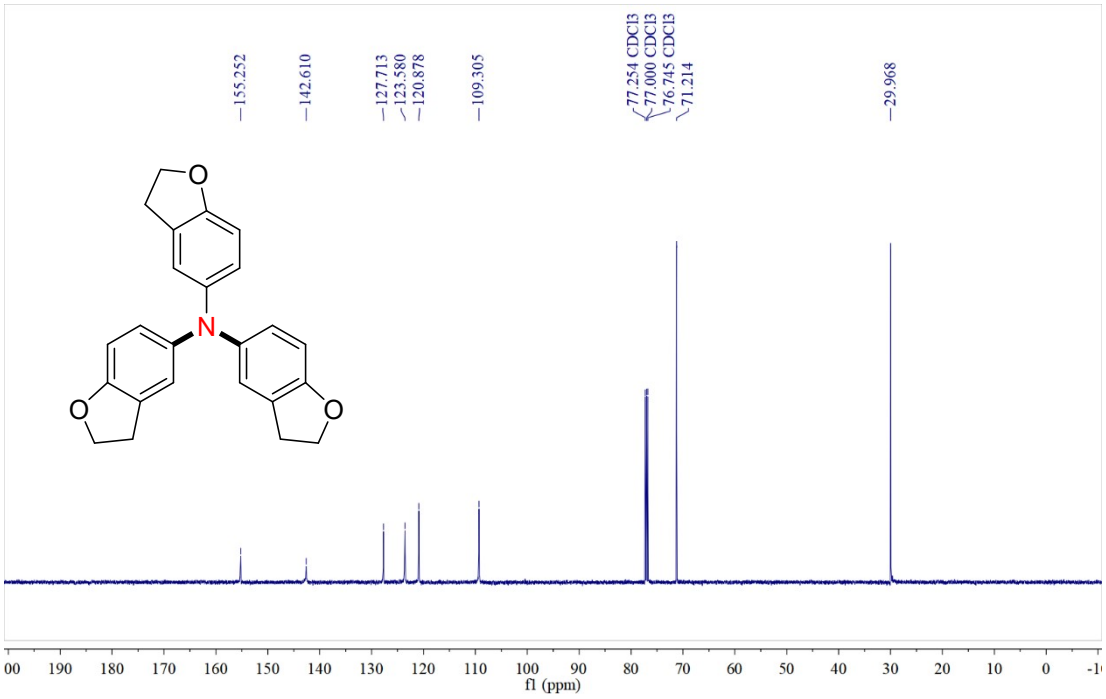
^{13}C NMR Spectrum of **3n**



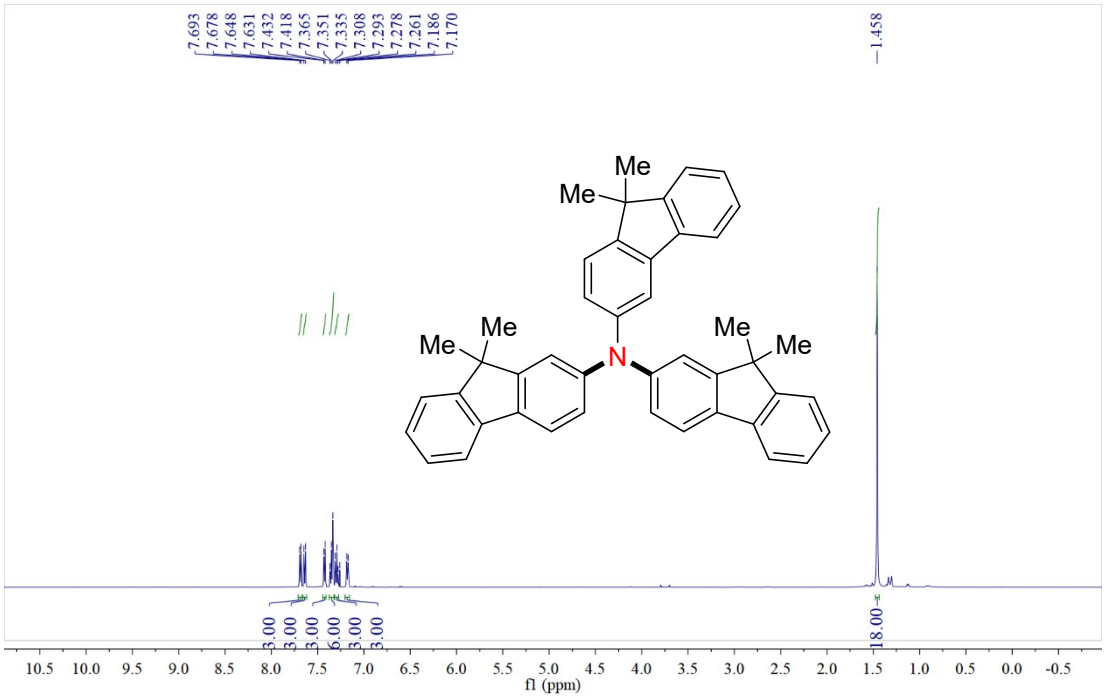
[1]H NMR Spectrum of **3o**



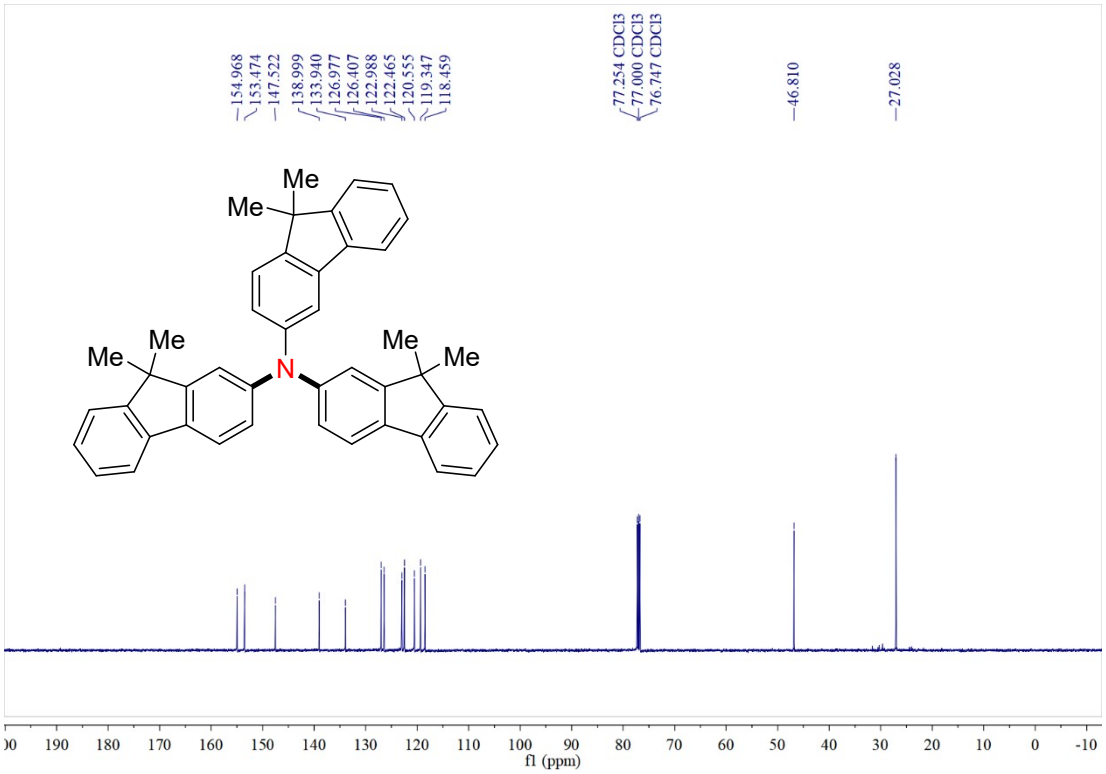
[13]C NMR Spectrum of **3o**



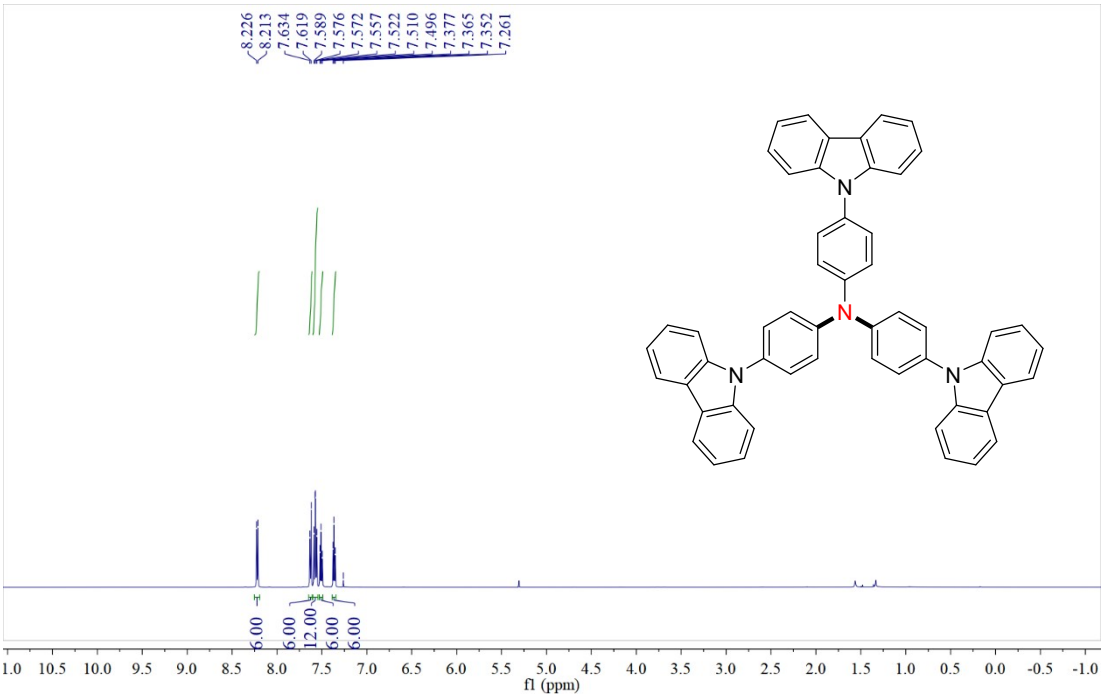
[1]H NMR Spectrum of **3p**



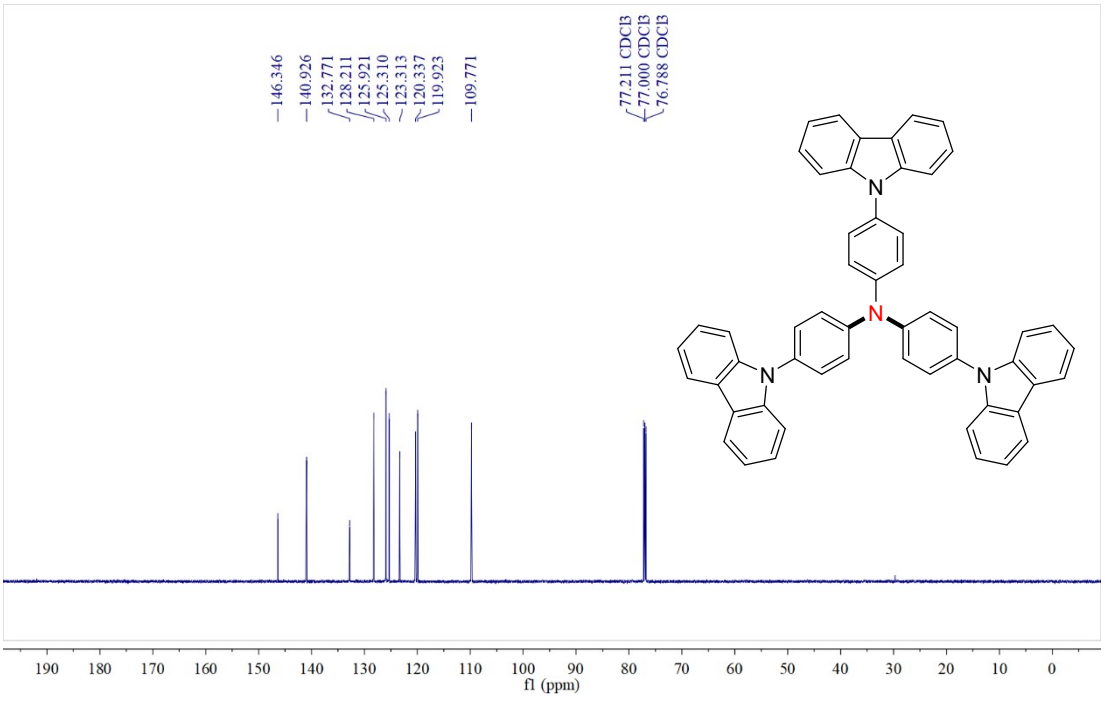
[13]C NMR Spectrum of **3p**



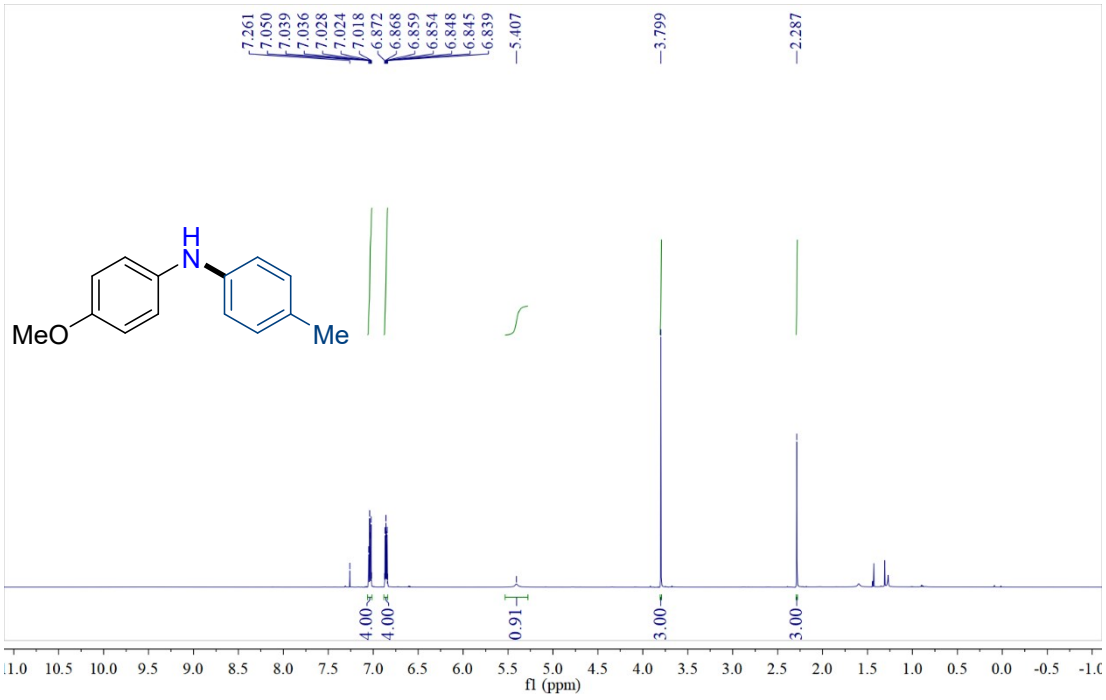
^{1}H NMR Spectrum of **3q**



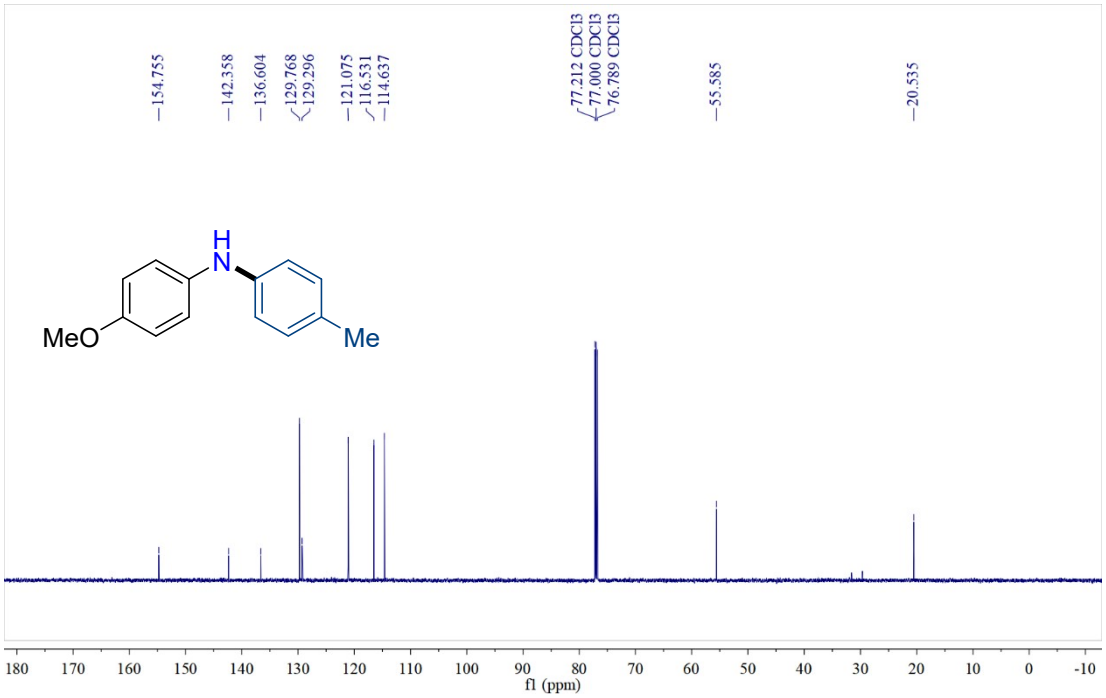
^{13}C NMR Spectrum of **3q**



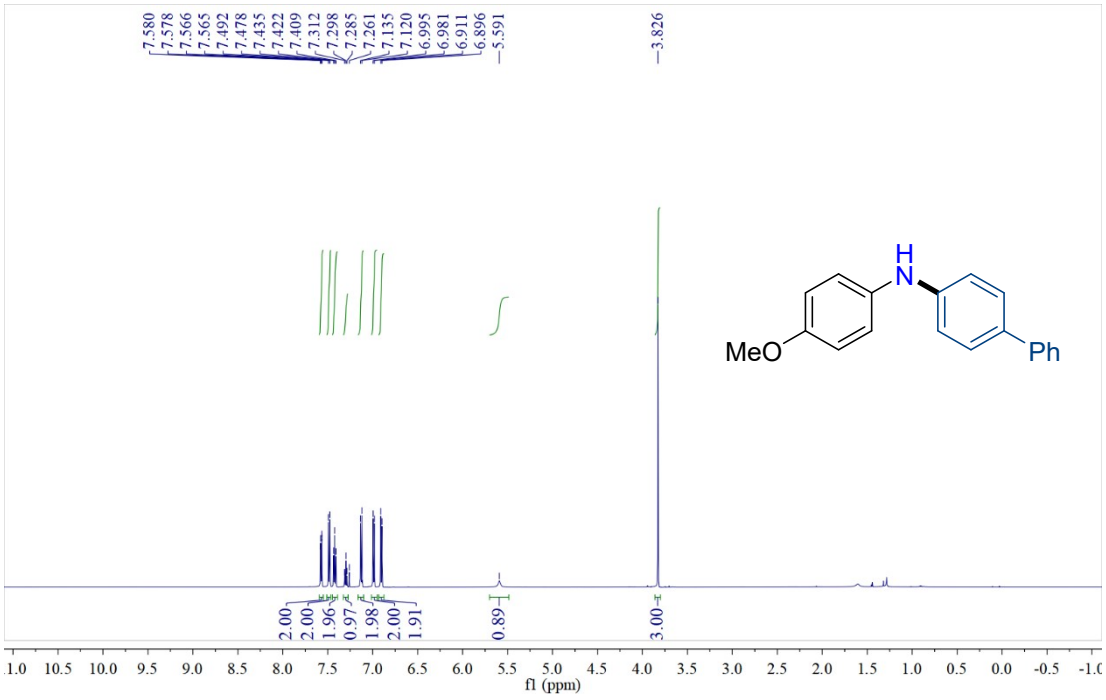
^{1}H NMR Spectrum of **4a**



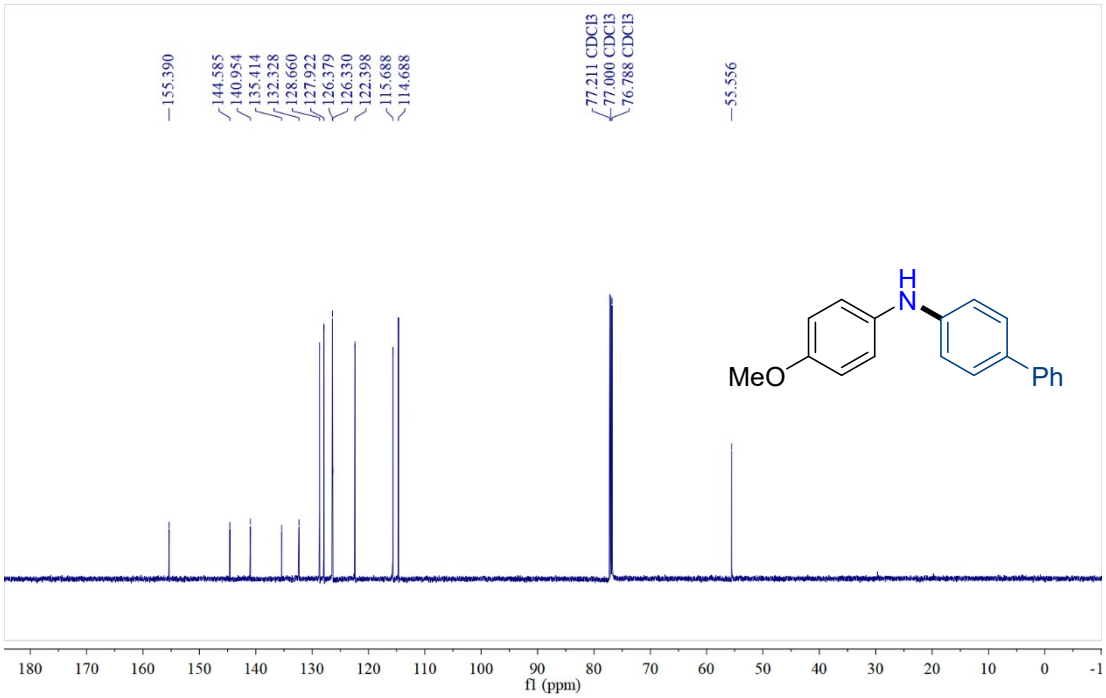
^{13}C NMR Spectrum of **4a**



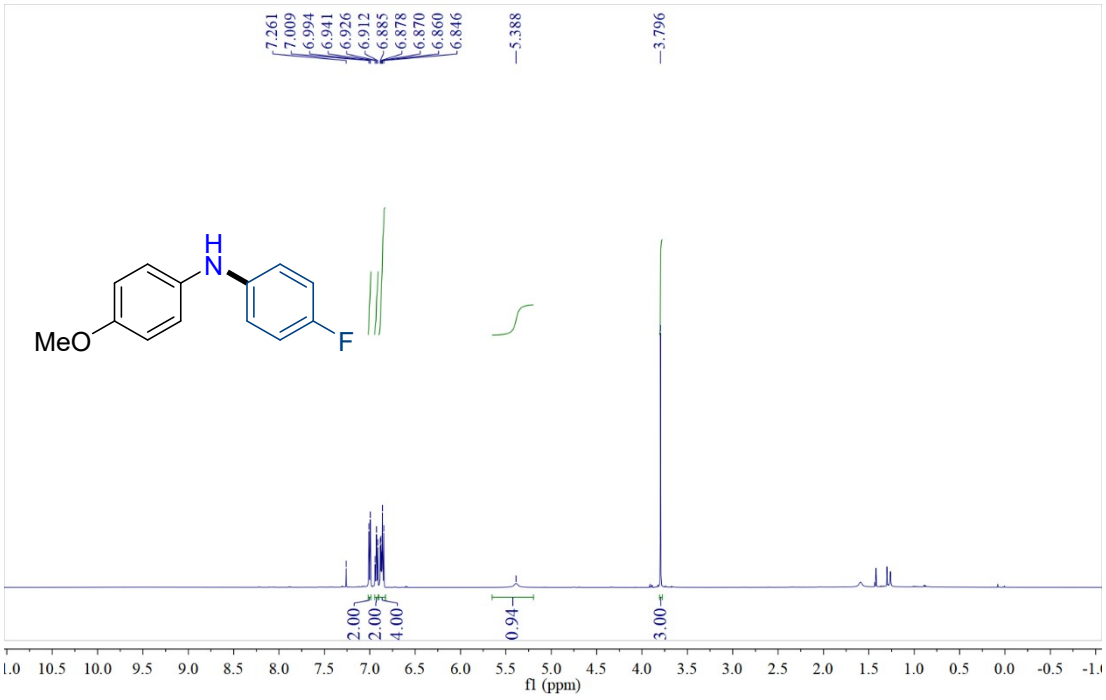
[1]H NMR Spectrum of **4b**



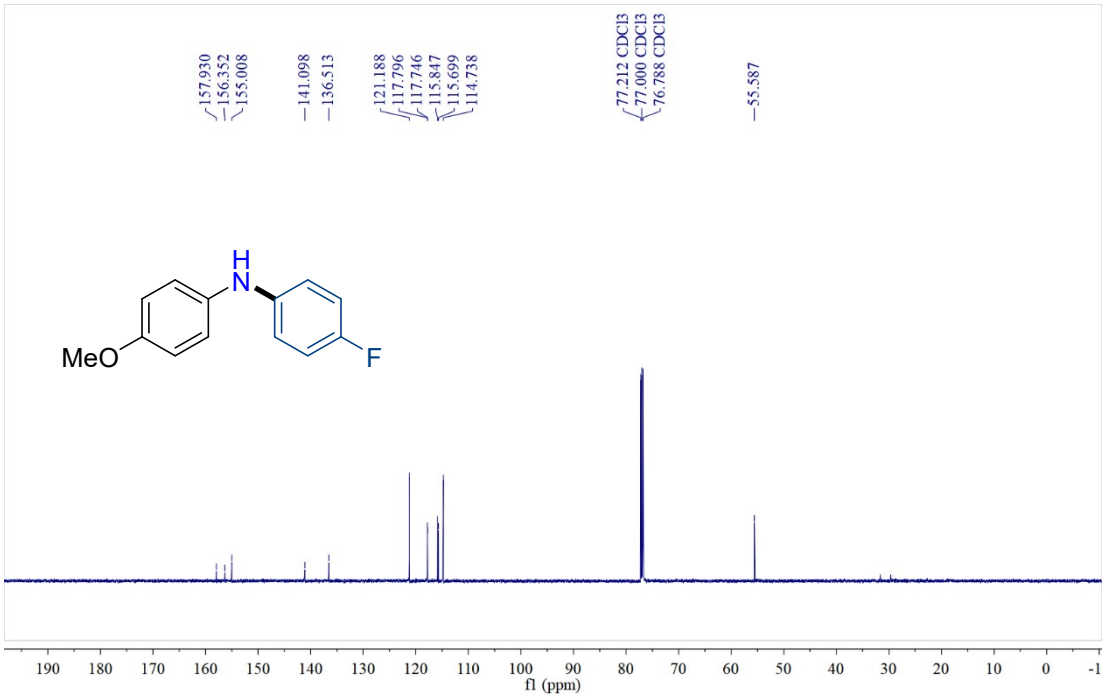
[13]C NMR Spectrum of **4b**



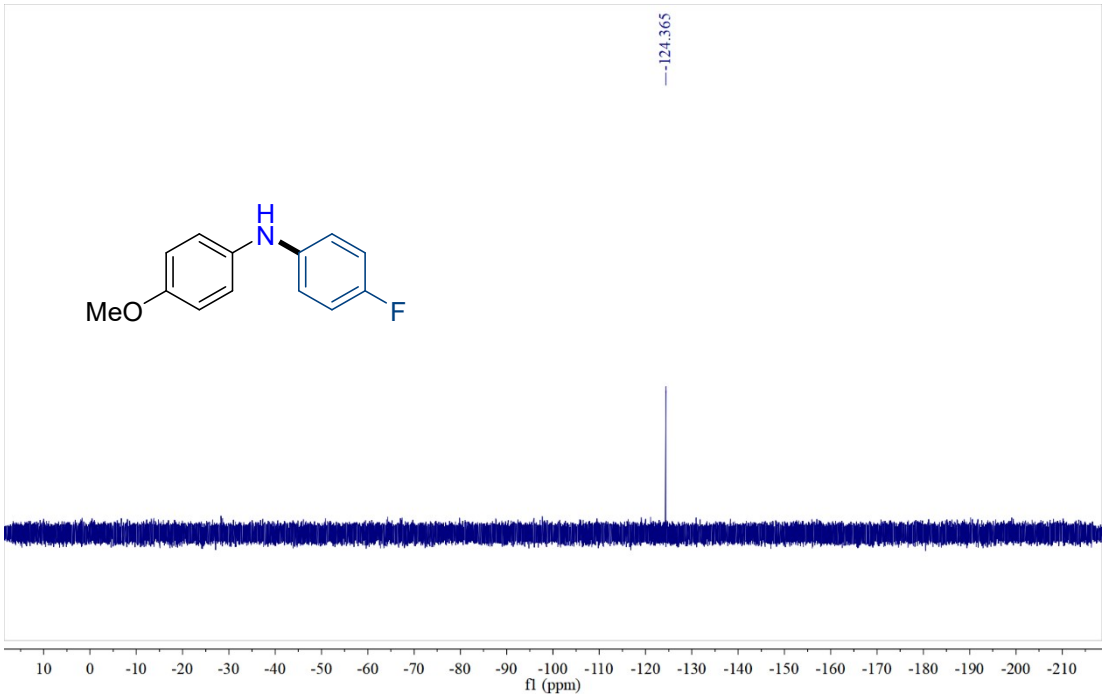
^{1}H NMR Spectrum of **4c**



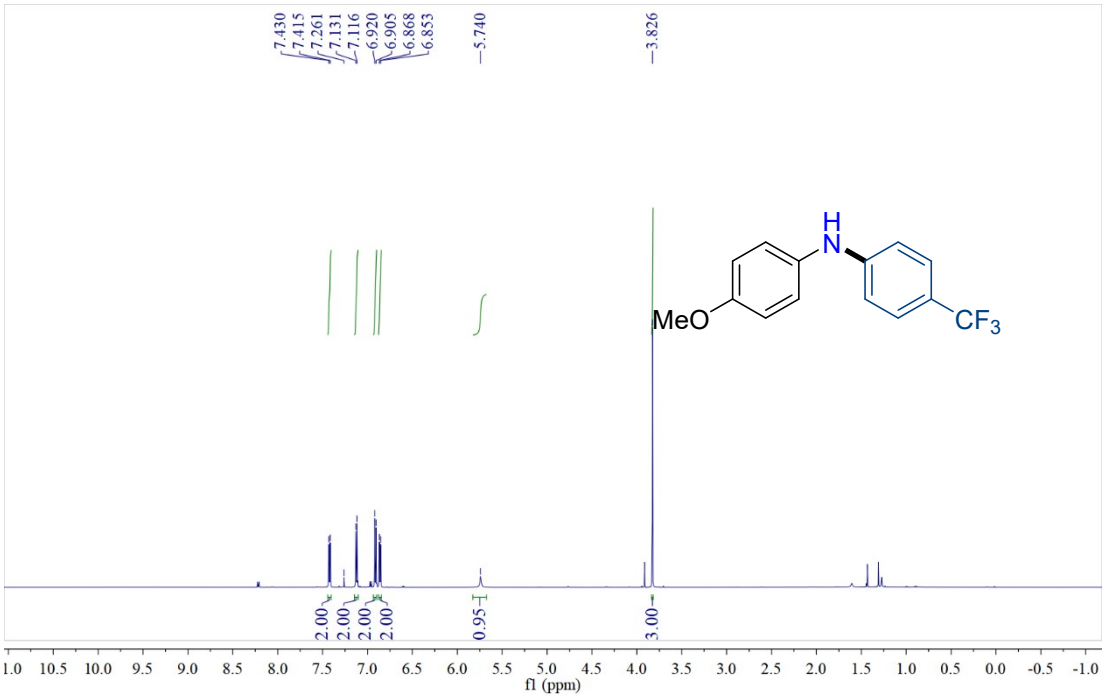
^{13}C NMR Spectrum of **4c**



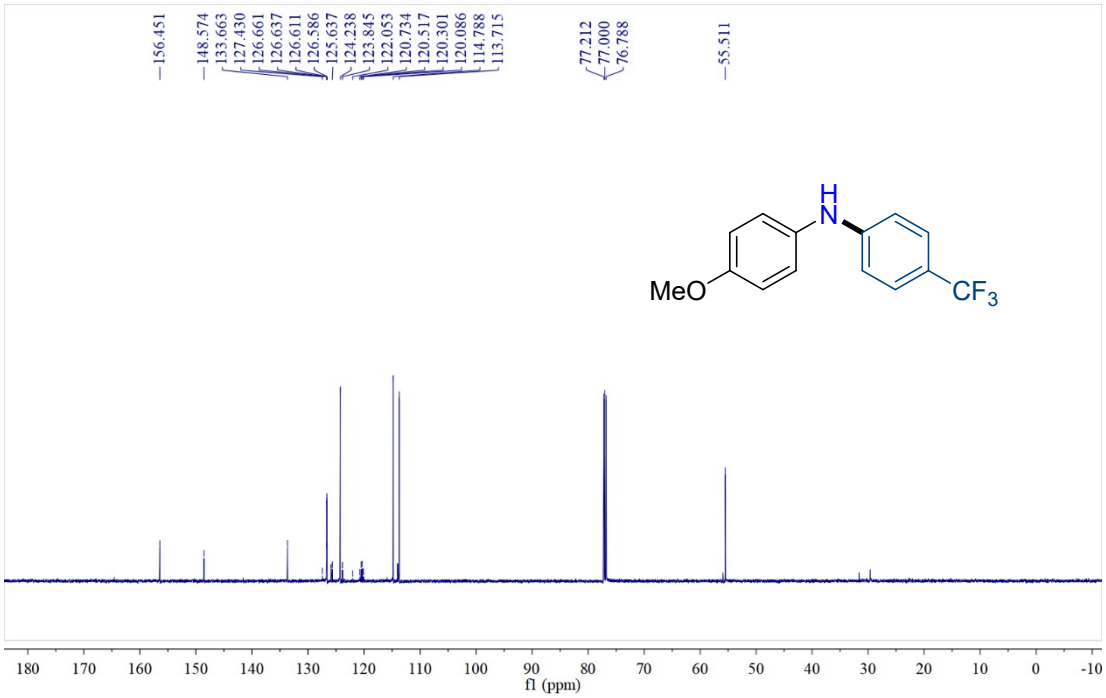
^{19}F NMR Spectrum of **4c**



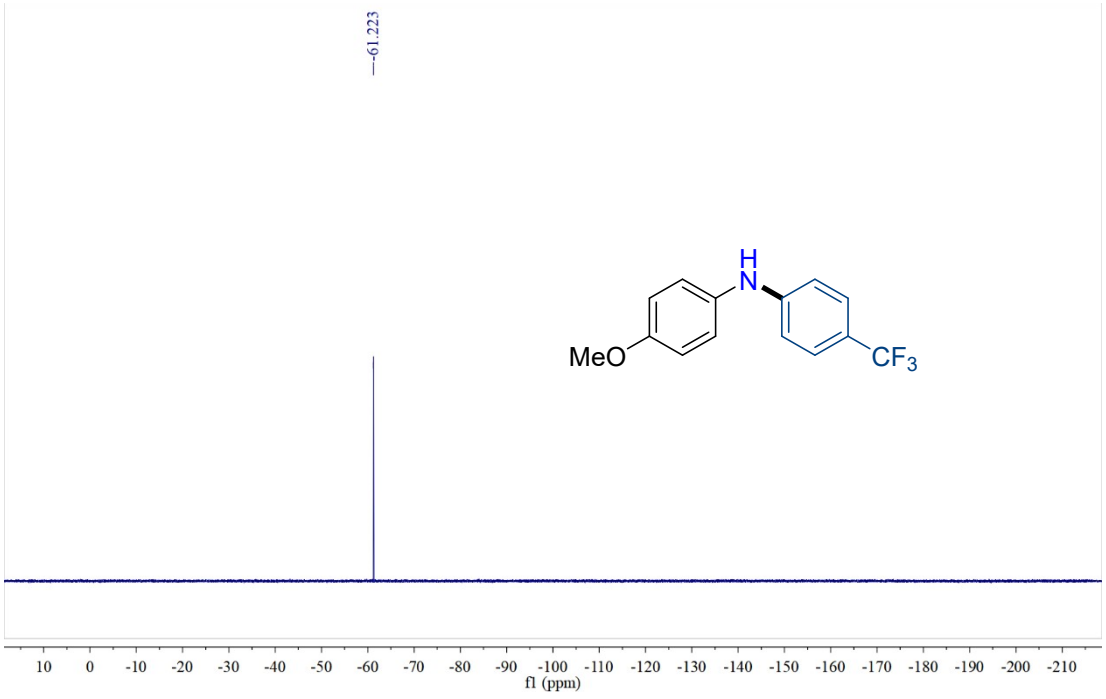
^{1}H NMR Spectrum of **4d**



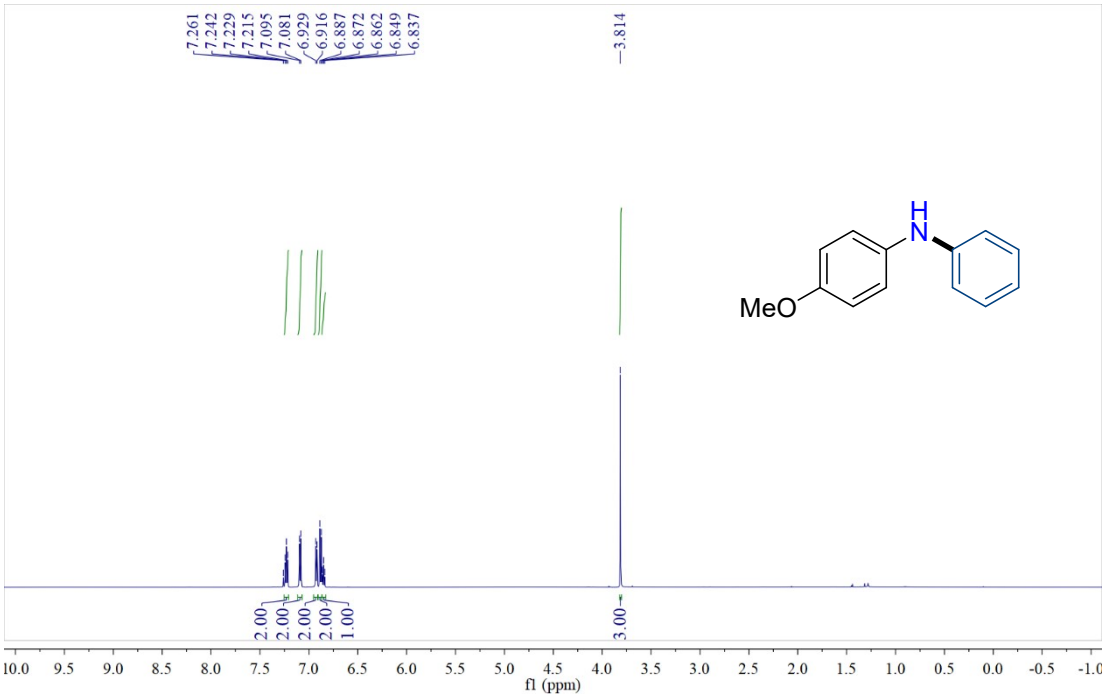
^{13}C NMR Spectrum of **4d**



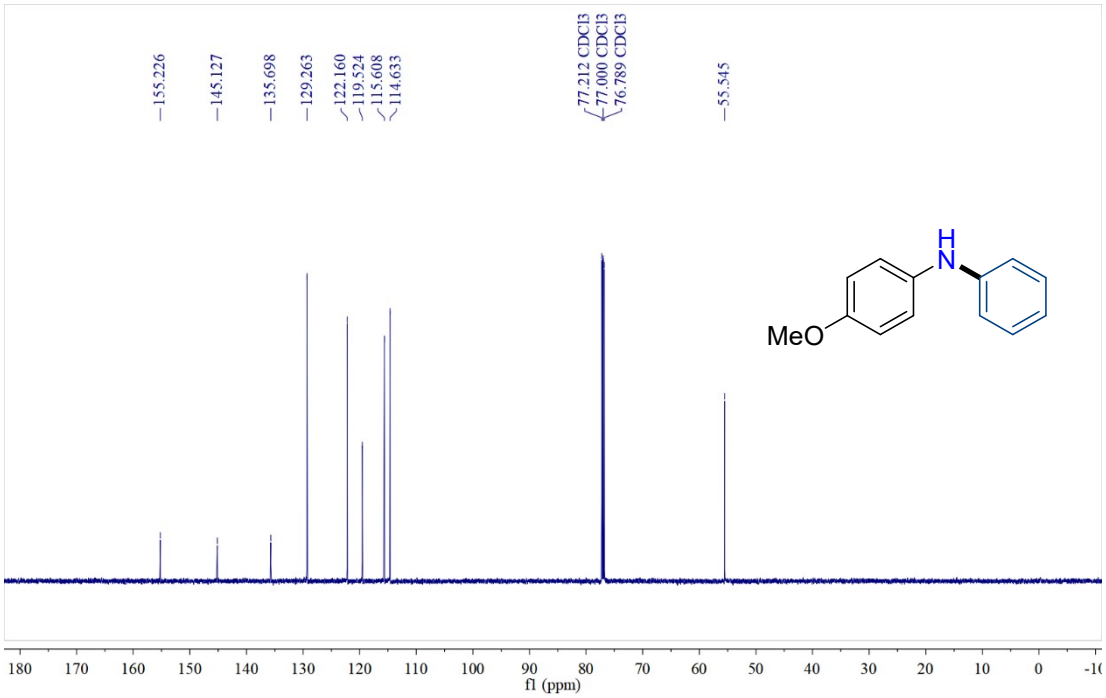
^{19}F NMR Spectrum of **4d**



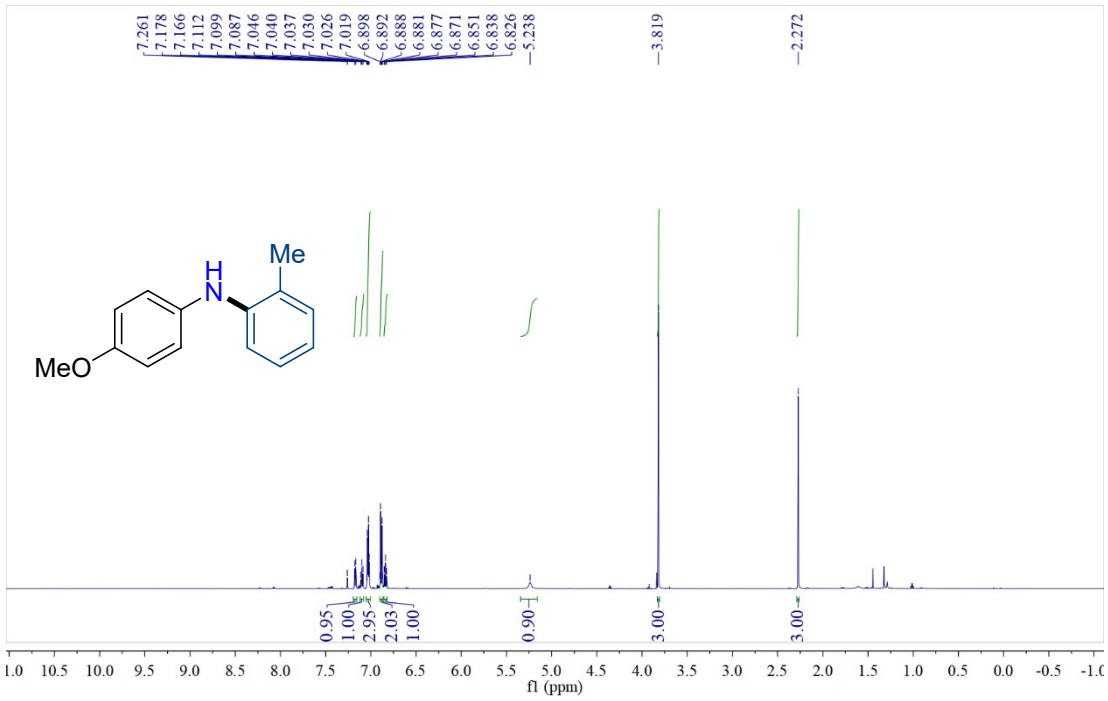
^{1}H NMR Spectrum of **4e**



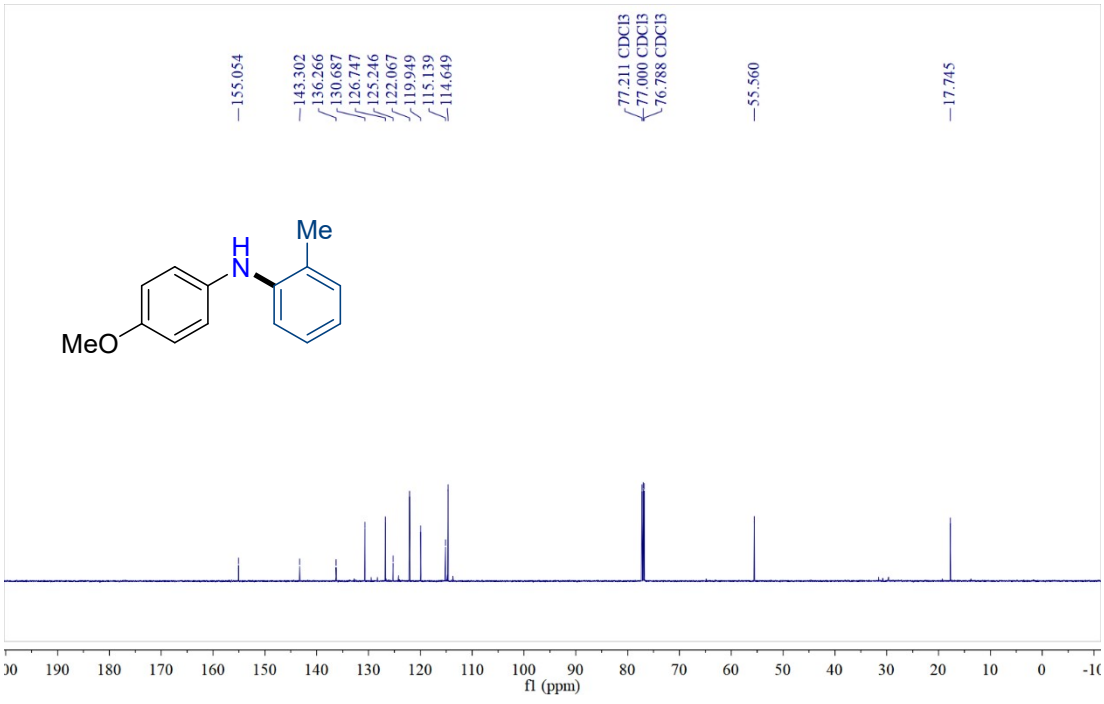
^{13}C NMR Spectrum of **4e**



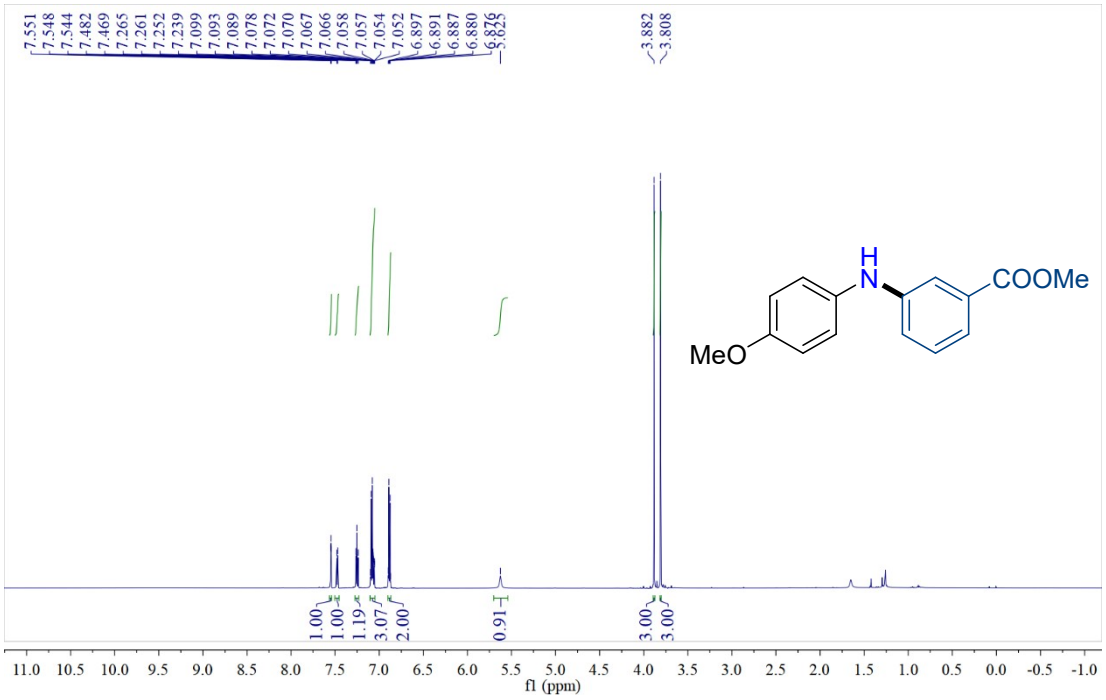
^{1}H NMR Spectrum of **4f**



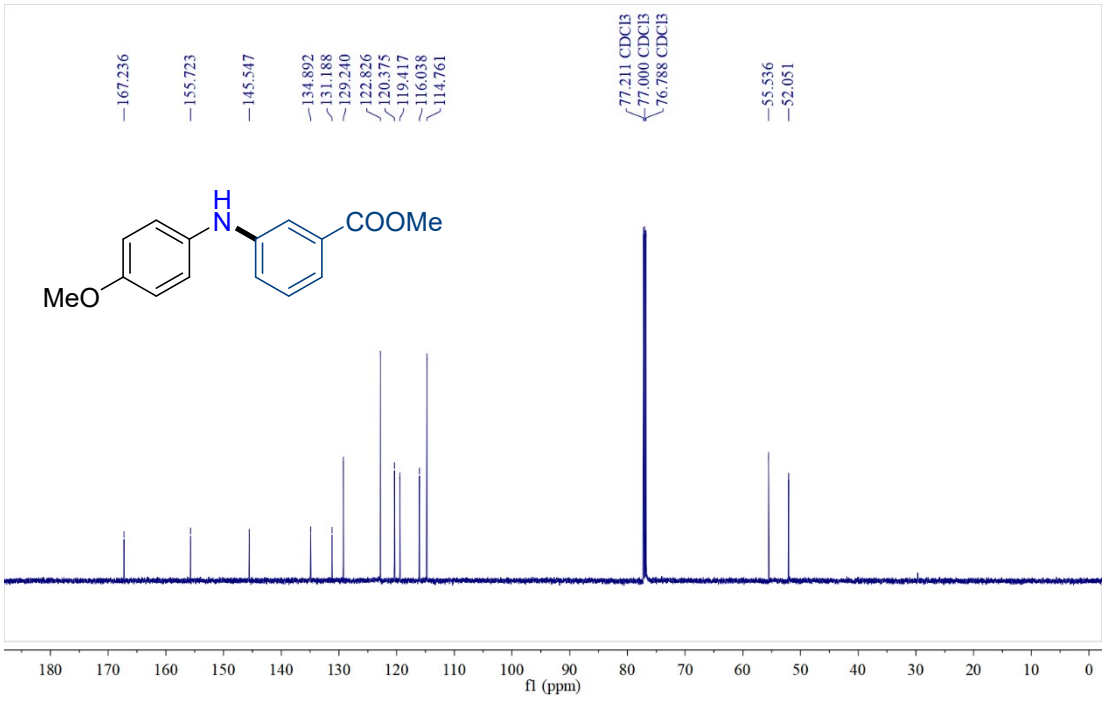
^{13}C NMR Spectrum of **4f**



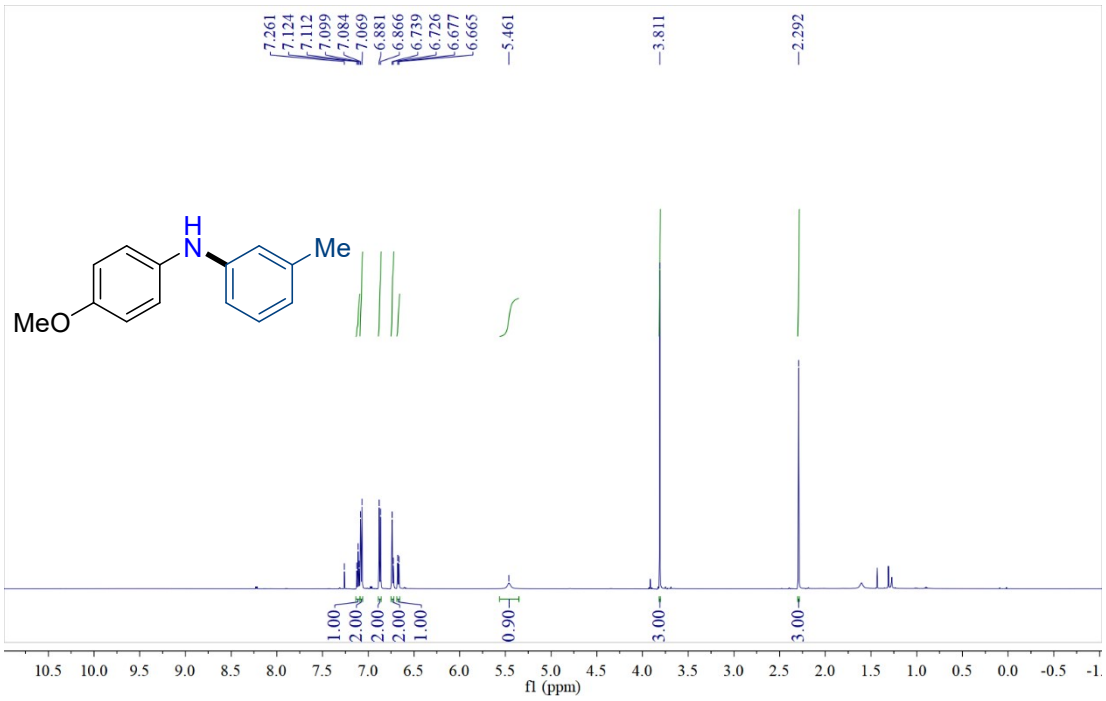
^{1}H NMR Spectrum of **4g**



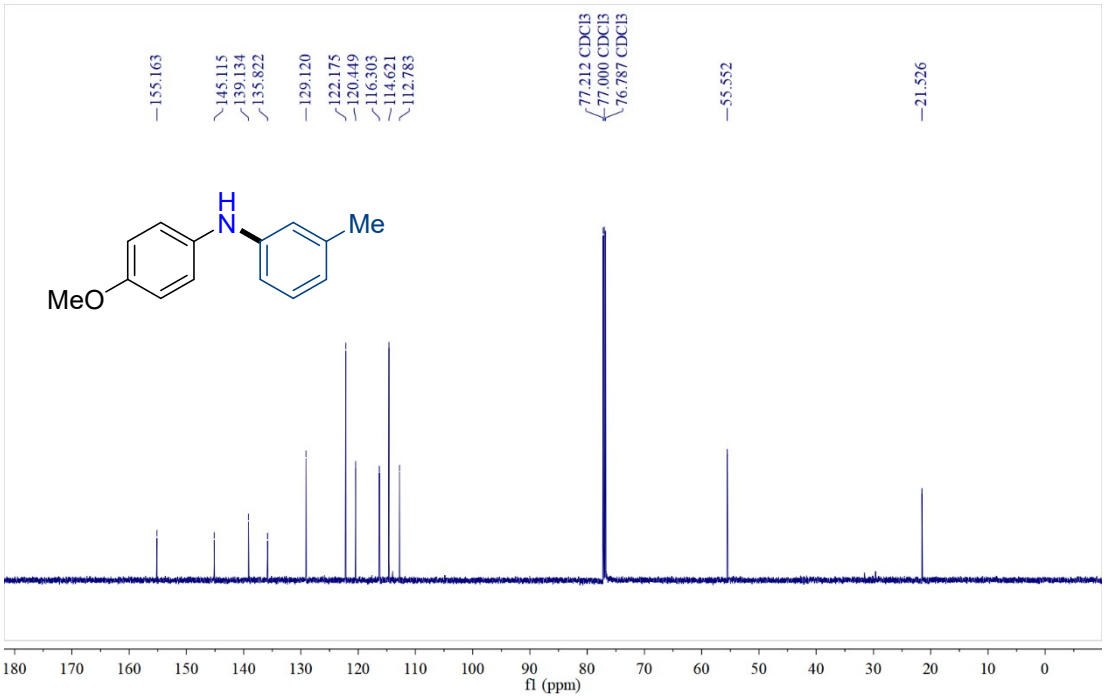
^{13}C NMR Spectrum of **4g**



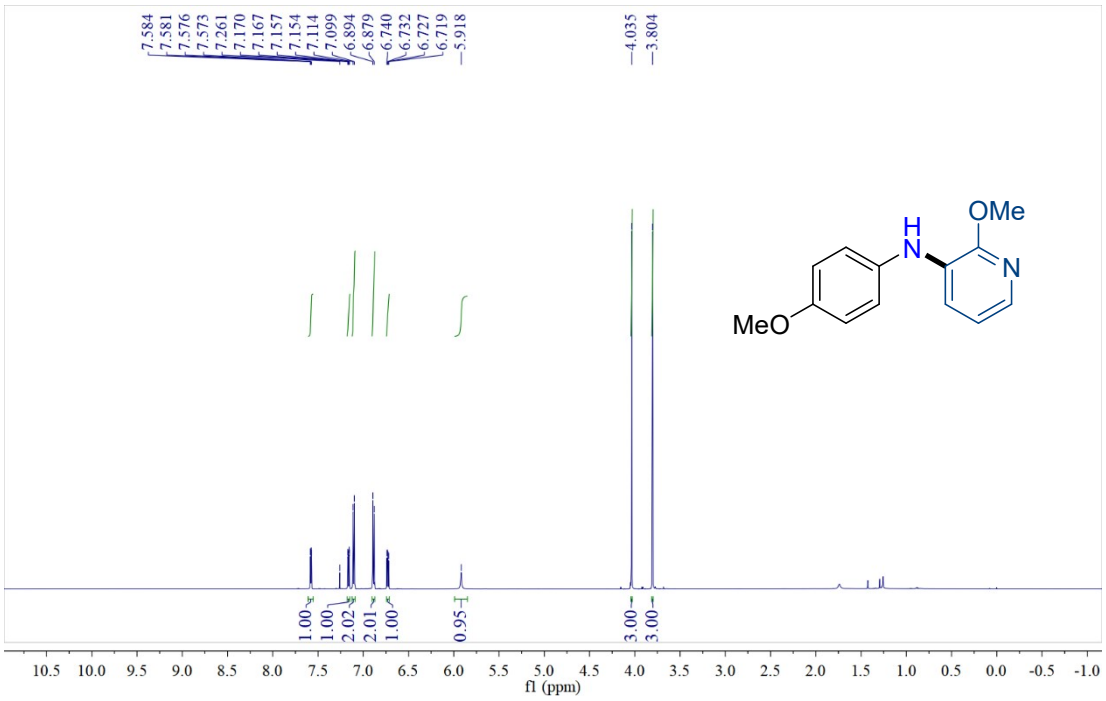
^{1}H NMR Spectrum of **4h**



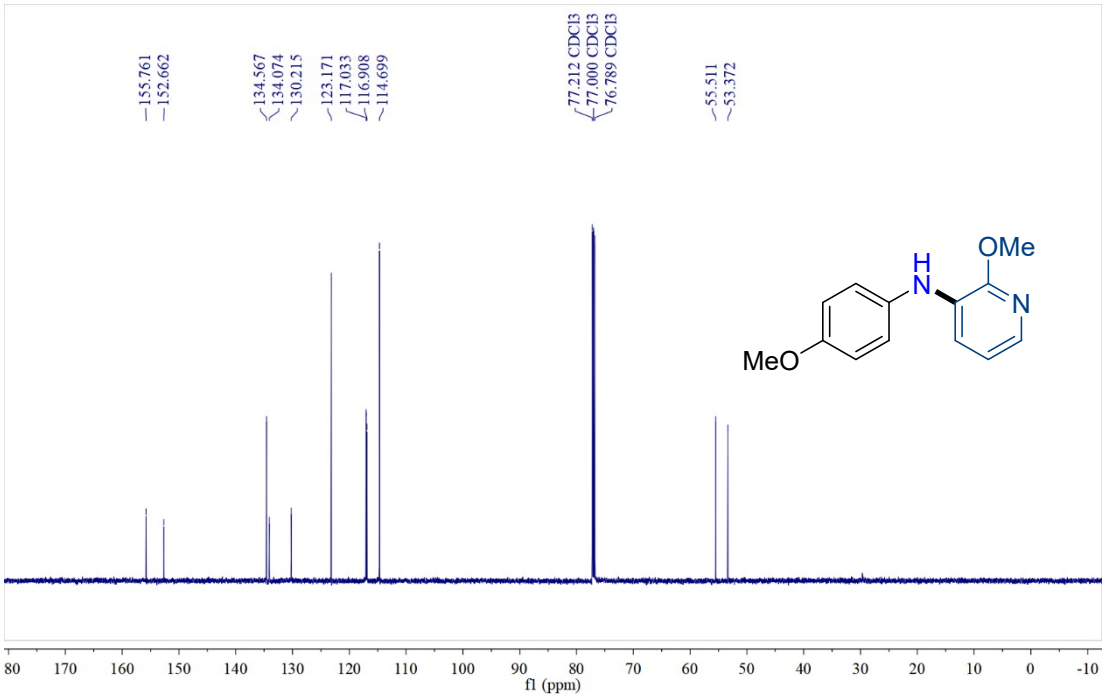
^{13}C NMR Spectrum of **4h**



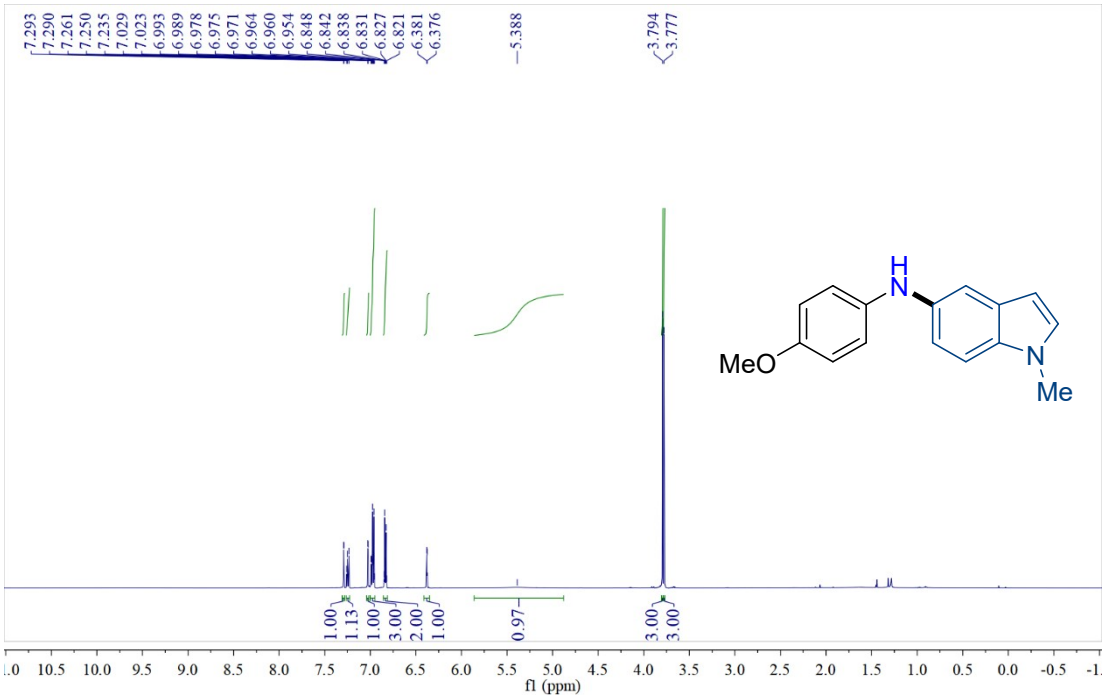
^{1}H NMR Spectrum of **4i**



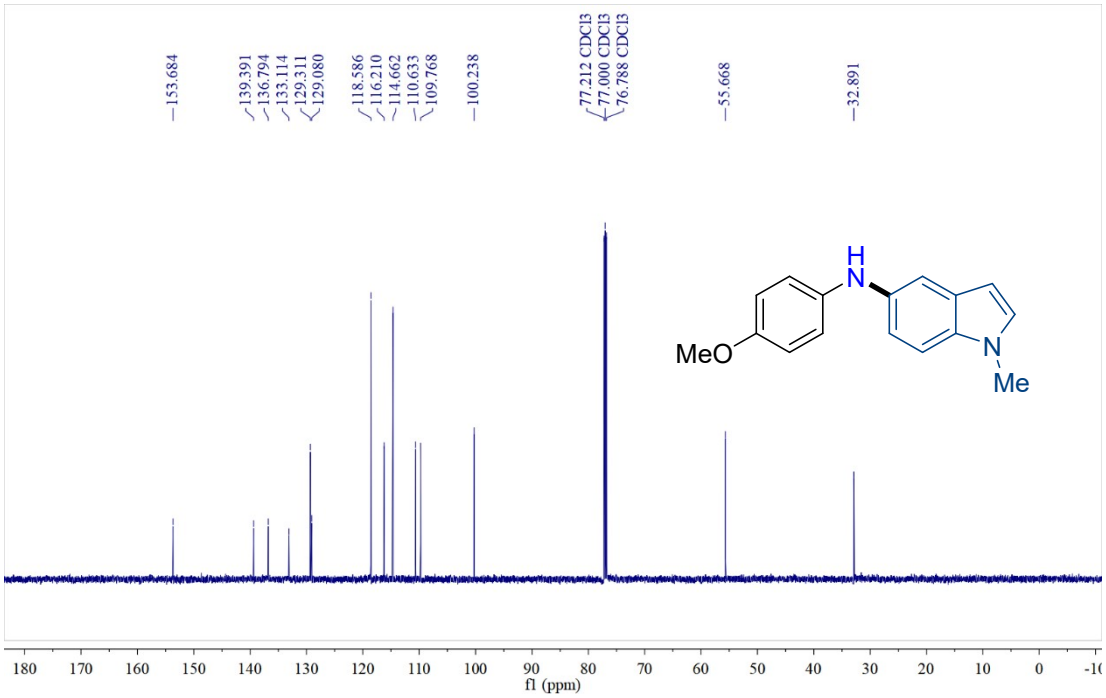
^{13}C NMR Spectrum of **4i**



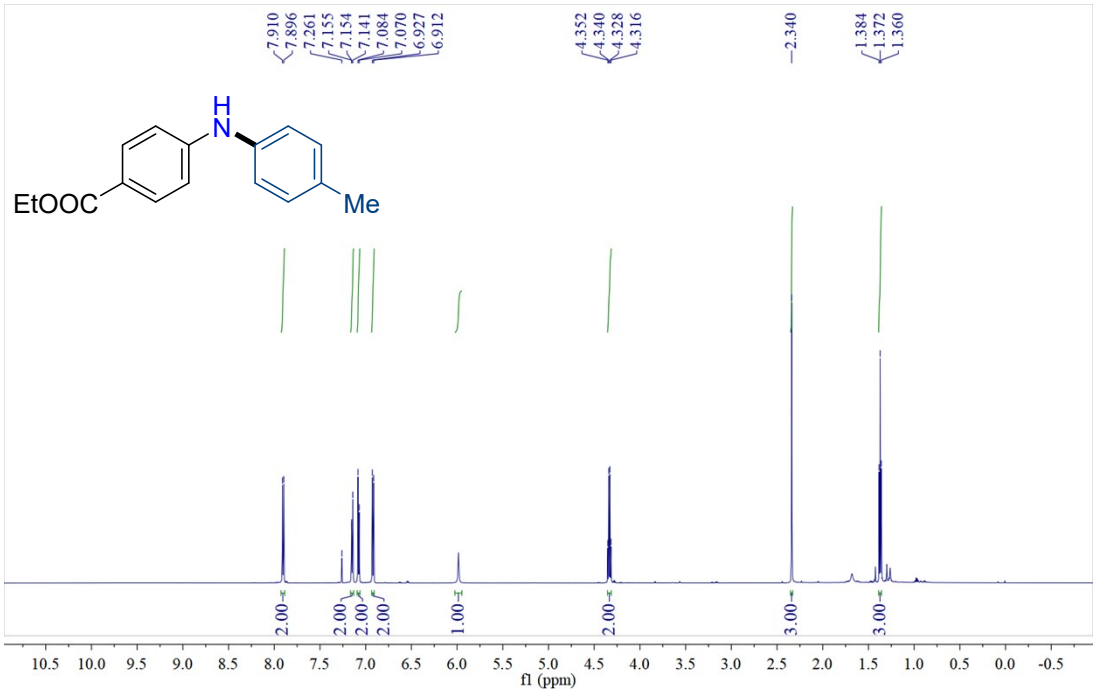
^{1}H NMR Spectrum of **4j**



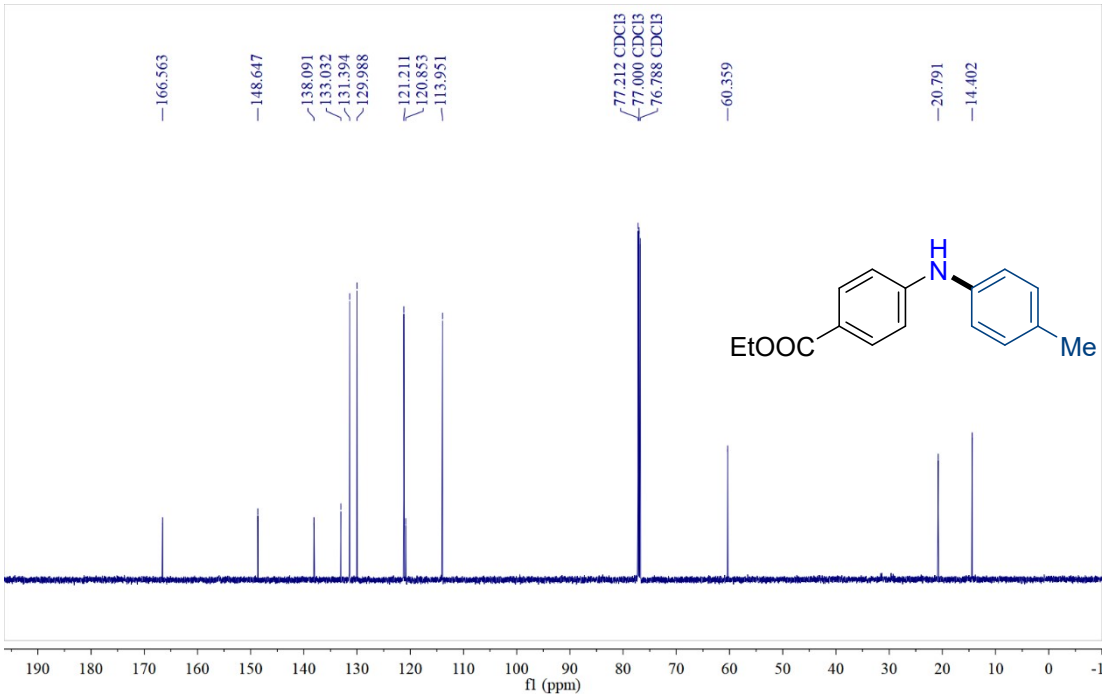
^{13}C NMR Spectrum of **4j**



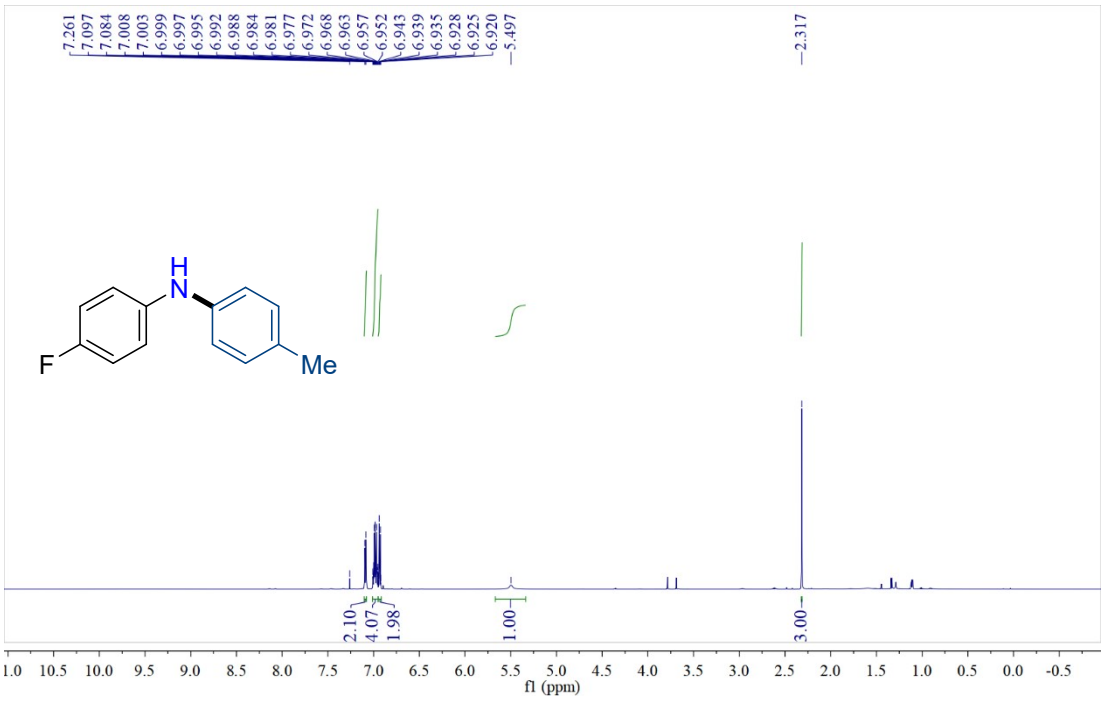
^{1}H NMR Spectrum of **4k**



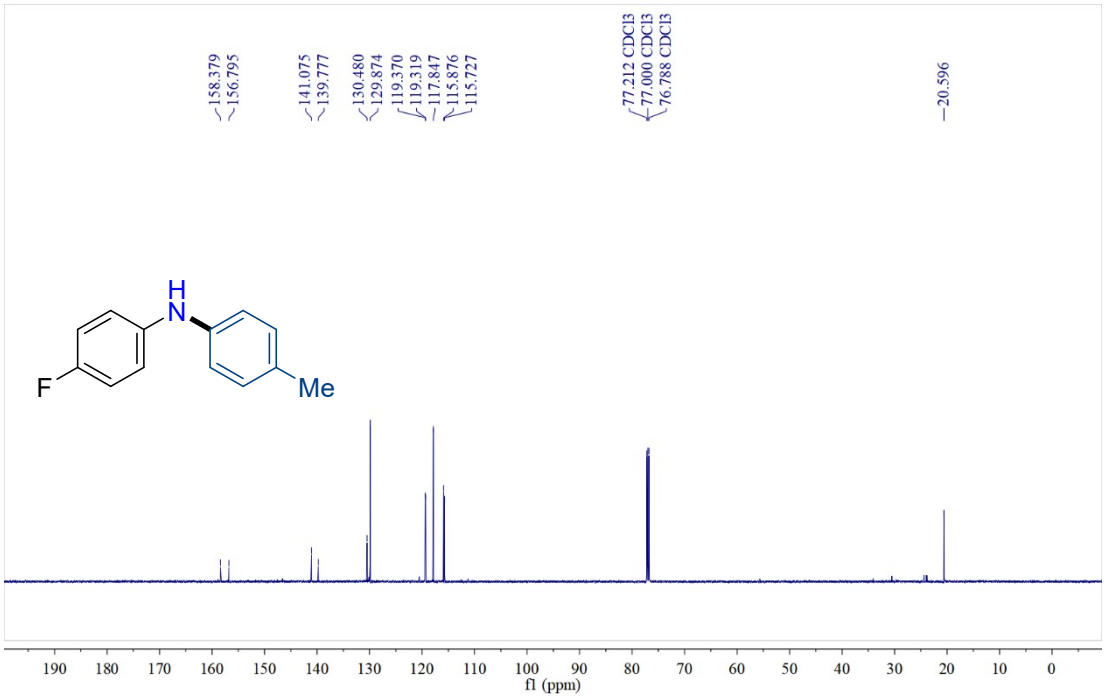
^{13}C NMR Spectrum of **4k**



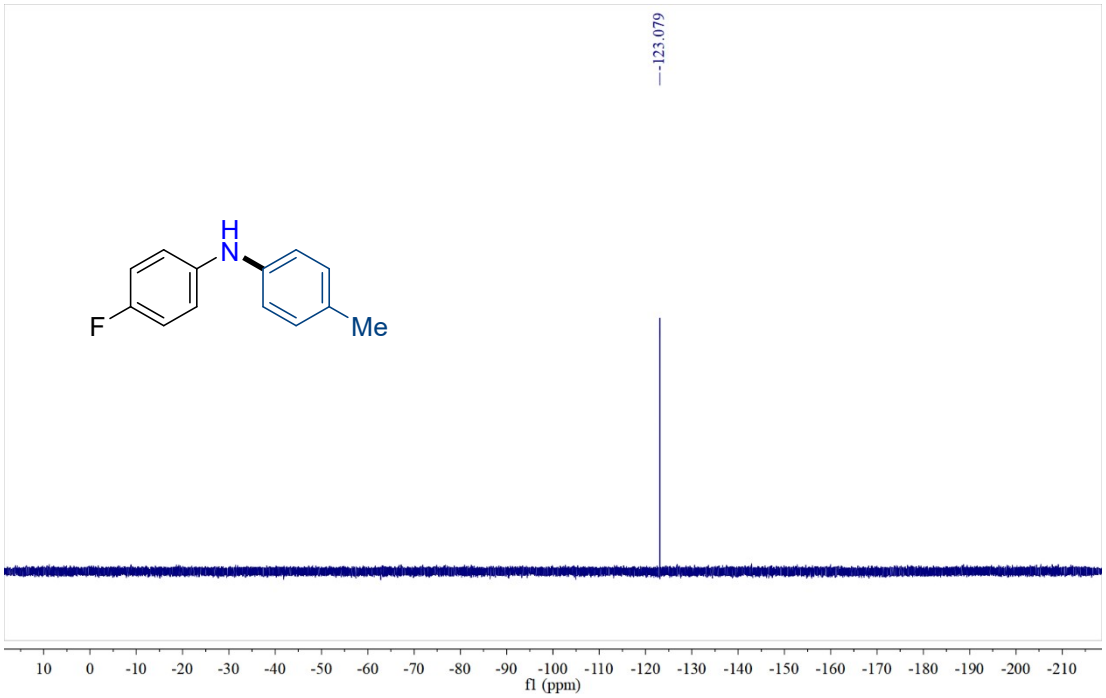
^{1}H NMR Spectrum of **4l**



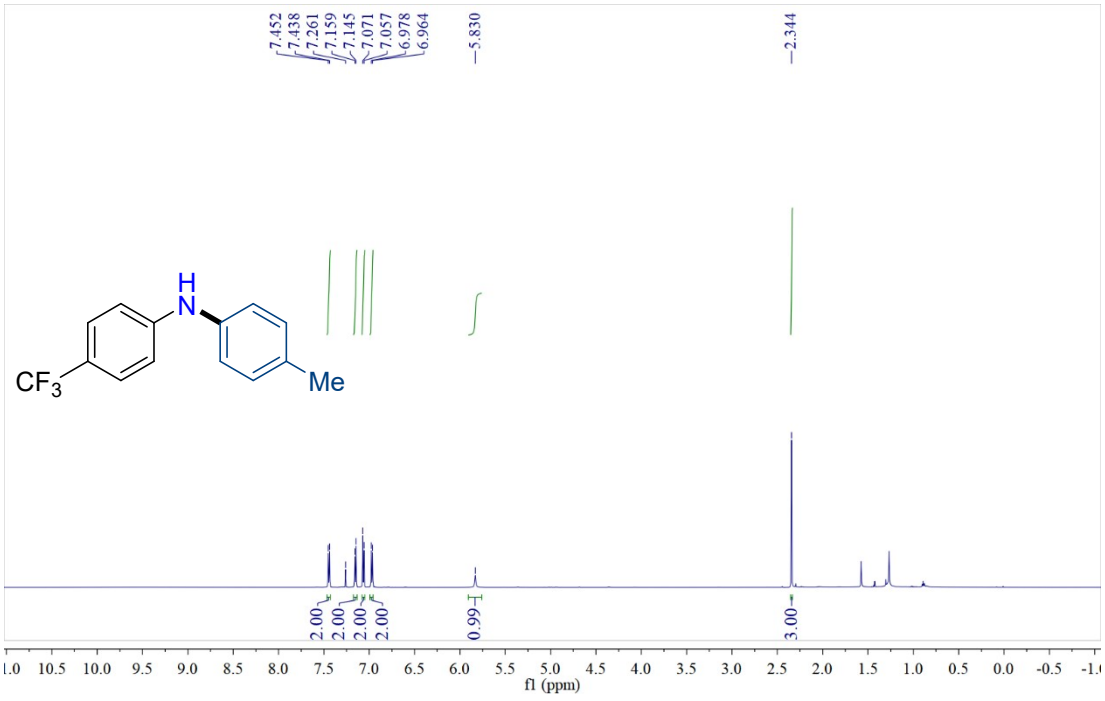
^{13}C NMR Spectrum of **4l**



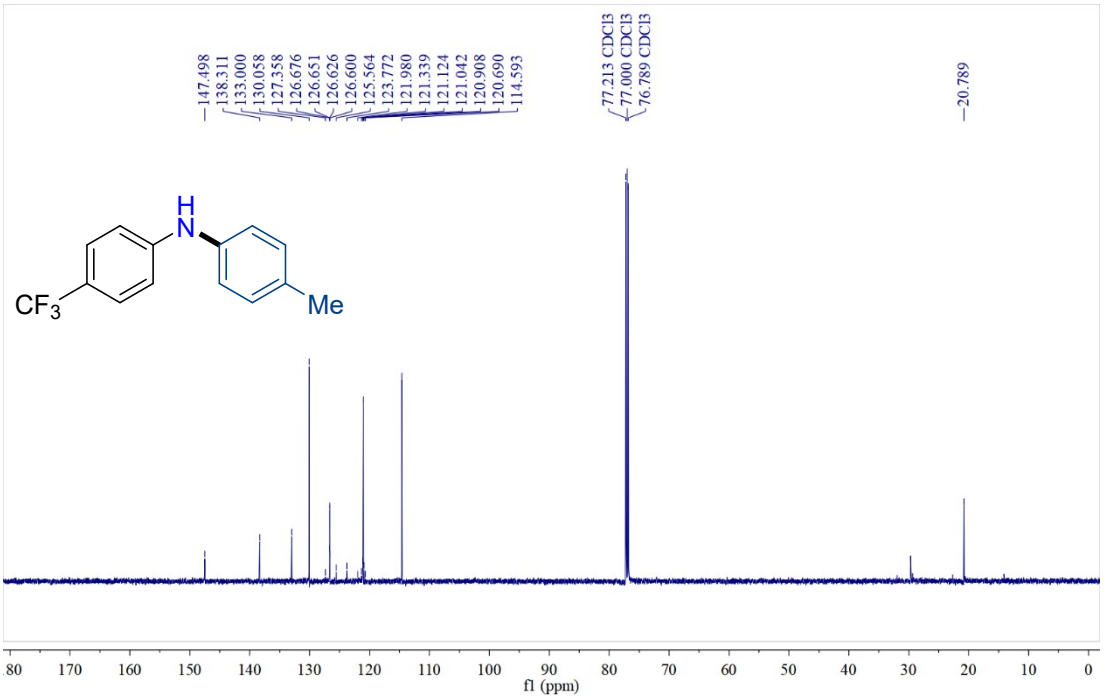
^{19}F NMR Spectrum of **4l**



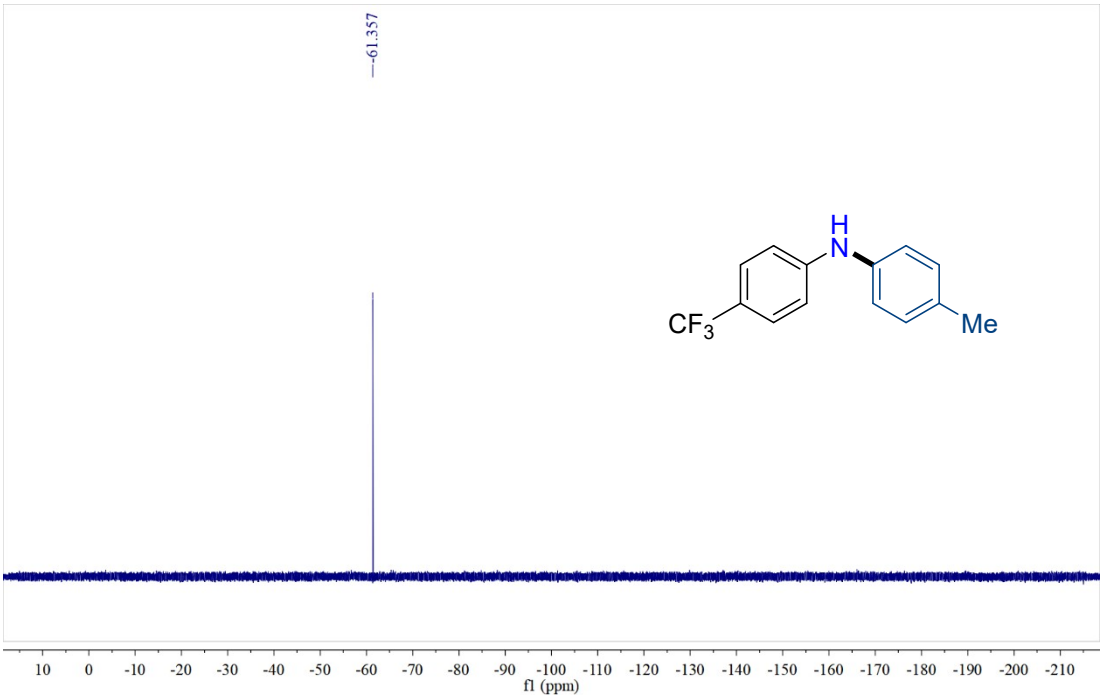
^{1}H NMR Spectrum of **4m**



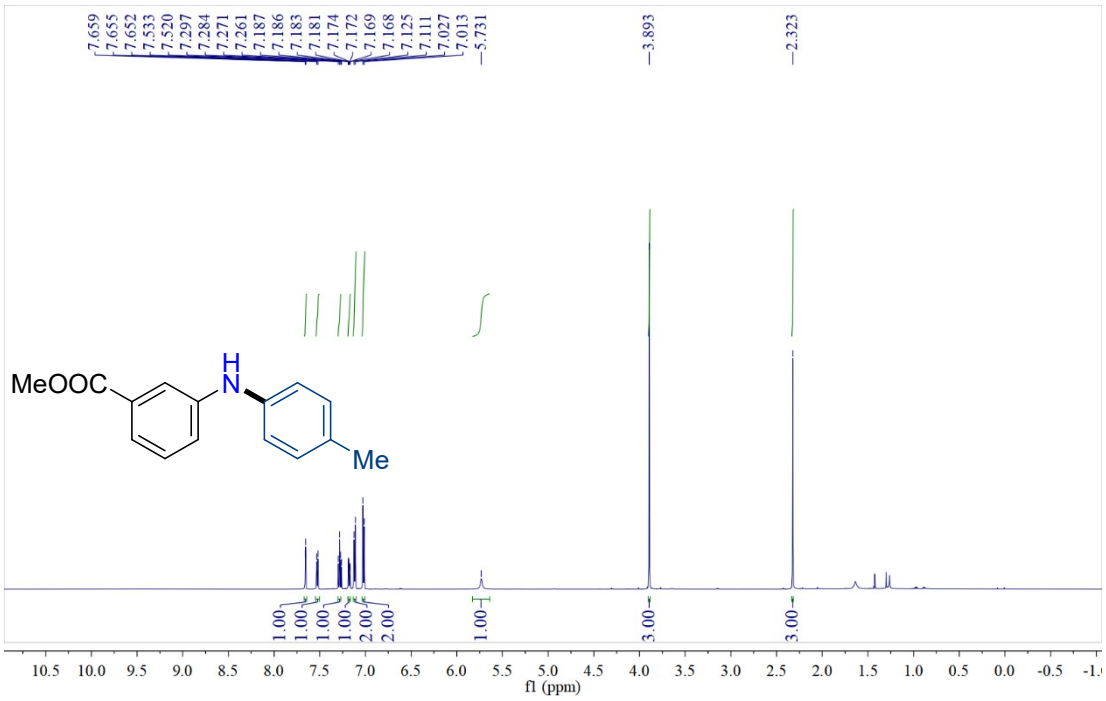
^{13}C NMR Spectrum of **4m**



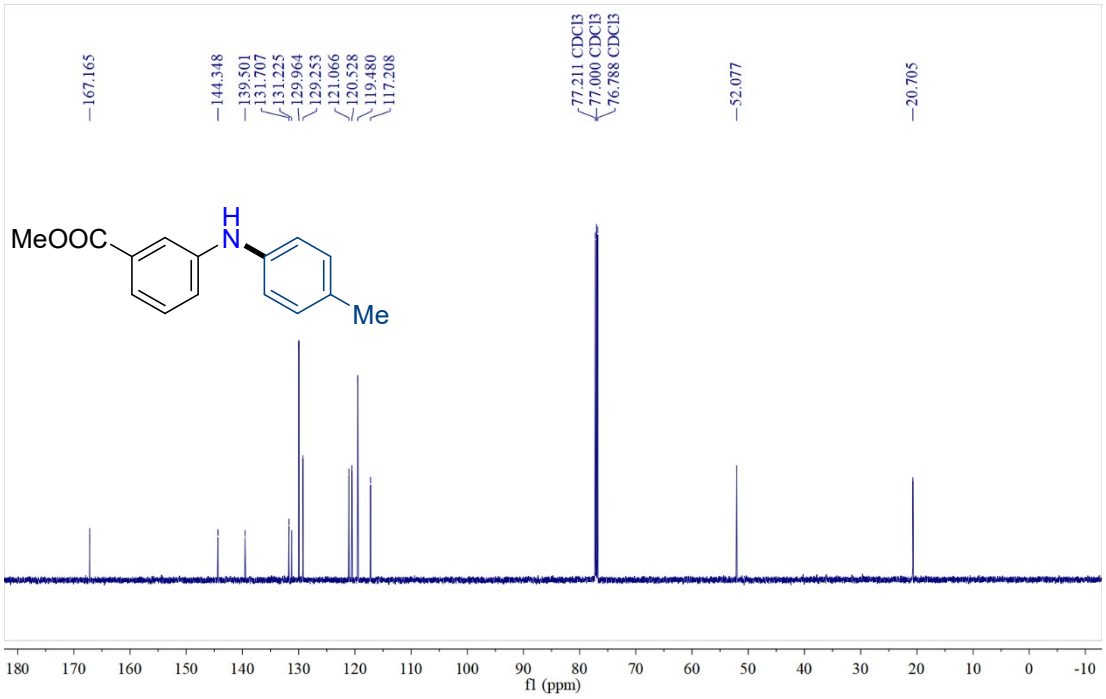
^{19}F NMR Spectrum of **4m**



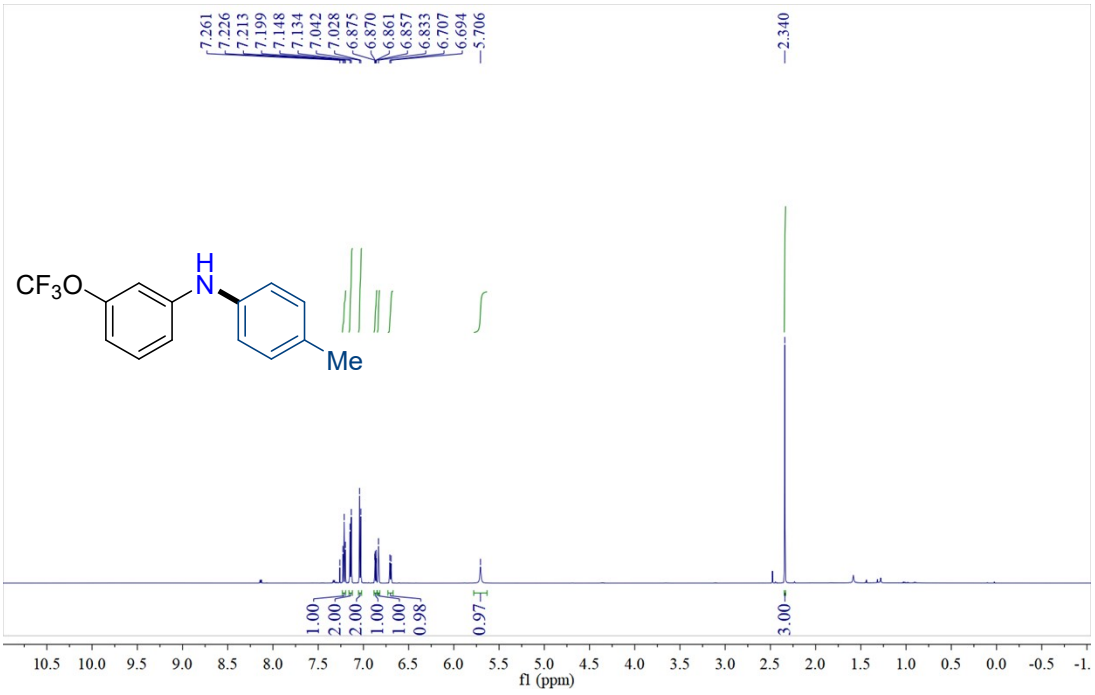
^{1}H NMR Spectrum of **4n**



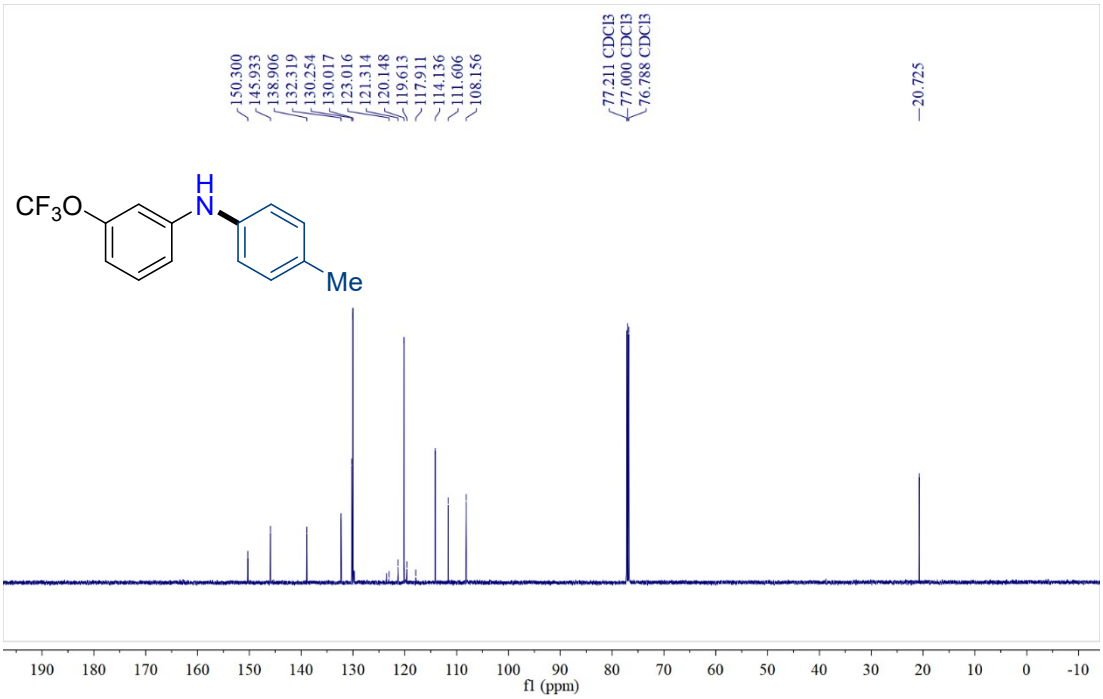
^{13}C NMR Spectrum of **4n**



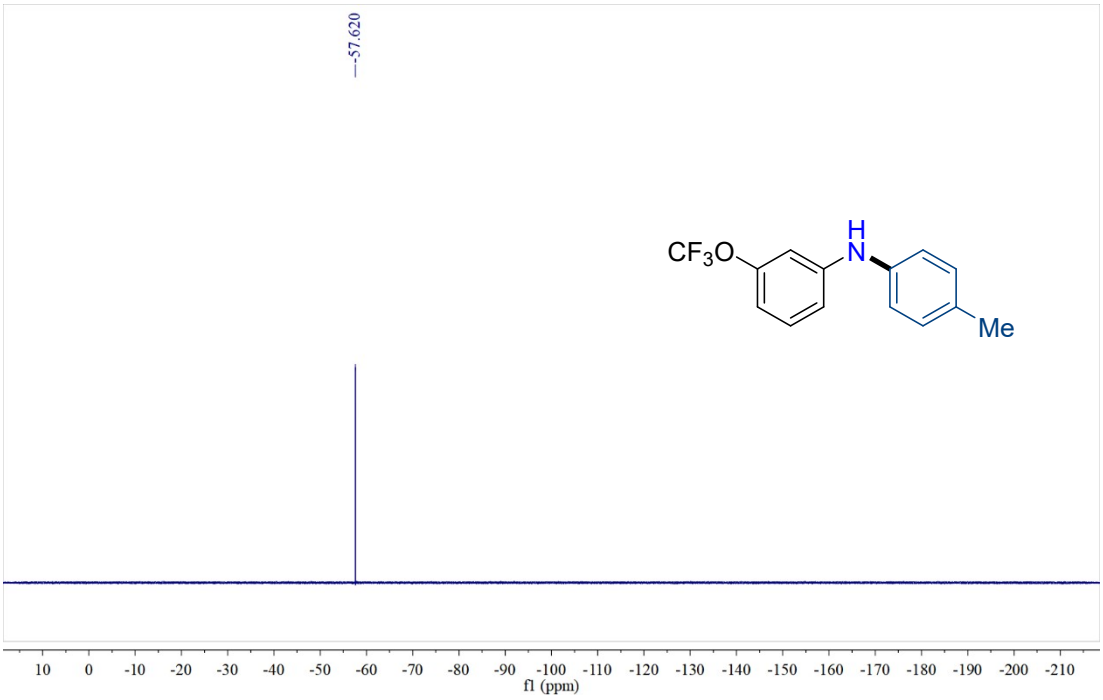
^{1}H NMR Spectrum of **4o**



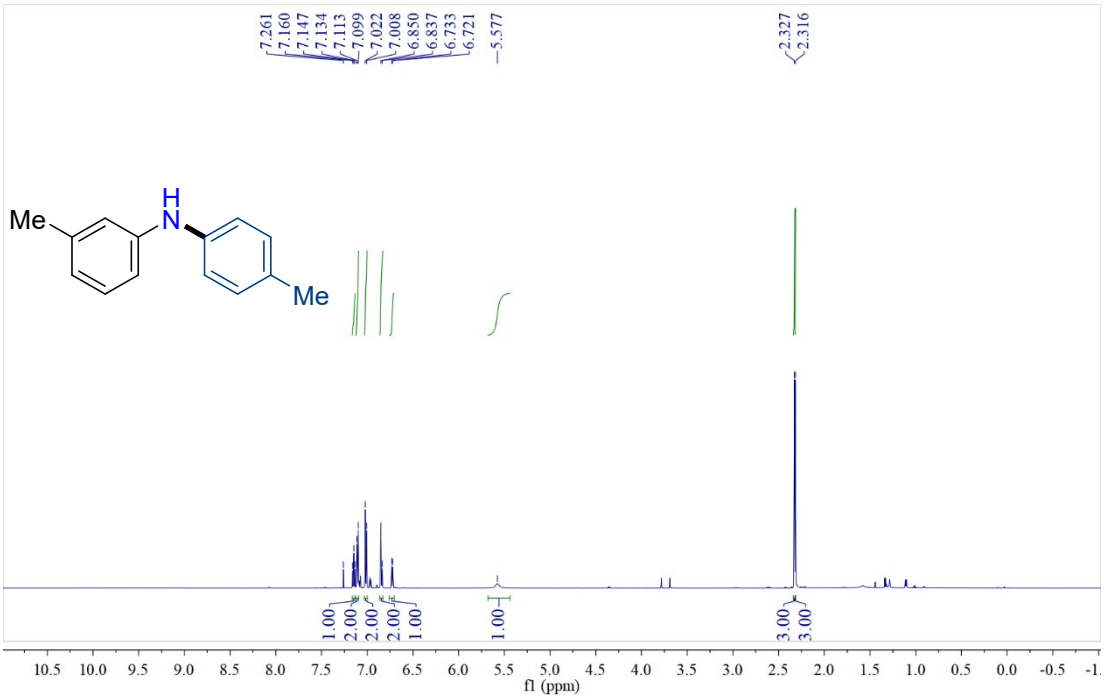
^{13}C NMR Spectrum of **4o**



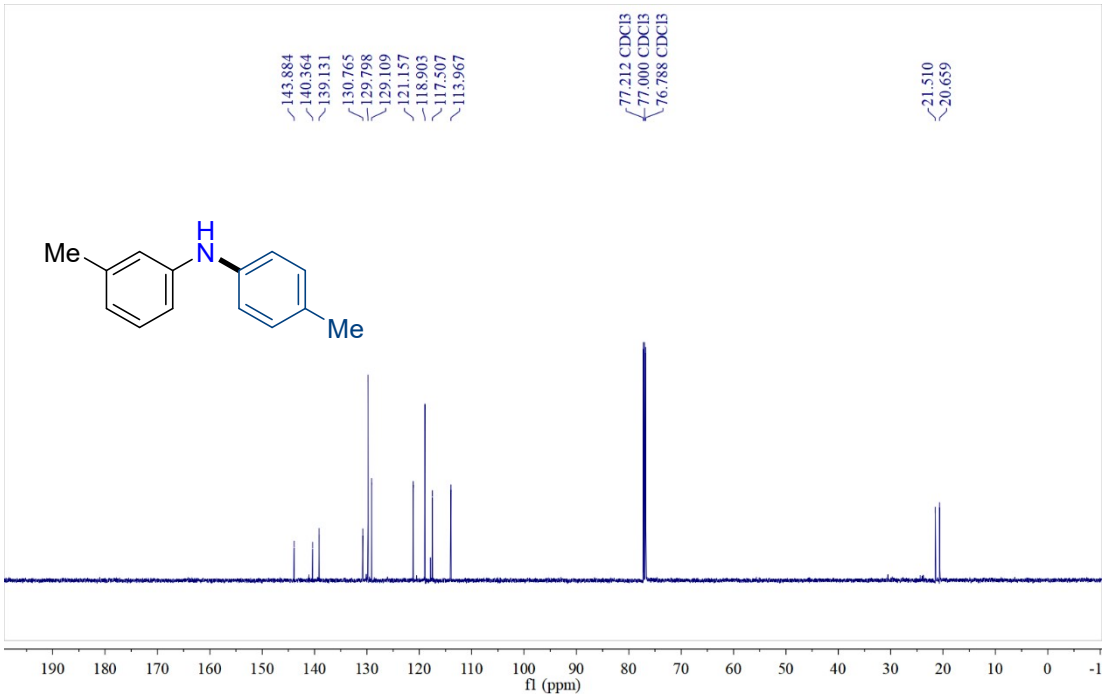
^{19}F NMR Spectrum of **4o**



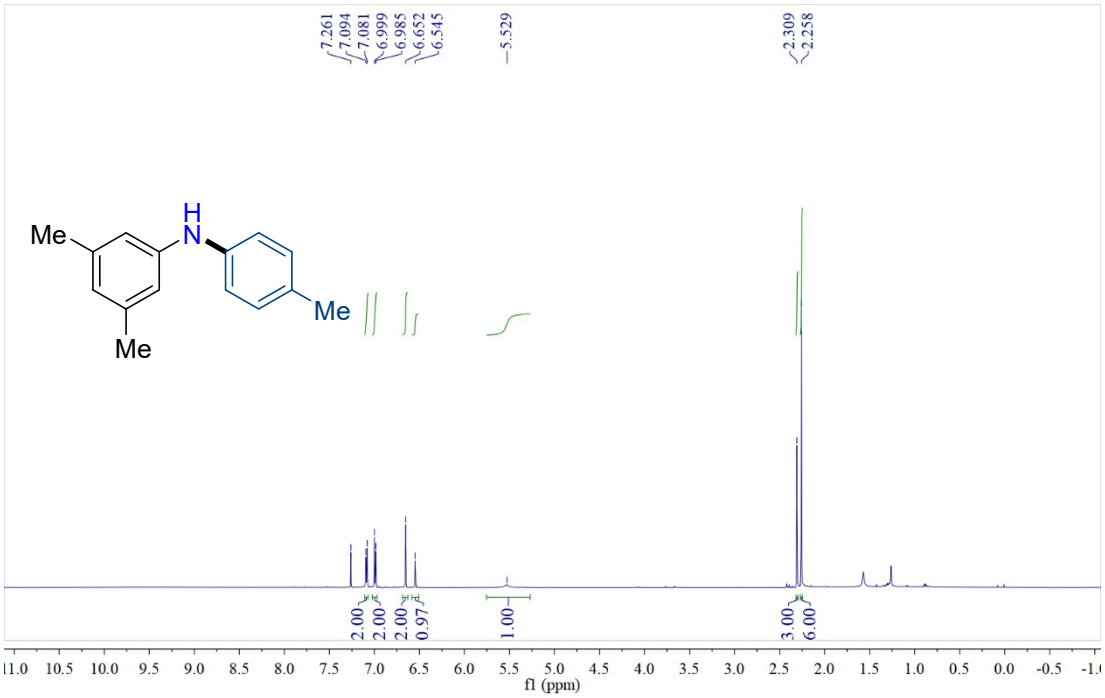
^{1}H NMR Spectrum of **4p**



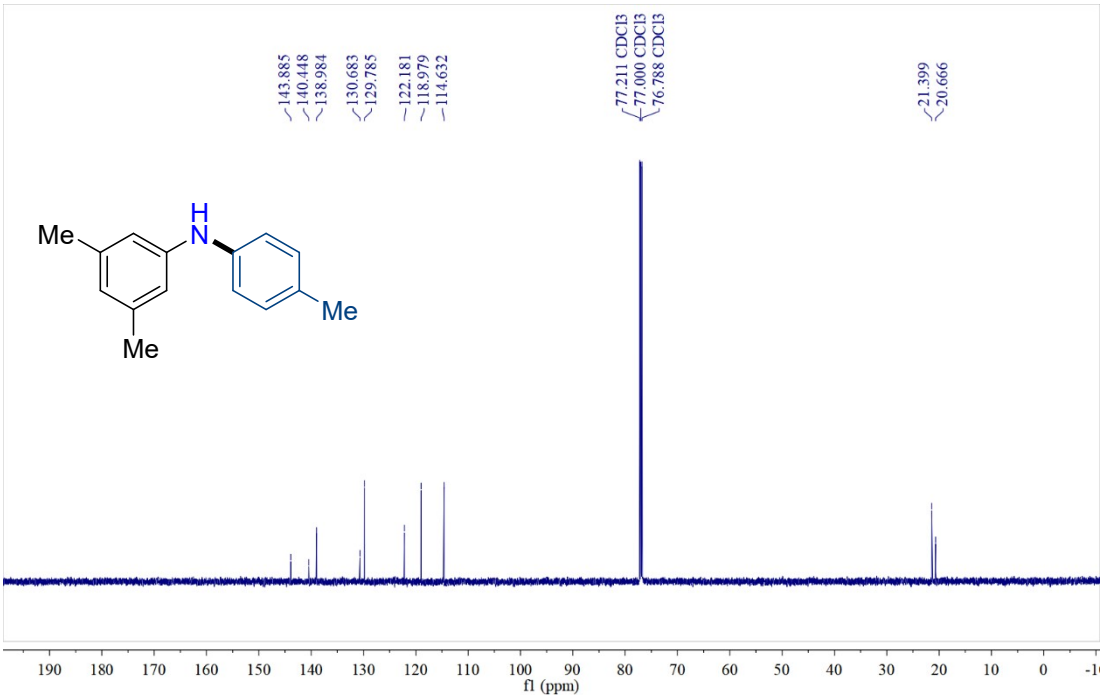
^{13}C NMR Spectrum of **4p**



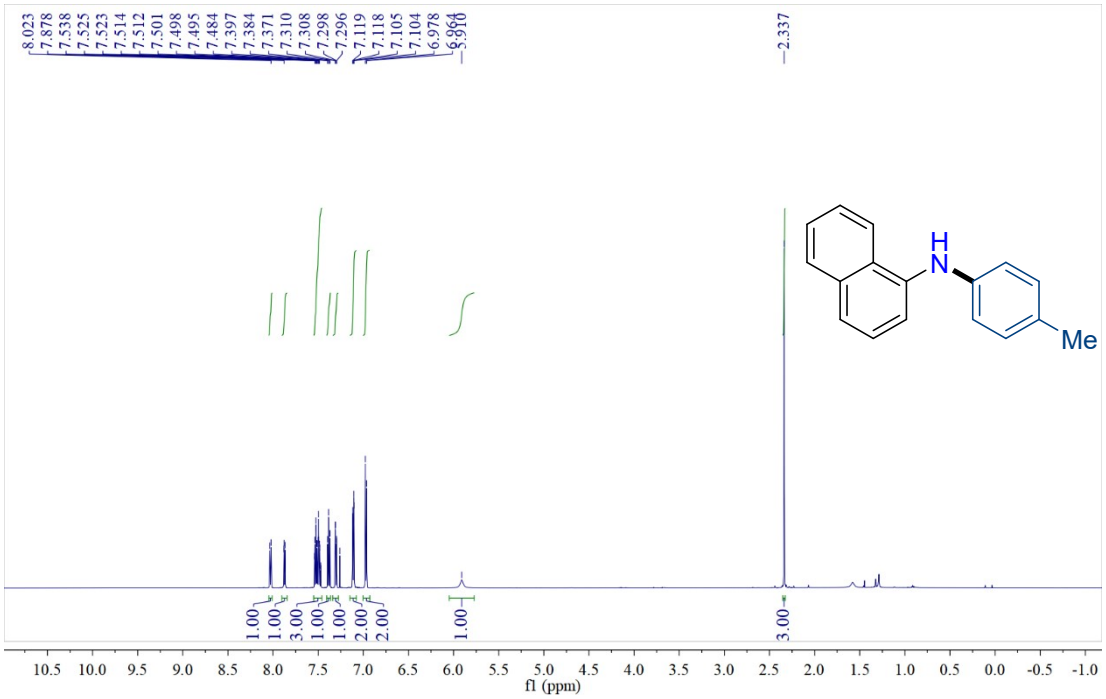
^{1}H NMR Spectrum of **4q**



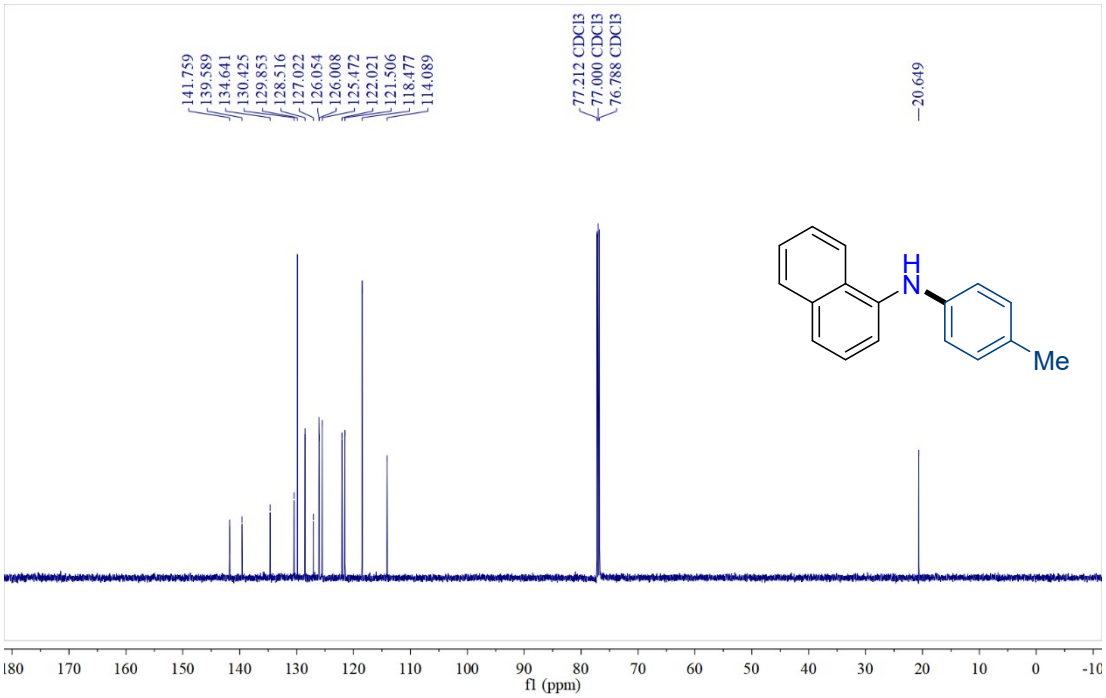
^{13}C NMR Spectrum of **4q**



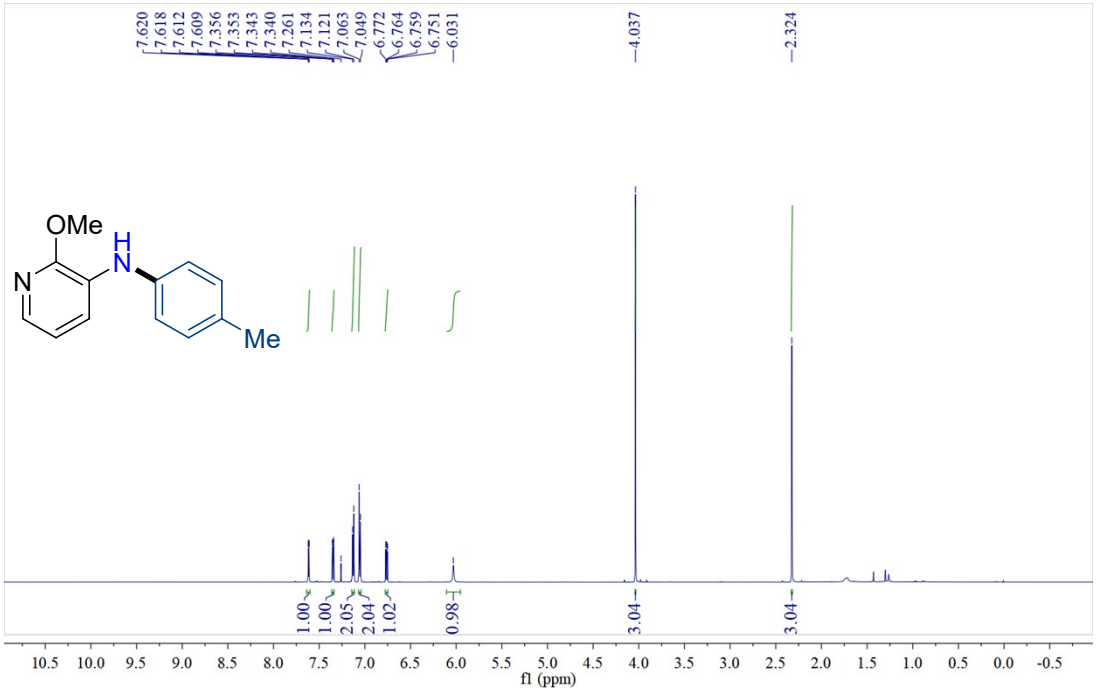
^{1}H NMR Spectrum of **4r**



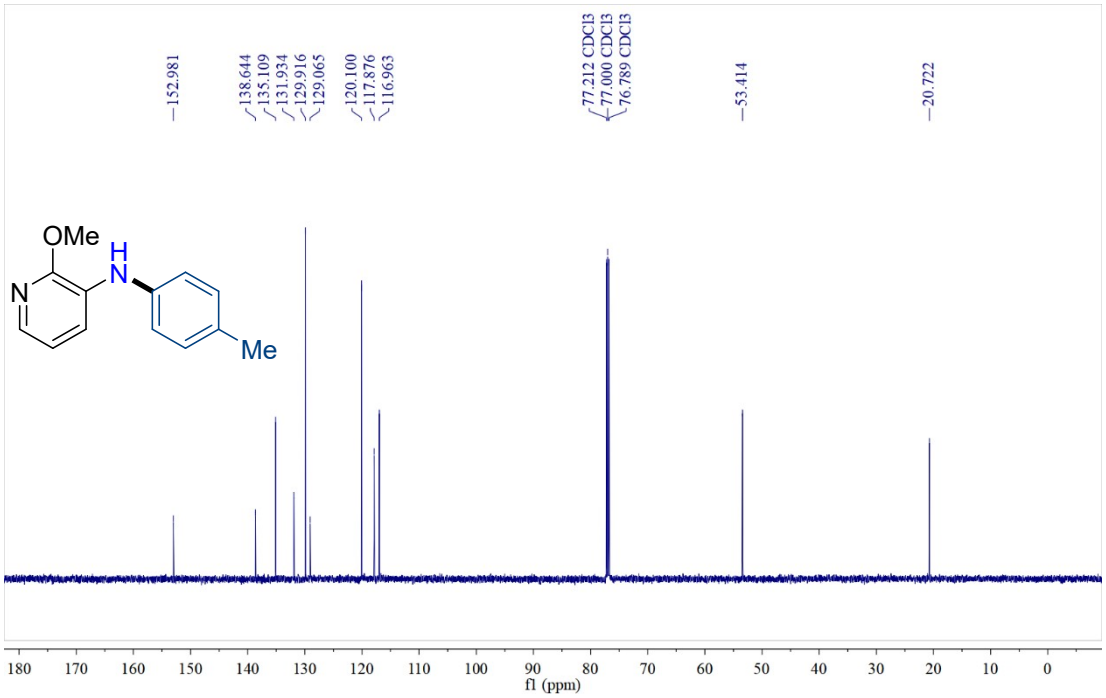
^{13}C NMR Spectrum of **4r**



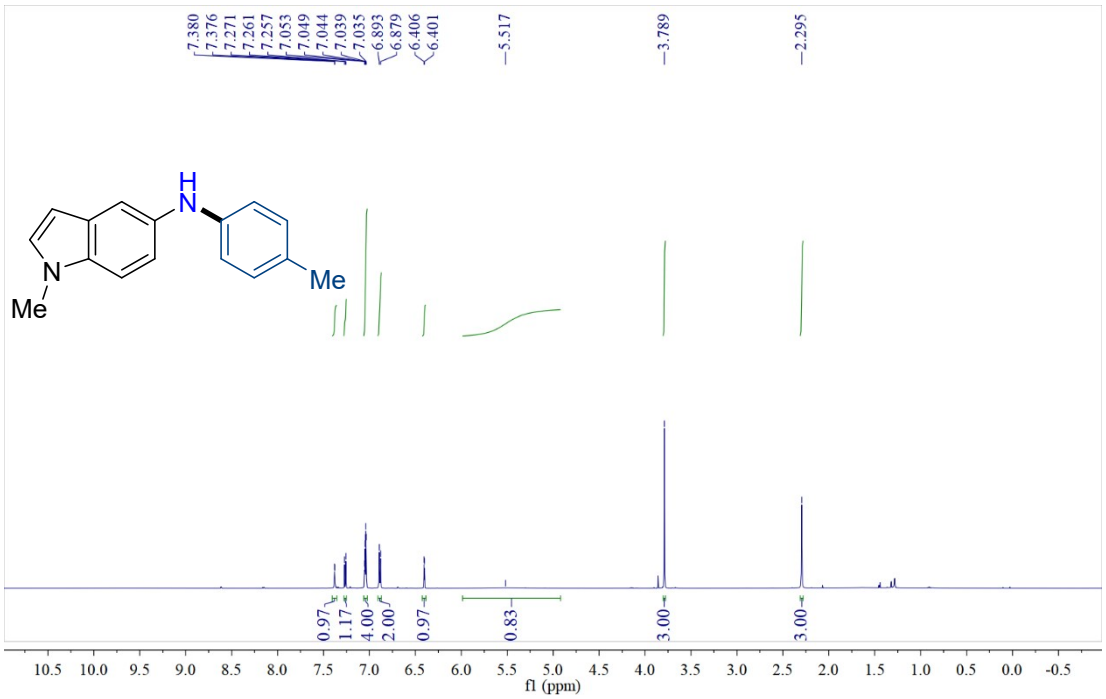
^{1}H NMR Spectrum of **4s**



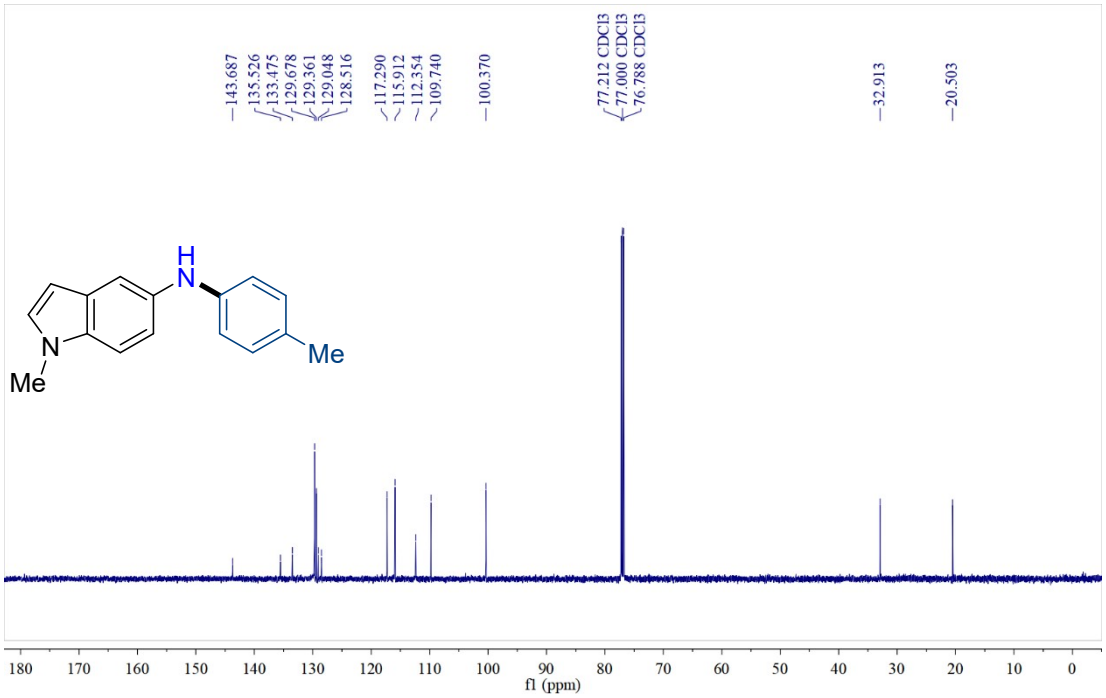
^{13}C NMR Spectrum of **4s**



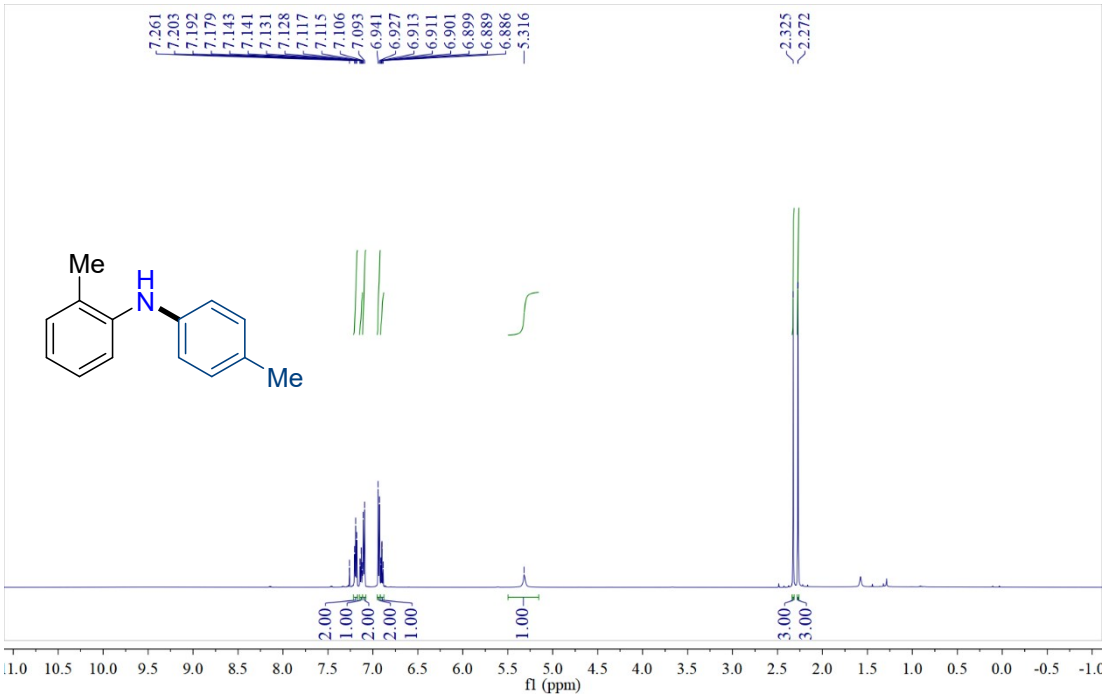
^{1}H NMR Spectrum of **4t**



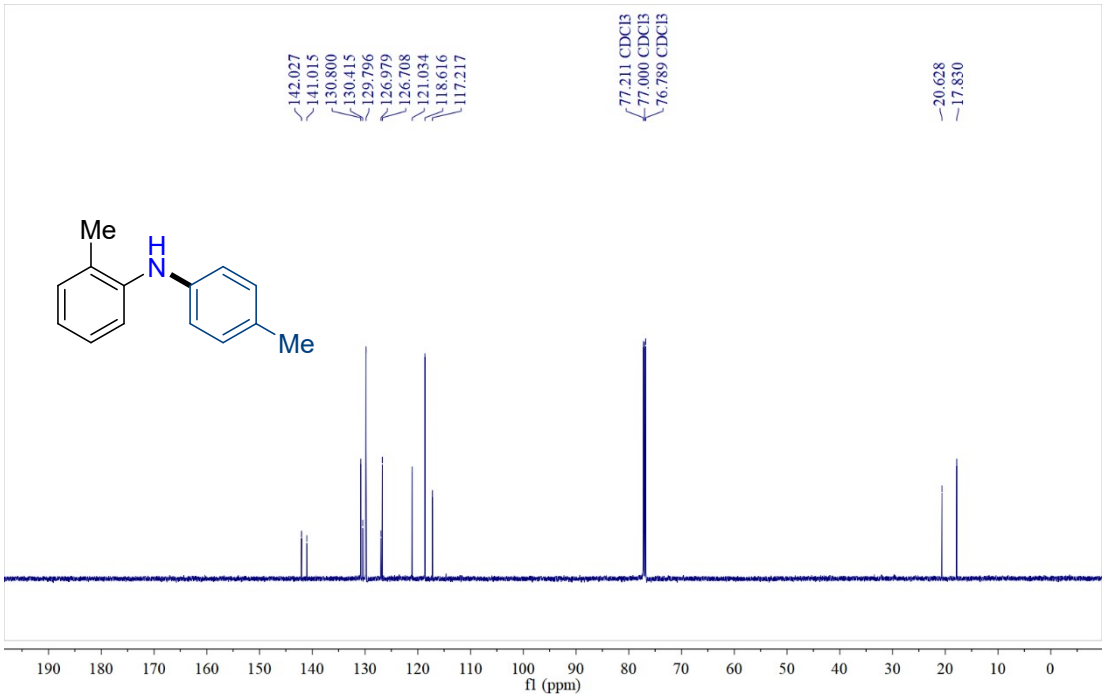
^{13}C NMR Spectrum of **4t**



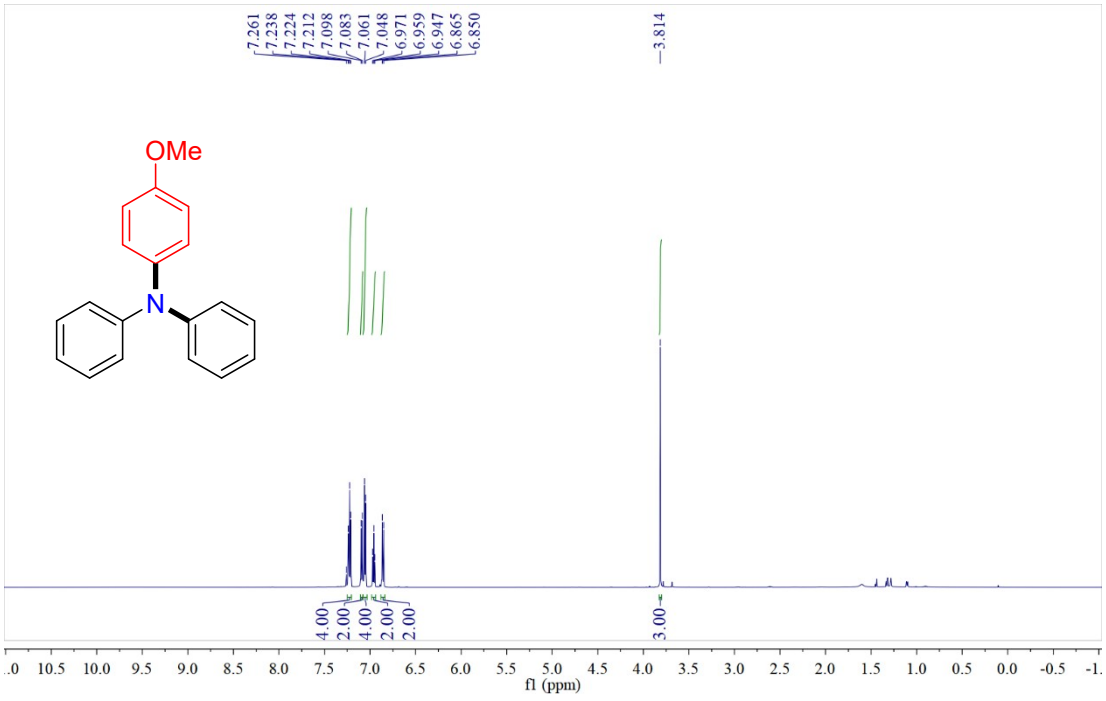
^{1}H NMR Spectrum of **4u**



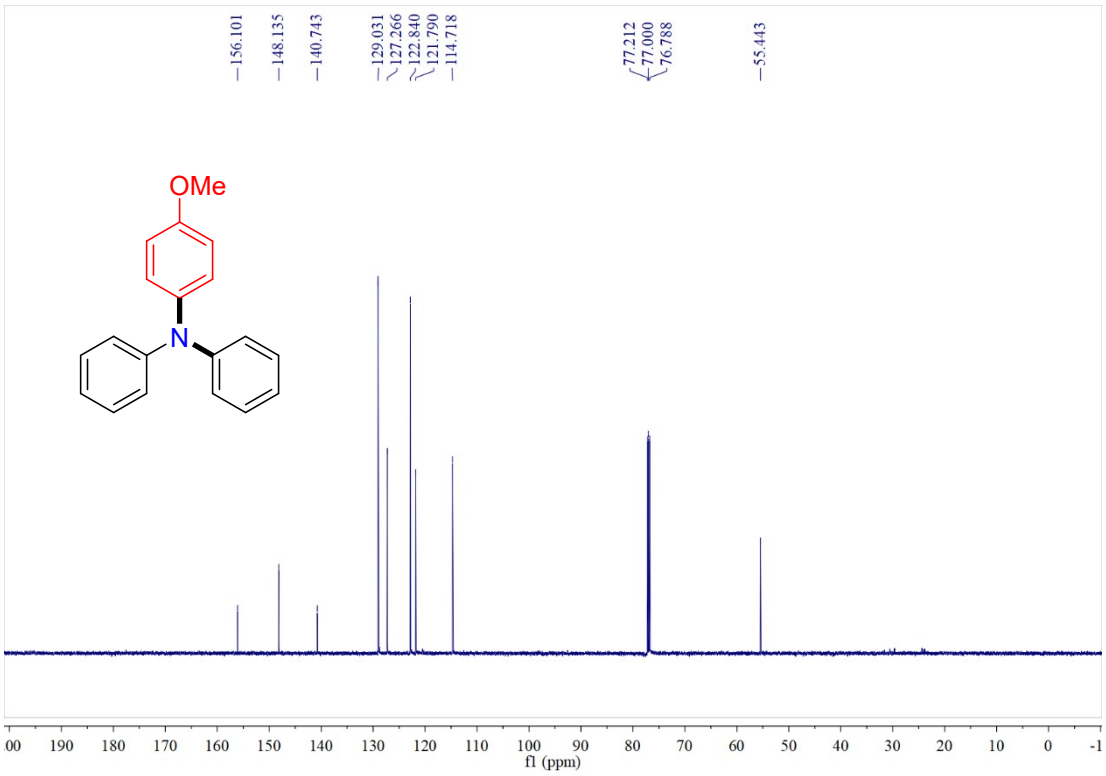
^{13}C NMR Spectrum of **4u**



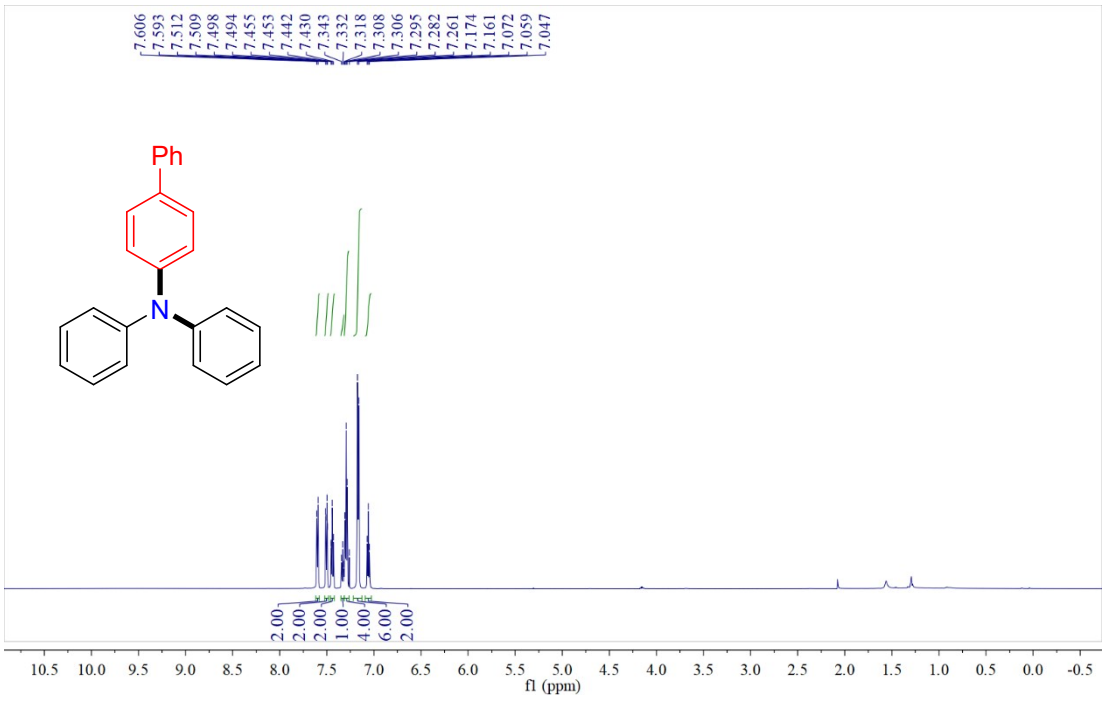
^{1}H NMR Spectrum of **5a**



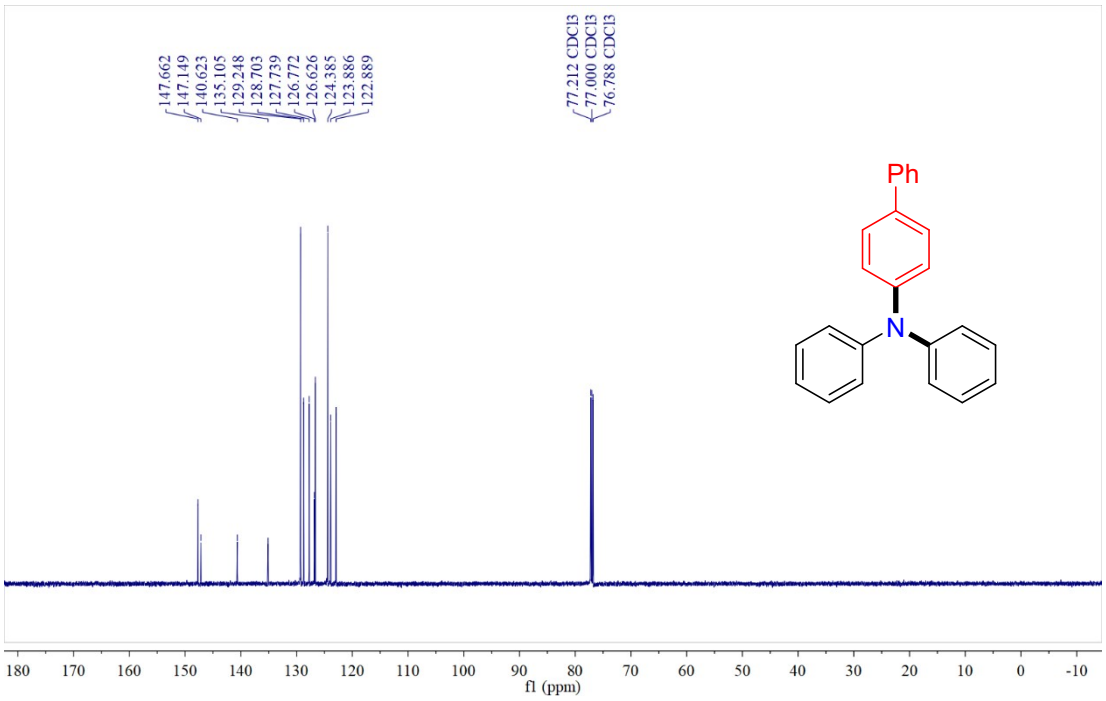
^{13}C NMR Spectrum of **5a**



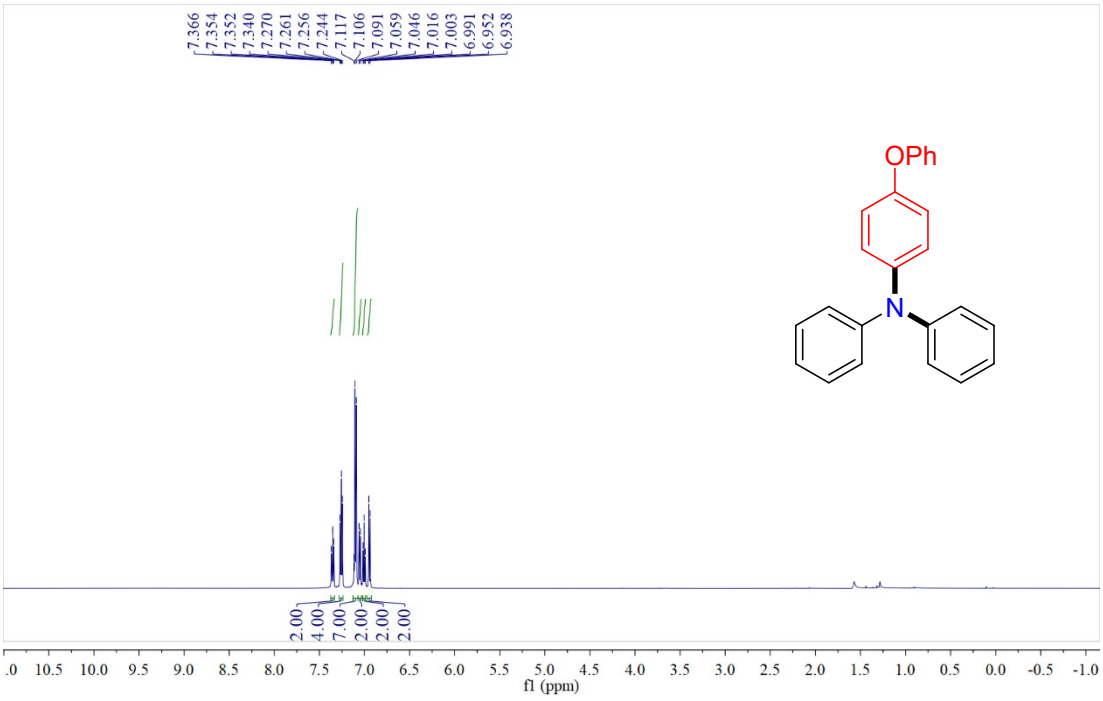
^{1}H NMR Spectrum of **5b**



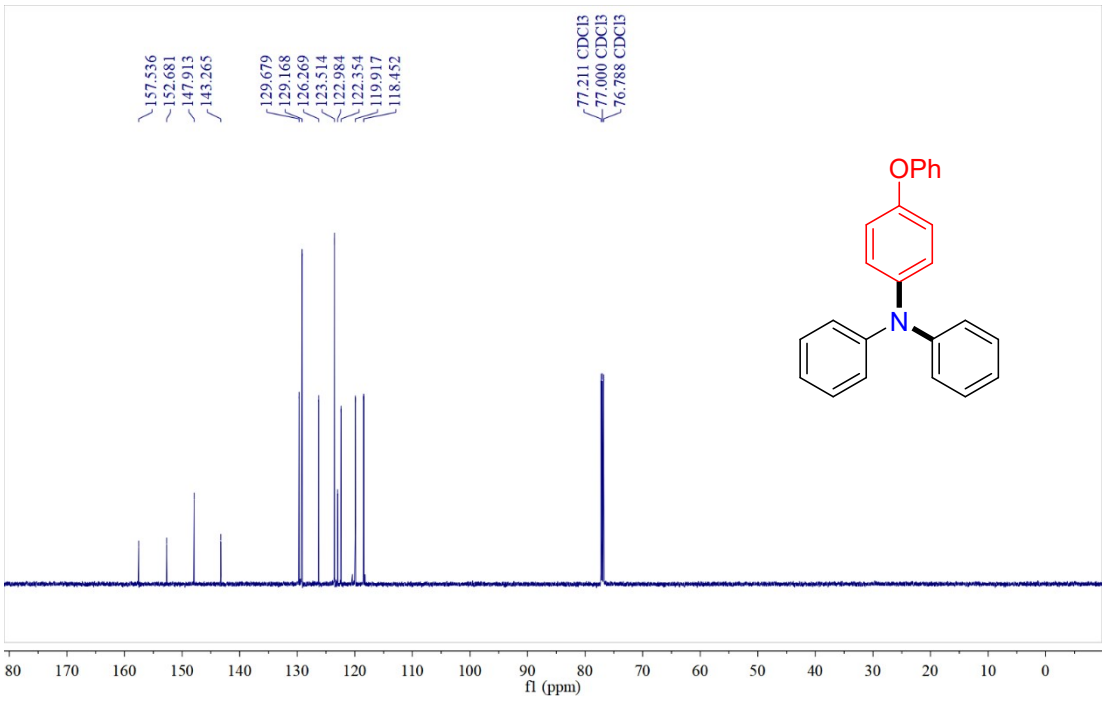
^{13}C NMR Spectrum of **5b**



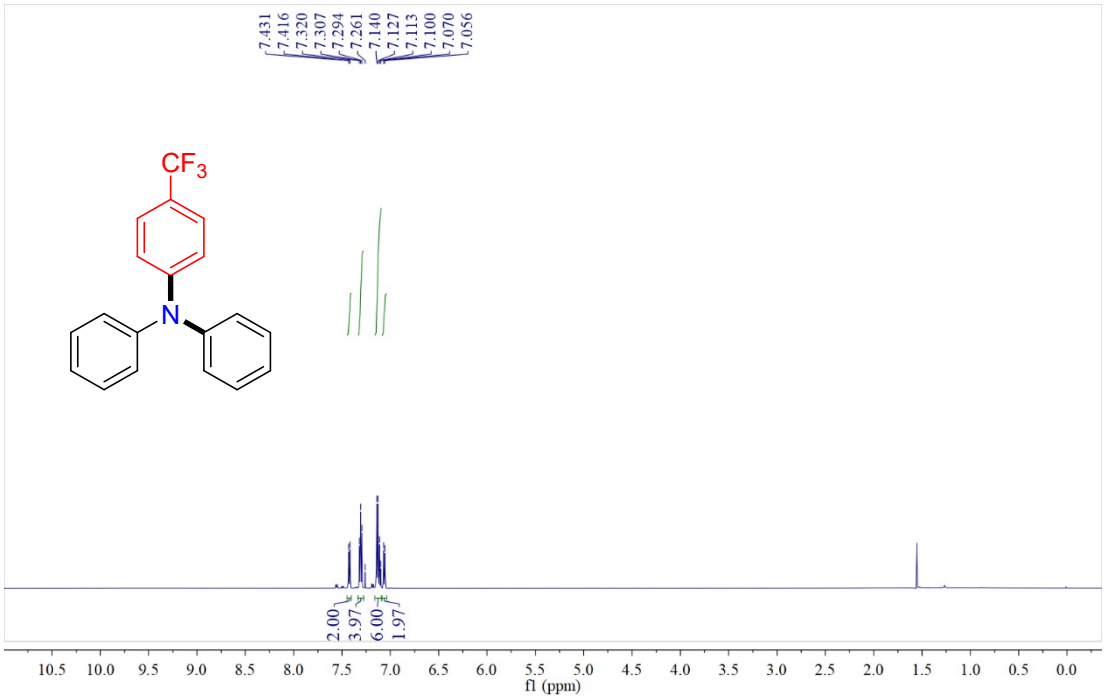
^{1}H NMR Spectrum of **5c**



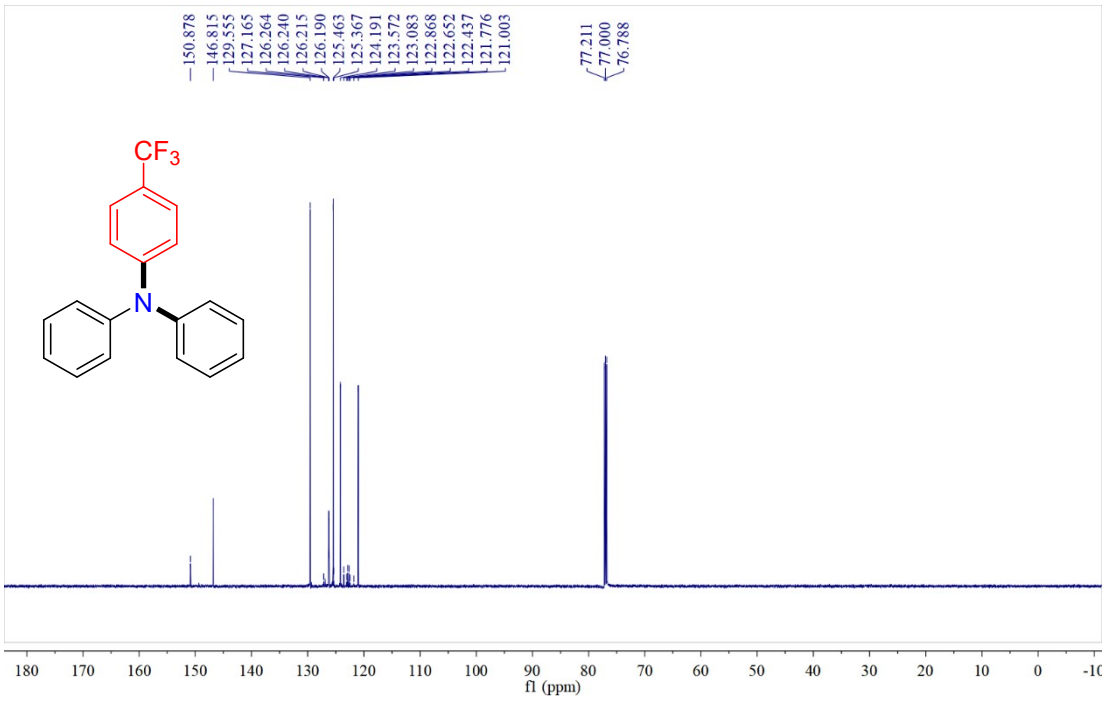
^{13}C NMR Spectrum of **5c**



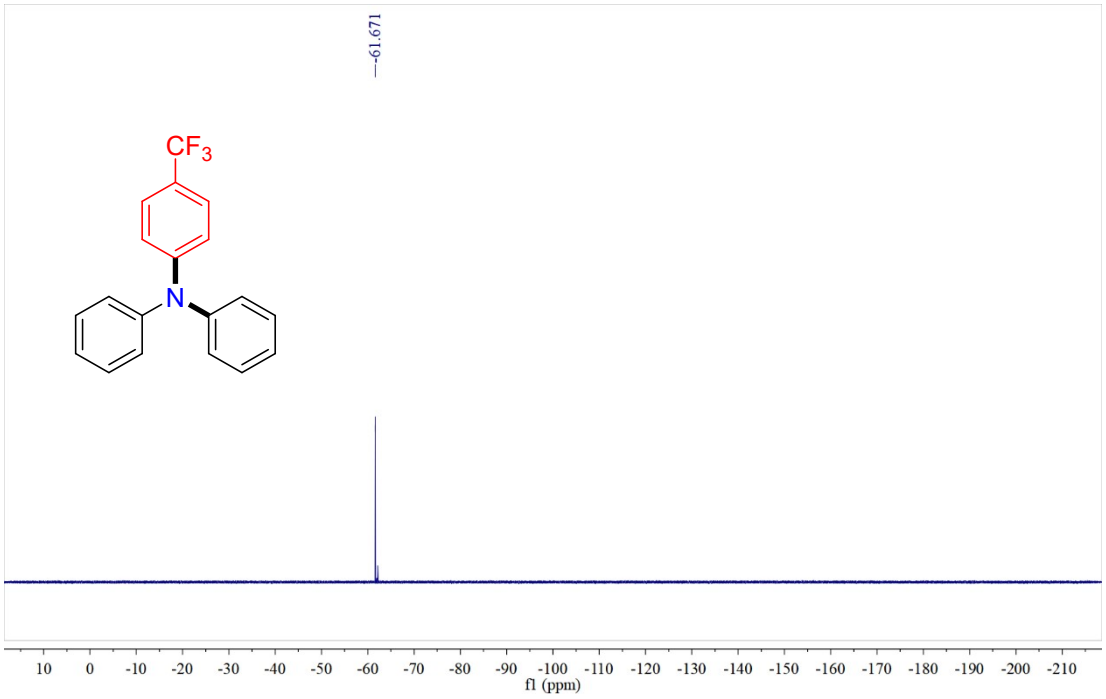
^{1}H NMR Spectrum of **5d**



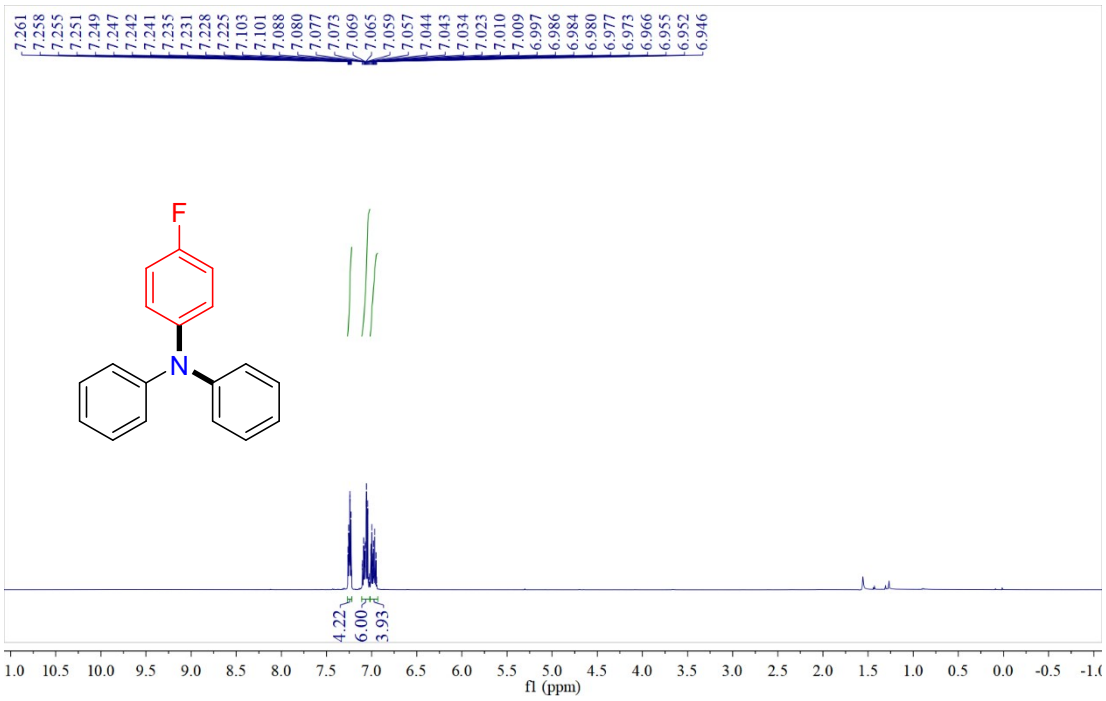
^{13}C NMR Spectrum of **5d**



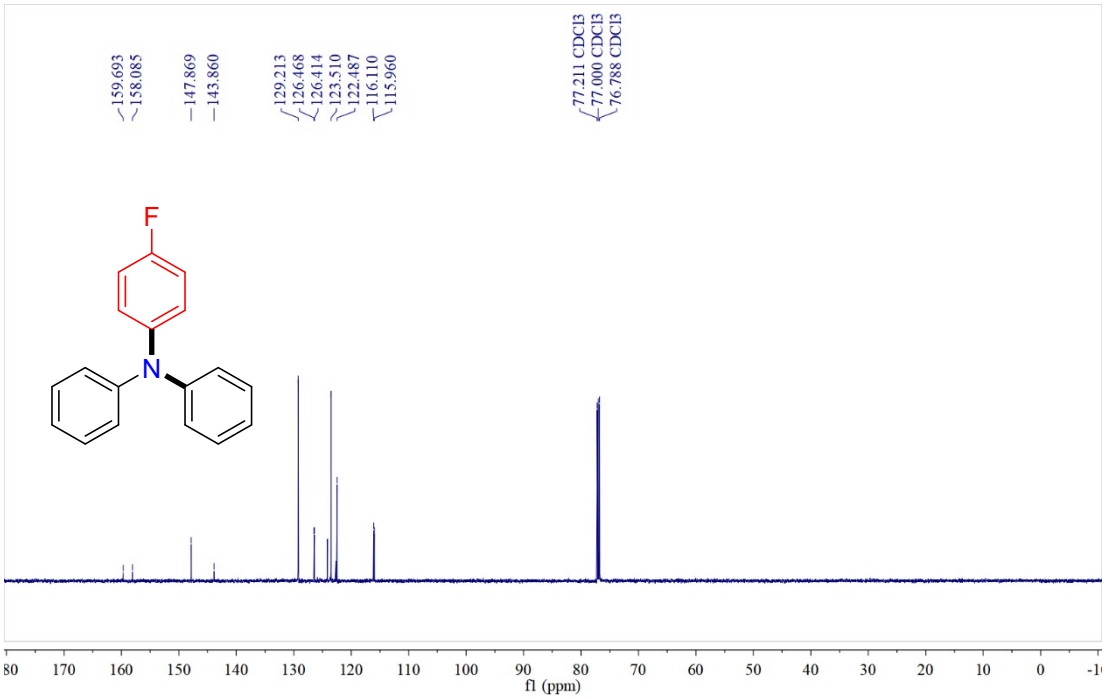
^{19}F NMR Spectrum of **5d**



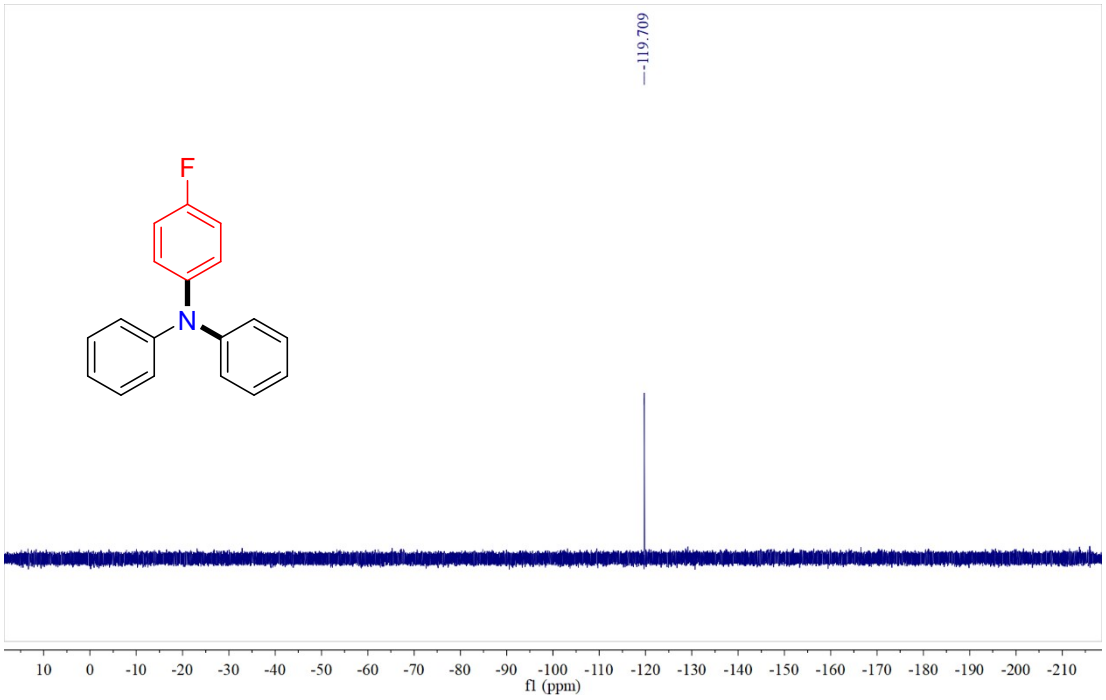
^{1}H NMR Spectrum of **5e**



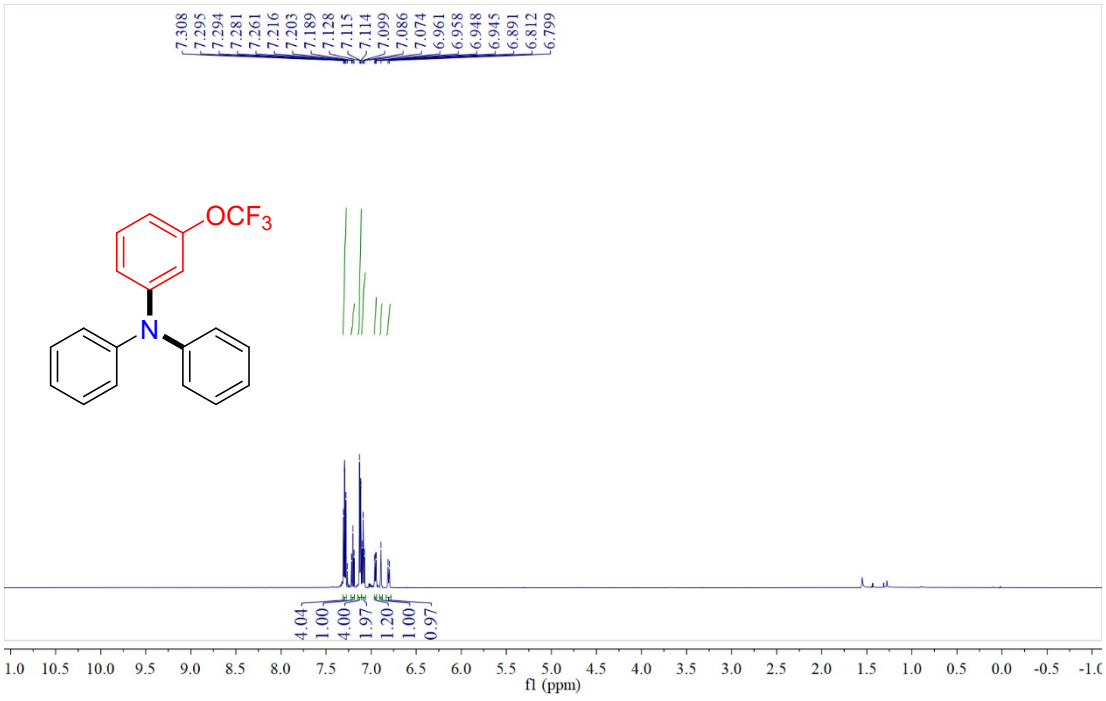
^{13}C NMR Spectrum of **5e**



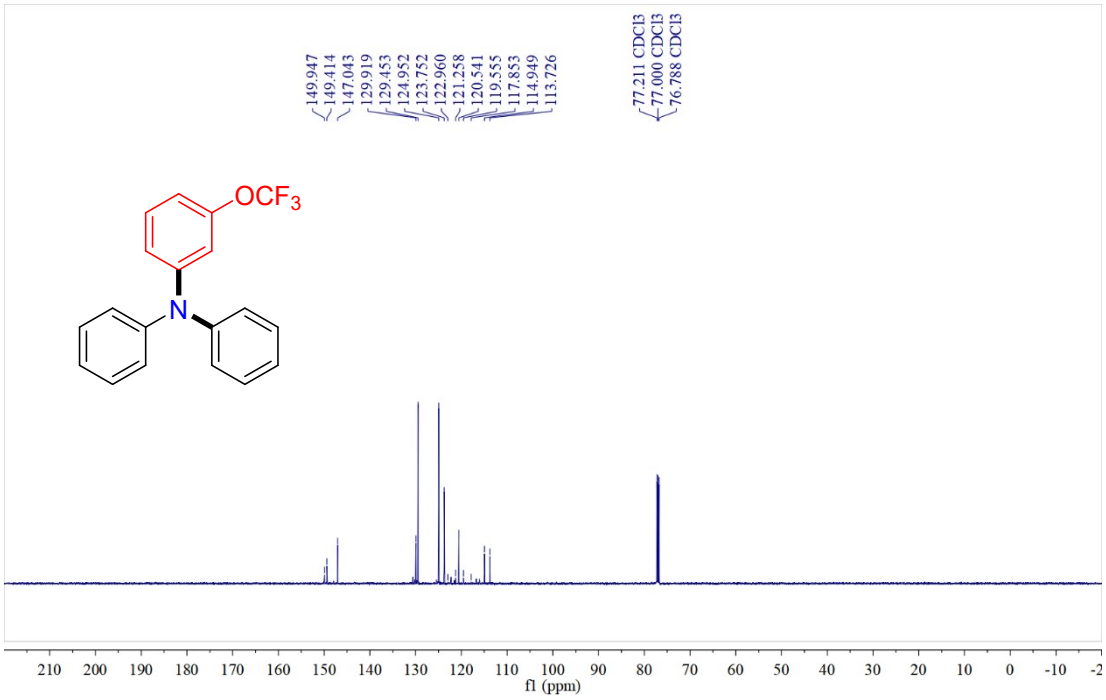
^{19}F NMR Spectrum of **5e**



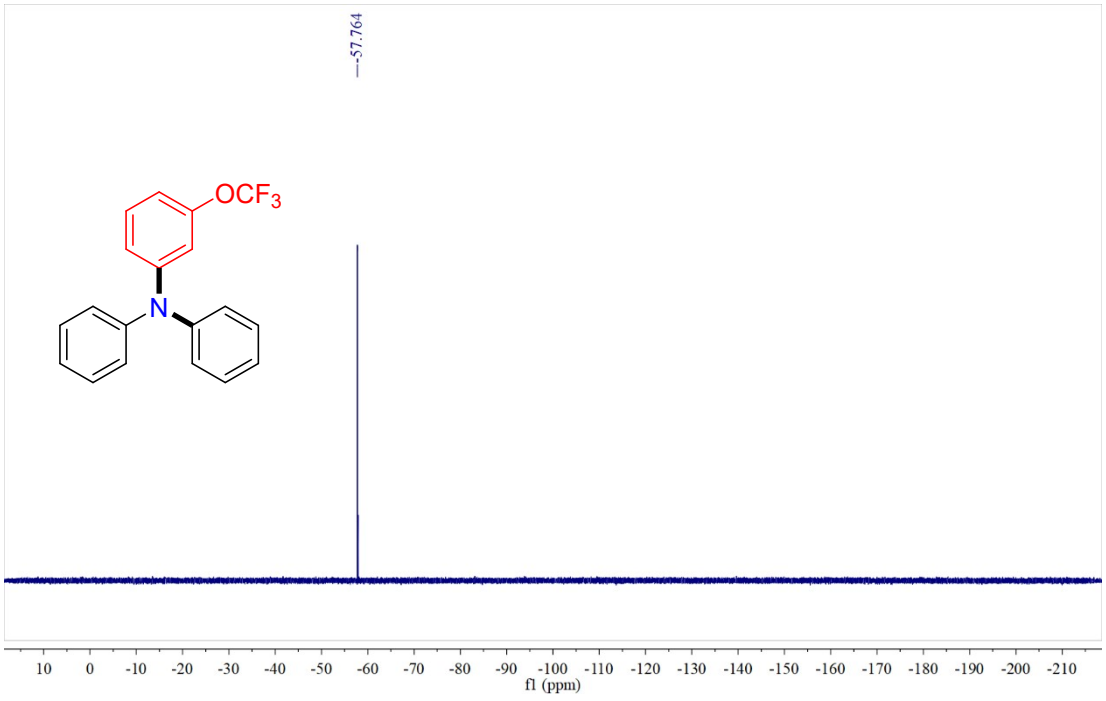
^{1}H NMR Spectrum of **5f**



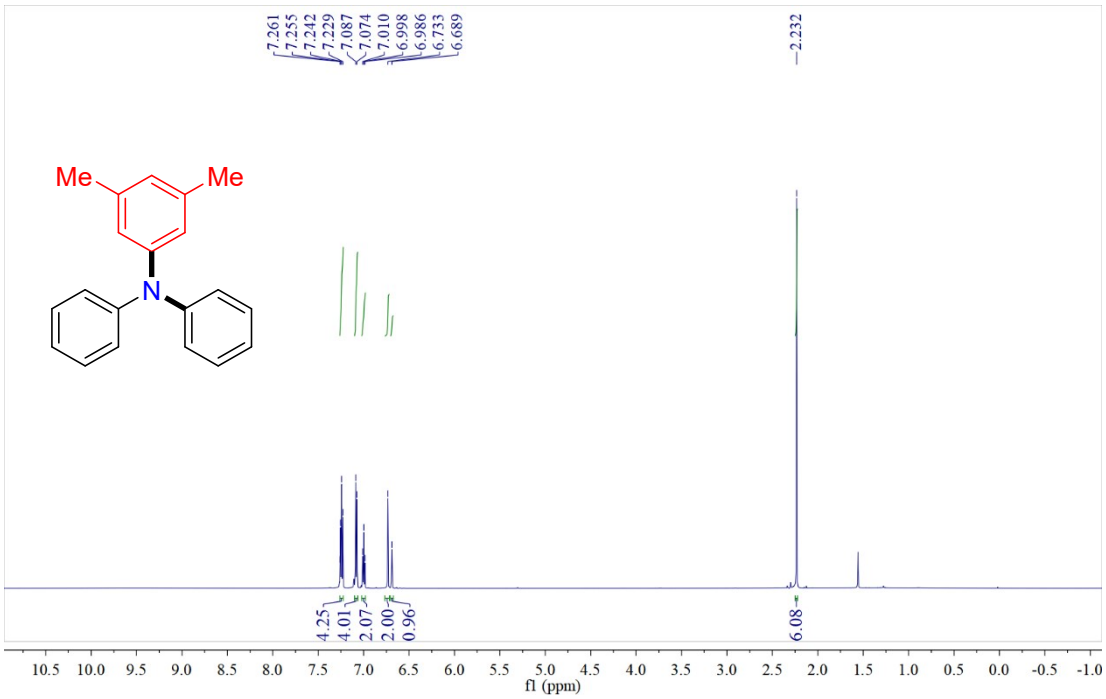
^{13}C NMR Spectrum of **5f**



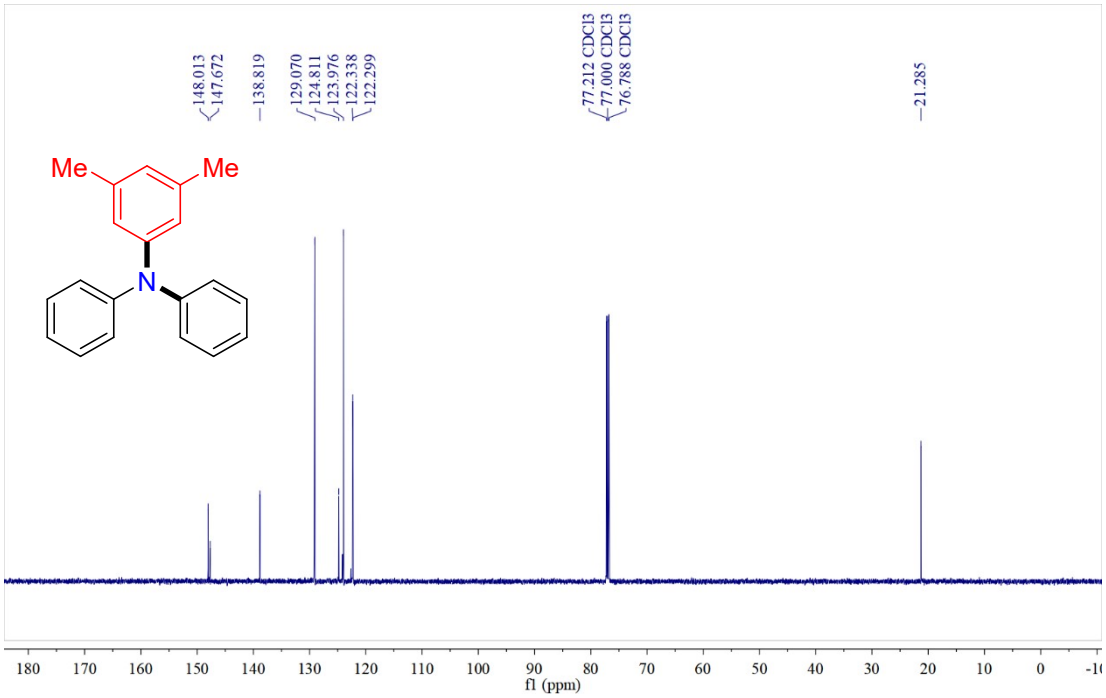
^{19}F NMR Spectrum of **5f**



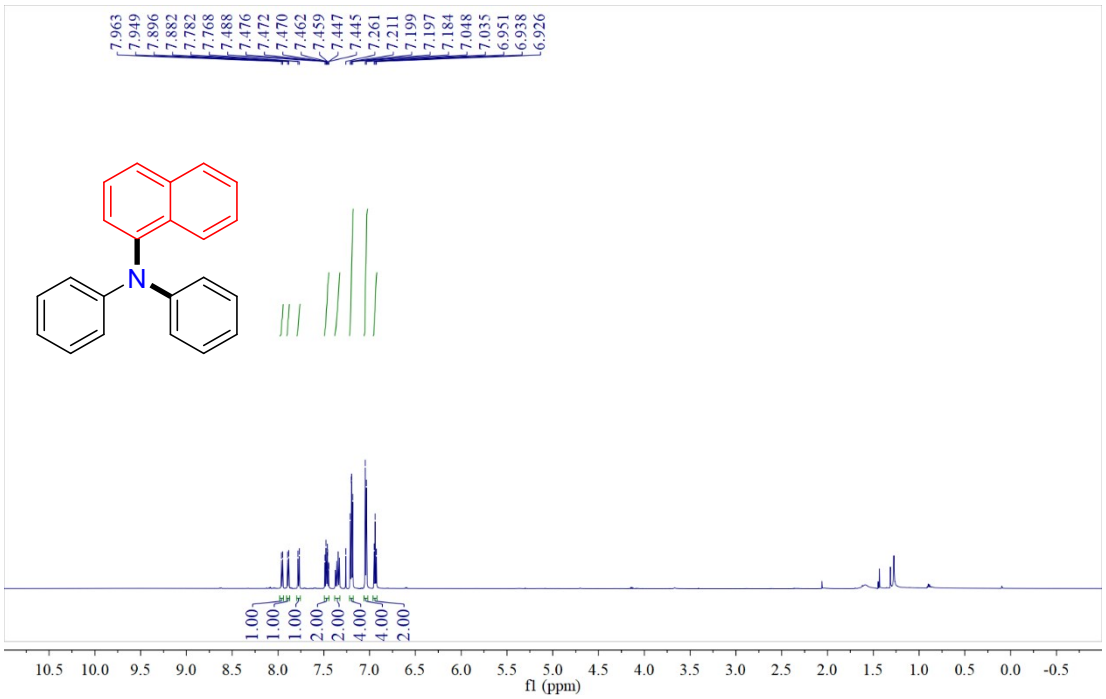
^{1}H NMR Spectrum of **5g**



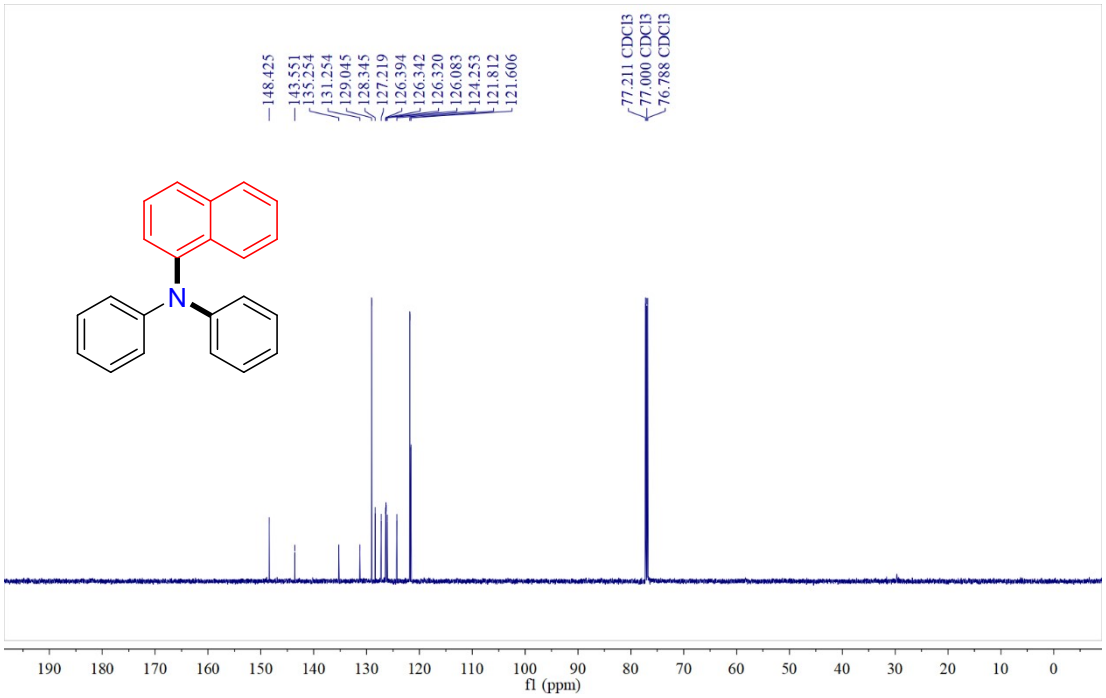
^{13}C NMR Spectrum of **5g**



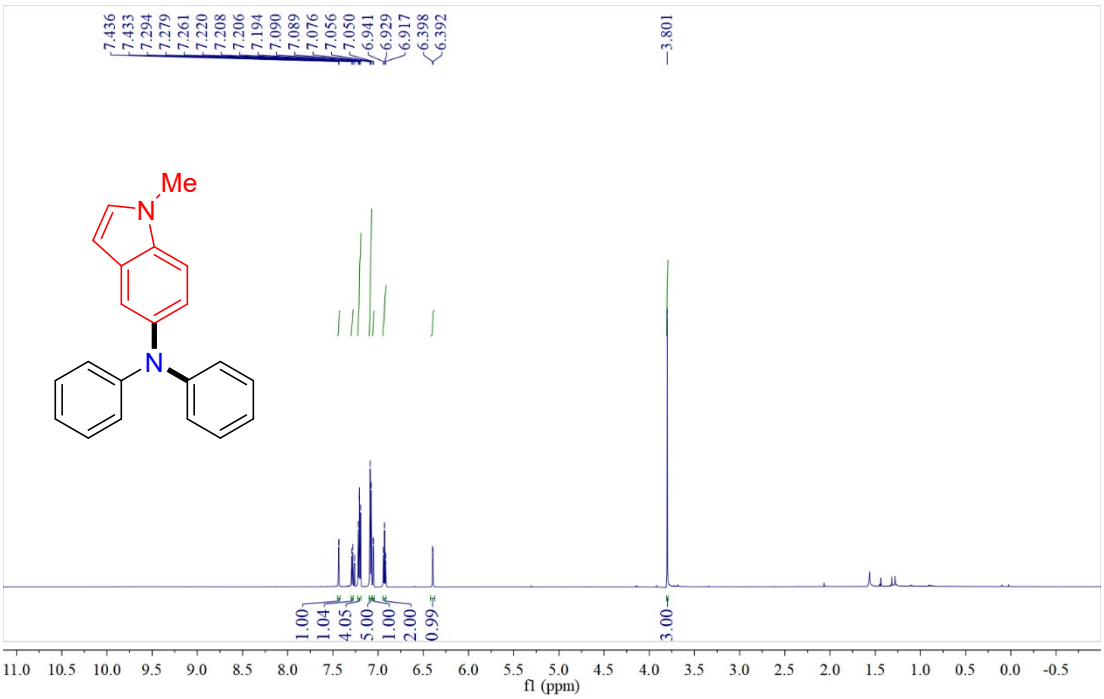
^{1}H NMR Spectrum of **5h**



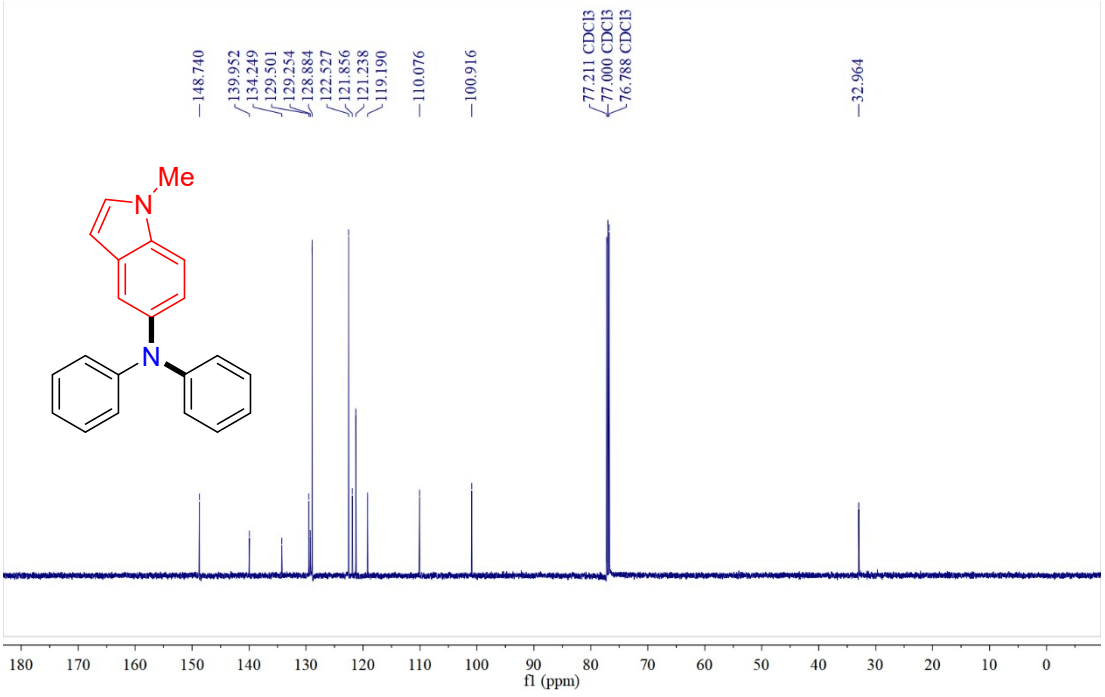
^{13}C NMR Spectrum of **5h**



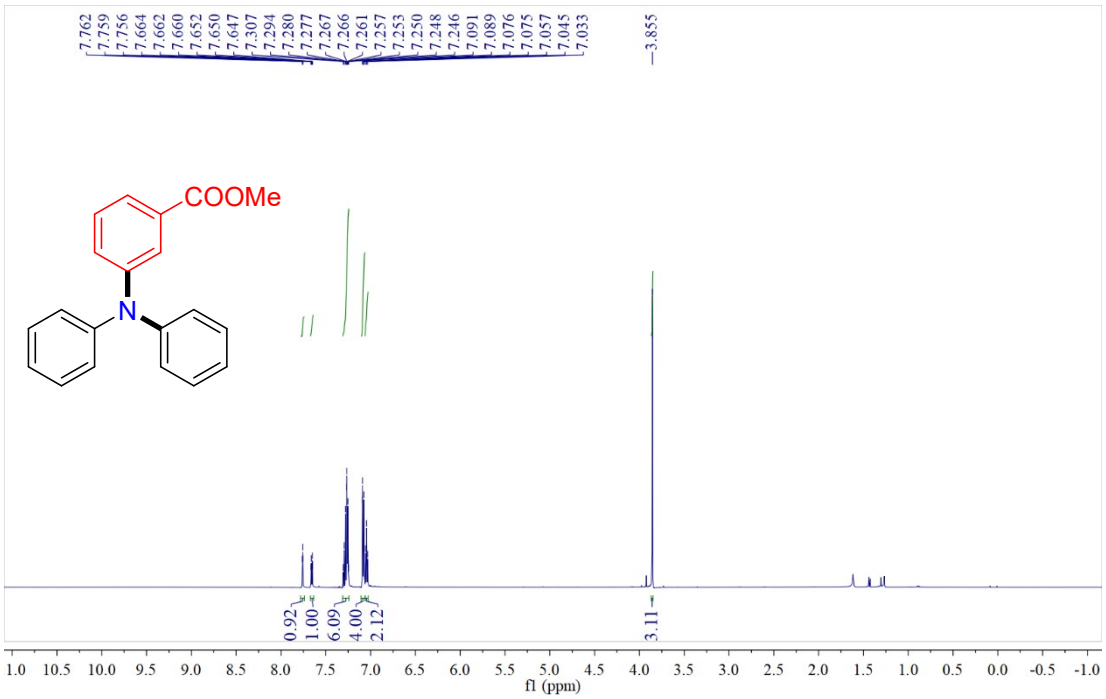
^{1}H NMR Spectrum of **5i**



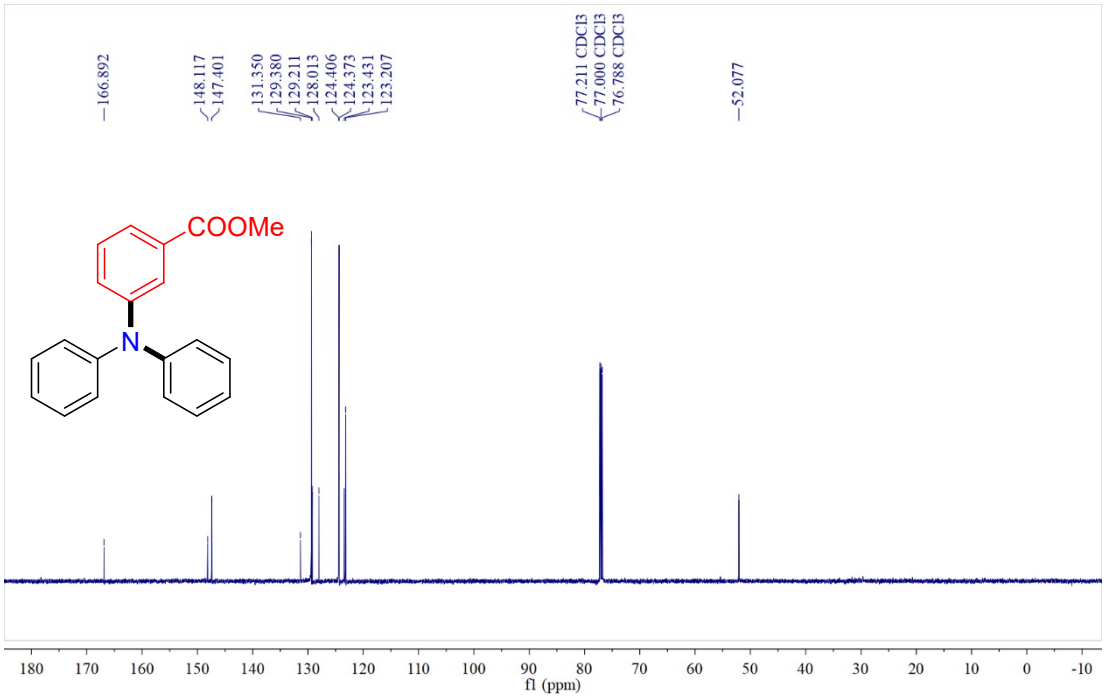
^{13}C NMR Spectrum of **5i**



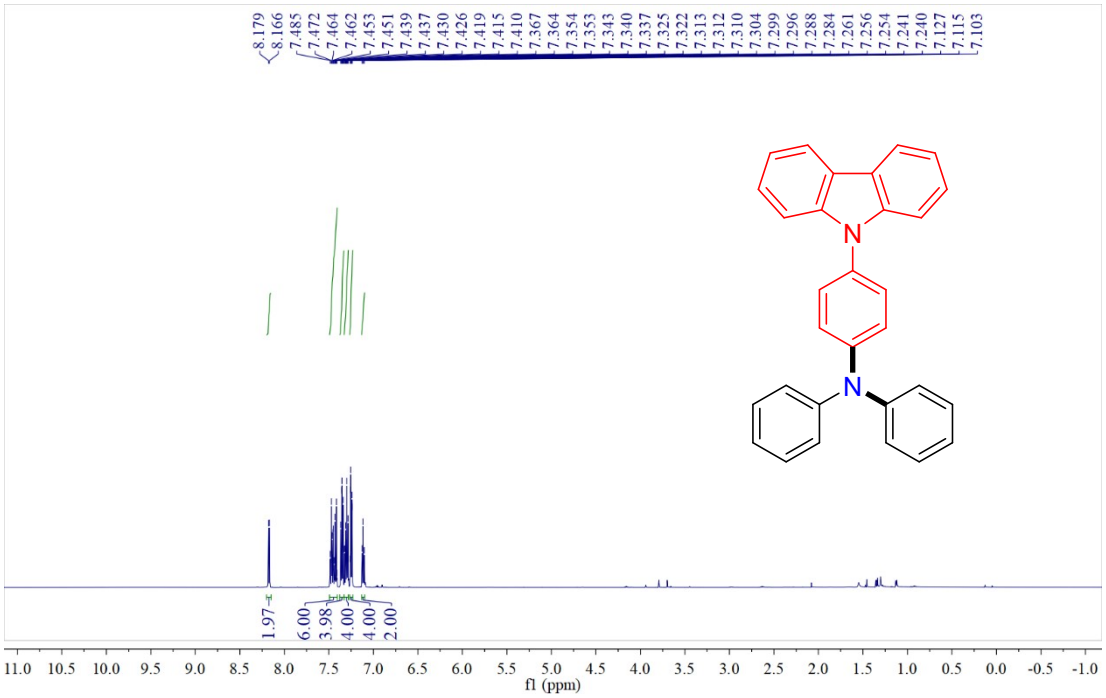
^{1}H NMR Spectrum of **5j**



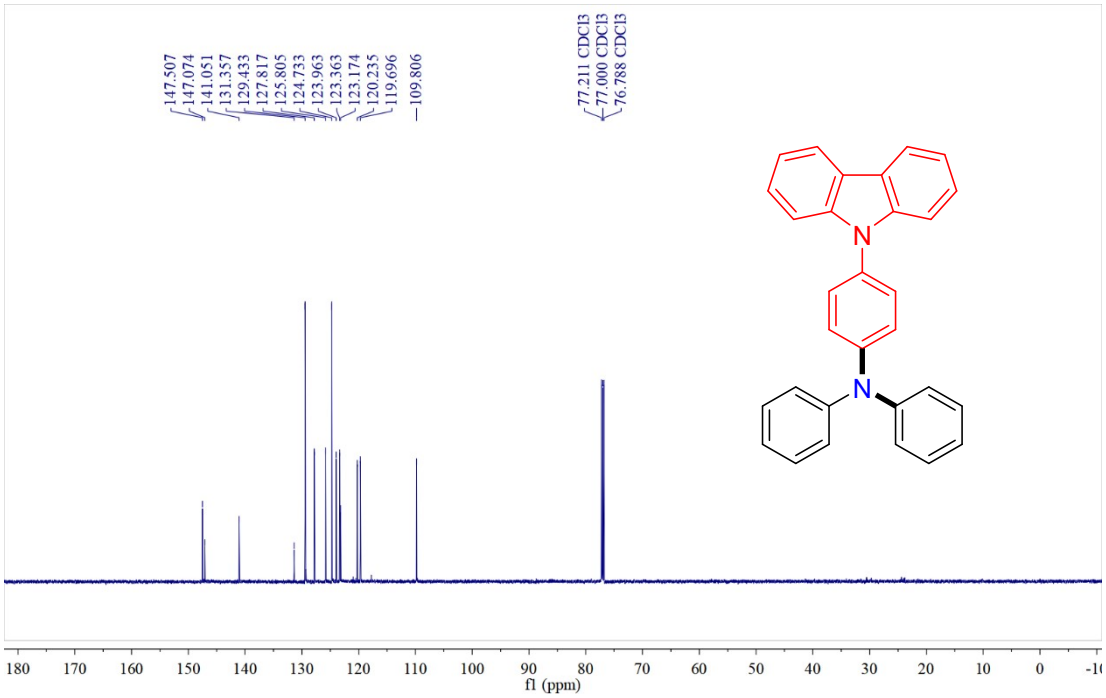
^{13}C NMR Spectrum of **5j**



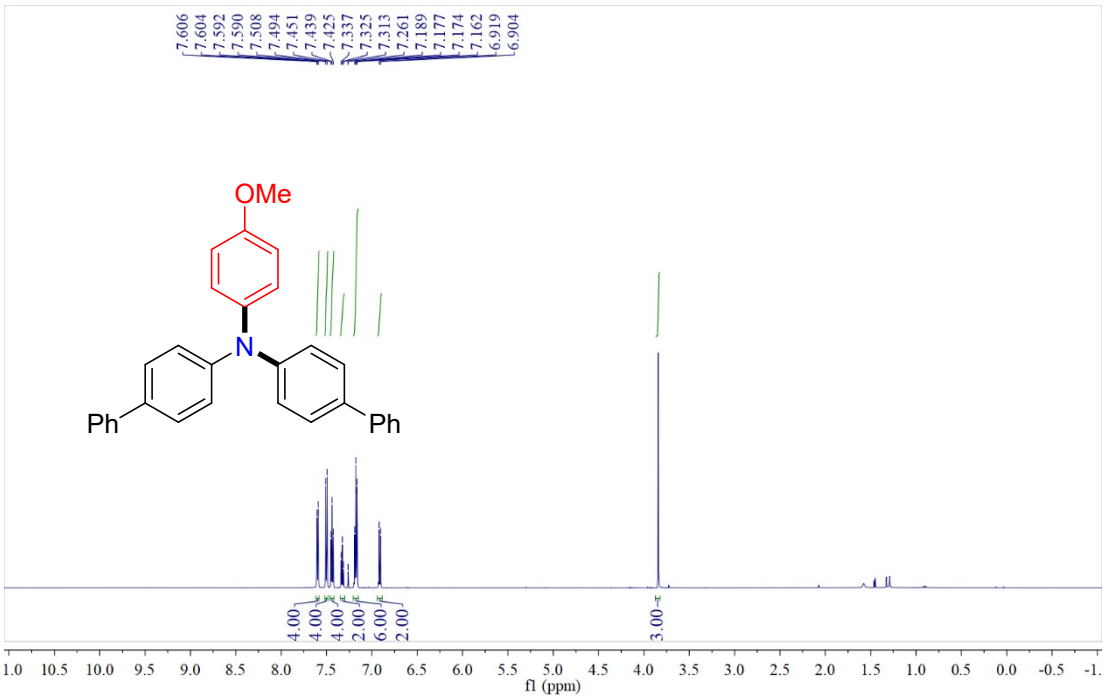
^{1}H NMR Spectrum of **5k**



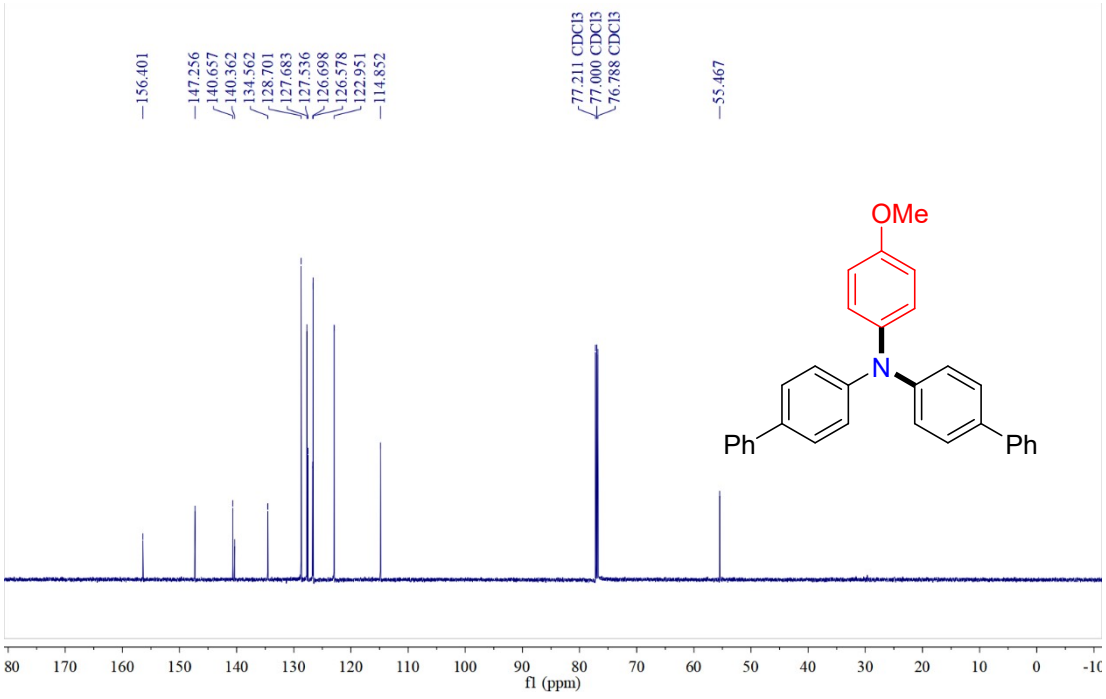
^{13}C NMR Spectrum of **5k**



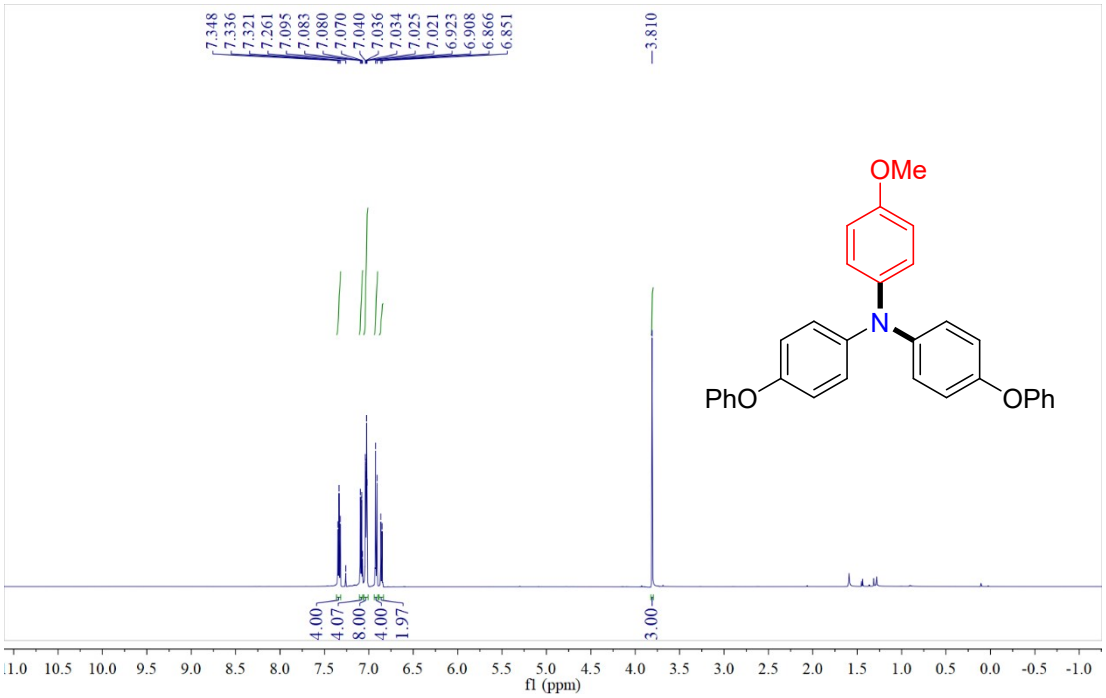
^{1}H NMR Spectrum of **5l**



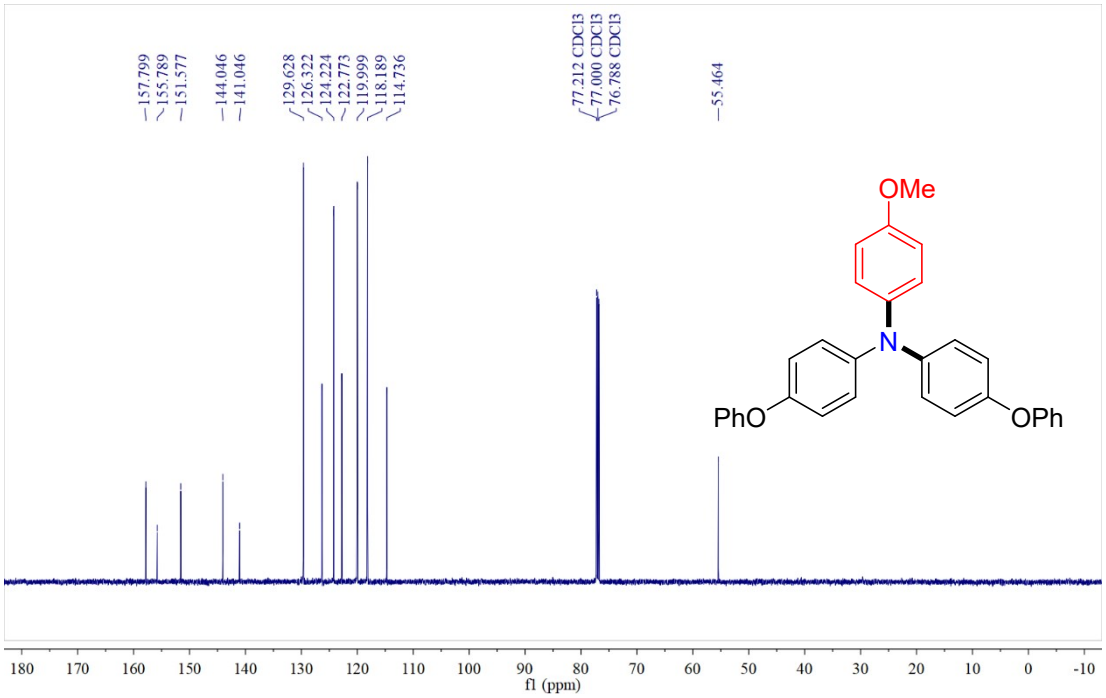
^{13}C NMR Spectrum of **5l**



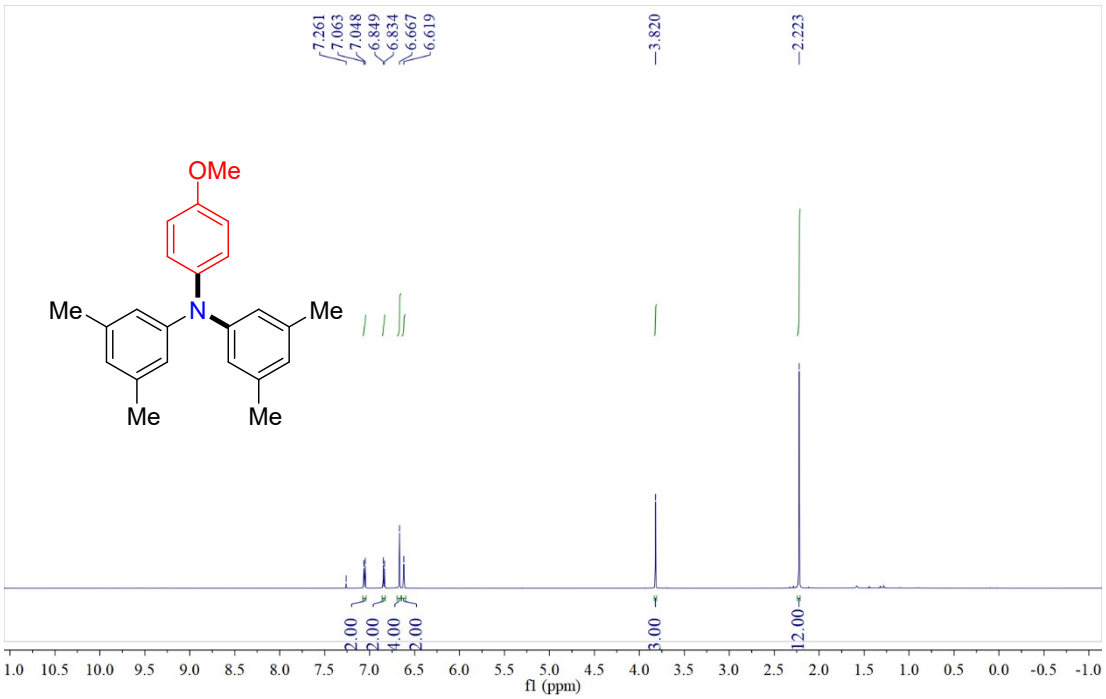
^{1}H NMR Spectrum of **5m**



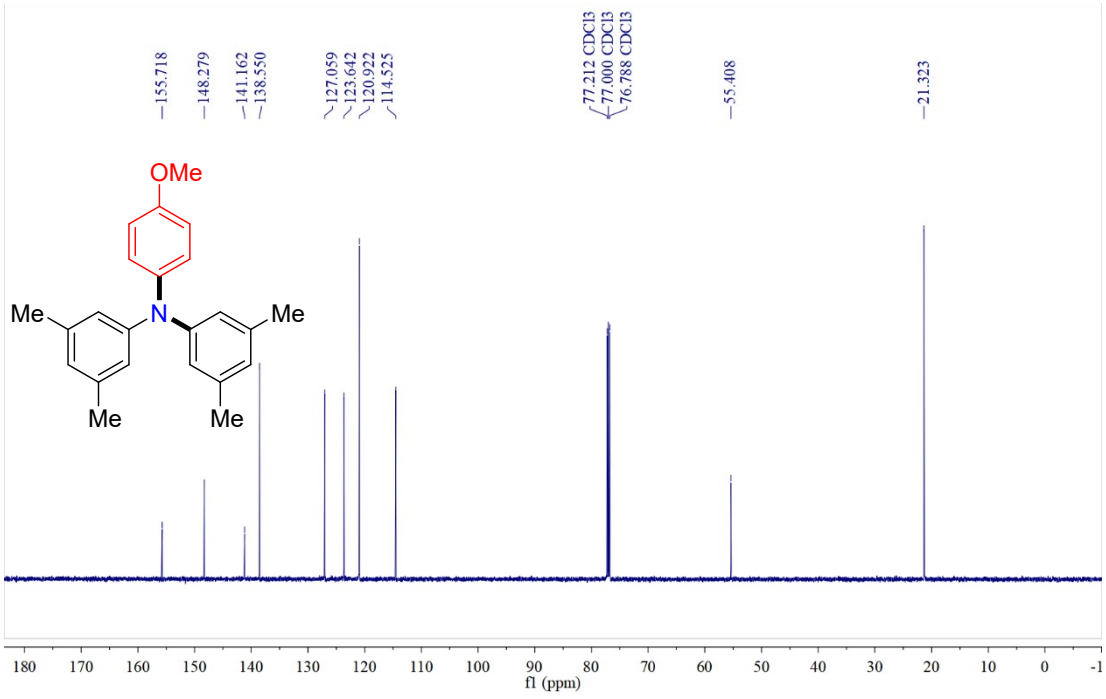
^{13}C NMR Spectrum of **5m**



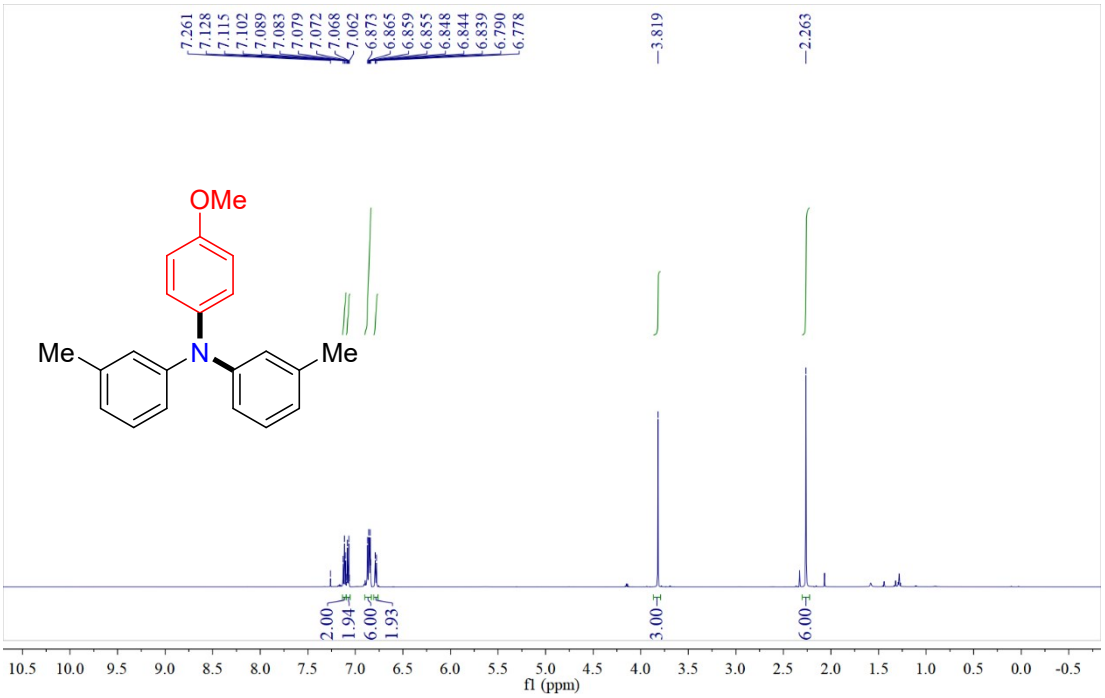
^{1}H NMR Spectrum of **5n**



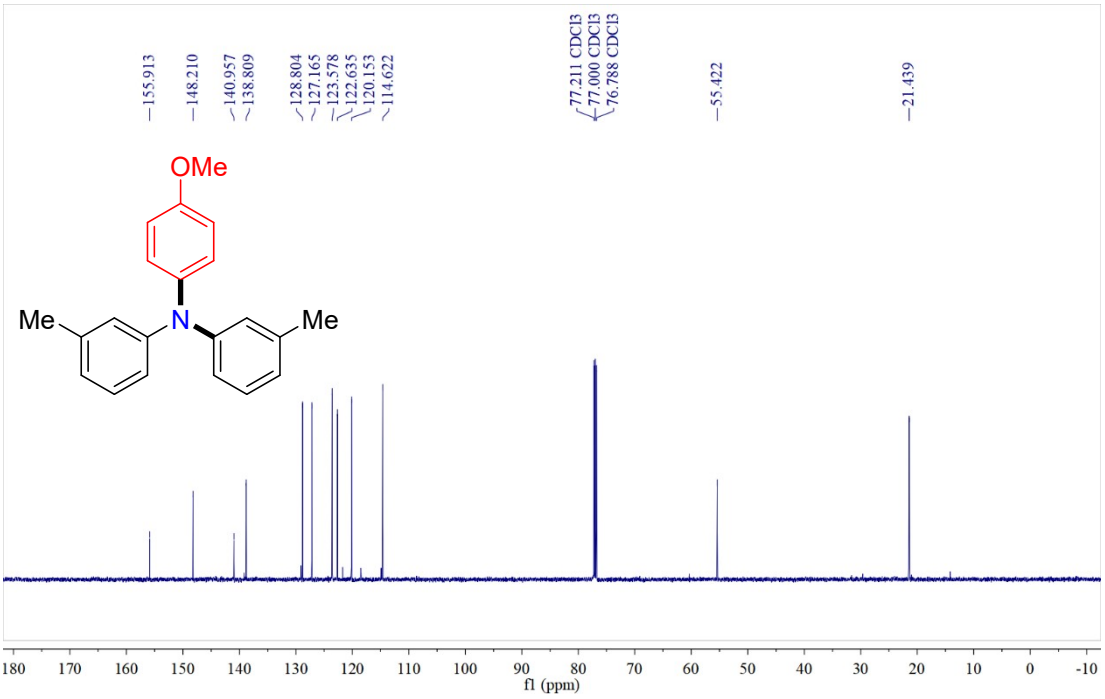
^{13}C NMR Spectrum of **5n**



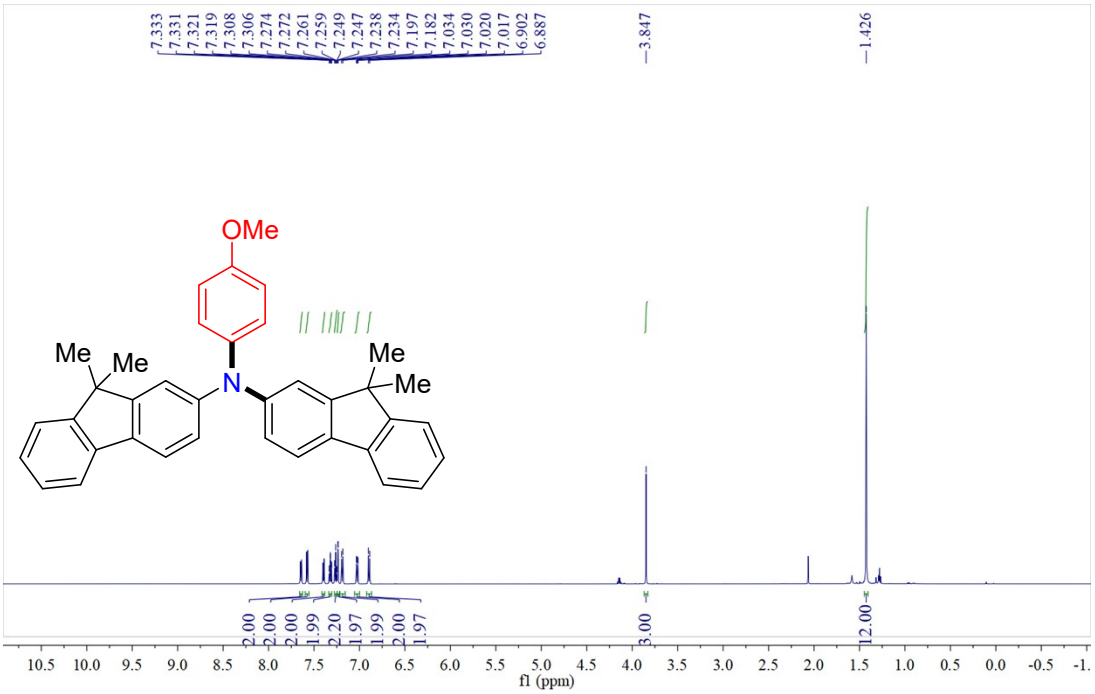
^{1}H NMR Spectrum of **5o**



^{13}C NMR Spectrum of **5o**



[1]H NMR Spectrum of **5p**



[13]C NMR Spectrum of **5p**