Supporting Information

Rh(III)-Catalyzed Olefination to Build Diverse Oxazole Derivatives from Functional Alkynes

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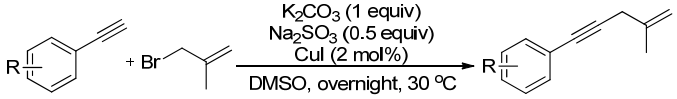
1. General Information

All reactions were carried out in high-pressure reaction tube. Column chromatography was performed with silica gel (200–300 mesh). High-resolution mass spectra (HRMS) were obtained with a Waters-Q-TOF-Premier (ESI). ^{1}H NMR and ^{13}C NMR spectra were recorded on a Bruker 400 MHz and 100MHz instrument. Spectra were reported relative to Me_4Si (δ 0.0 ppm), $CDCl_3$ (δ 7.26 ppm). ^{13}C NMR were reported relative to $CDCl_3$ (δ 77.16 ppm). Splitting patterns are designated as follows: s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet. Compounds were characterized by ^{1}H NMR, ^{13}C NMR, ^{19}F NMR and HRMS.

2. Material

Unless otherwise noted, all reagents were obtained from commercial suppliers and used without further purification. Solvents were dried over sodium (for THF and ether) and CaH_2 (for toluene, DCM and DCE) by refluxing for overnight and freshly distilled prior to use. Methanol was dried and distilled from magnesium powder under nitrogen atmosphere. 2-aryloxazoles was prepared following literature procedures[1]. Alkynes were purified by column chromatography (petroleum ether) before each used.

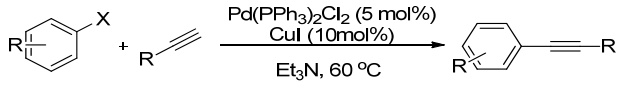
General Procedure A for the Synthesis of Alkynes [2]



2

To a solution of the allylic halide (1.5 equiv), Na_2SO_3 (0.5 equiv), CuI (2 mol%), K_2CO_3 (1 equiv) and 1 drop of DBU in DMSO, alkyne derivatives (1 equiv) were added and stirred at 30 °C overnight. After acidic work up, the mixture was quenched with water and extracted with dichloromethane (3 × 20 mL), the combined organic layer was washed with saturated aqueous $NaHCO_3$ and brine, then the combined organic layers were dried ($MgSO_4$), filtered, and concentrated in vacuo. Purification of the residue by column chromatography (petroleum ether) afforded the product **2**.

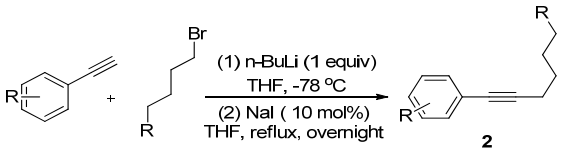
General Procedure B for the Synthesis of Alkynes [3]



2

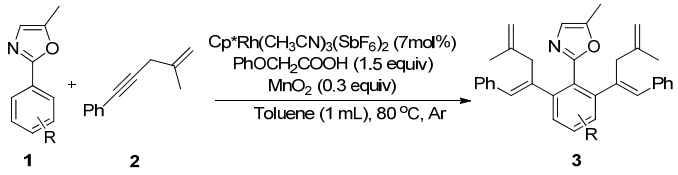
A mixture of the $Pd(PPh_3)_2Cl_2$ (5 mol%), CuI (5 mol%), aryl halide or bromide (1.0 equiv), Degassed Et_3N and alkyne derivatives (1.1 equiv) were added and stirred at 60 °C overnight under Ar atmosphere. The mixture was quenched with aqueous saturated NH_4Cl and extracted with EtOAc (3 × 20 mL), the combined organic layer was washed with brine and then the combined organic layers were dried (MgSO4), filtered, and concentrated in vacuo. Purification of the residue by column chromatography (petroleum ether) afforded the product **2**.

General Procedure B for the Synthesis of Alkynes [4]



A mixture of alkyne (1.0 equiv) in THF (0.25 M) was cooled to -78 °C and a solution of *n*-BuLi (1.0 equiv, 1.6 M in hexanes) was added. The reaction mixture was allowed to warm to room temperature. Then NaI (0.1 equiv.) and the corresponding bromoethylbenzene (1.2 equiv) were added. The mixture was heated to reflux. The reaction mixture was cooled to room temperature and quenched by addition of ammonium chloride solution. After completion of the reaction, extracted with EtOAc (3 × 20 mL), the combined organic layer was washed with brine and then the combined organic layers were dried (MgSO4), filtered, and concentrated in vacuo. Purification of the residue by column chromatography (petroleum ether) afforded the product **2**.

3. General Procedure for the Synthesis of Oxazole Derivatives



A mixture of 2-aryloxazolines **1** (0.1 mmol), acetylene derivatives **2** (2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (7 mol%), $PhOCH_2COOH$ (1.5 equiv), and MnO_2 (0.3 equiv) were added to an oven dried high pressure tube under Ar atmosphere. Toluene (1 mL) was then added by syringe. The reaction mixture was stirred at 80 °C until raw materials disappear (monitored by TLC). After removal of the volatiles under vacuum, the crude product was purified by column chromatography on silica gel afforded the pure product **3**.

4. Optimization of the Reaction Conditions

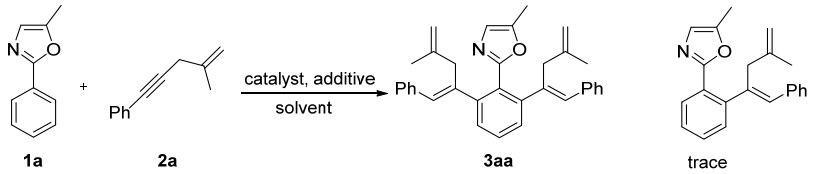


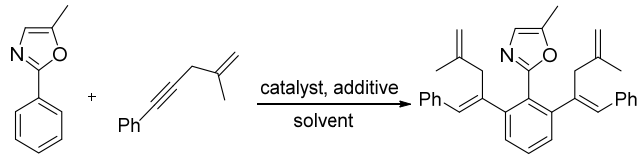
Table S1. The effect of catalysts on the reaction[a]

Entry	Catalyst	Acid	Yield
1	$[Cp^*IrCl_2]_2$	$PhOCH_2COOH$	ND
2	$[RuCl_2(p\text{-cymene})]_2$	$PhOCH_2COOH$	ND
3	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	$PhOCH_2COOH$	56%
4	$[Cp^*RhCl_2]_2$	$PhOCH_2COOH$	ND
5[b]	$[Cp^*RhCl_2]_2$	$PhOCH_2COOH$	27%
6	$Cp^*Rh(OAc)_2 \cdot H_2O$	$PhOCH_2COOH$	28%
7	$Cp^*Co(CO)I_2$	$PhOCH_2COOH$	ND

[a]Reaction conditions: **1a** (0.05 mmol), **2a** (2.5 equiv), catalyst (8 mol%), $PhOCH_2COOH$ (1.5 equiv), toluene

(0.5 mL), 100 °C, 24 h under Ar. [b]$AgSbF_6$ (20 mol%) was added.

Table S2. The effect of solvents on the reaction[a]

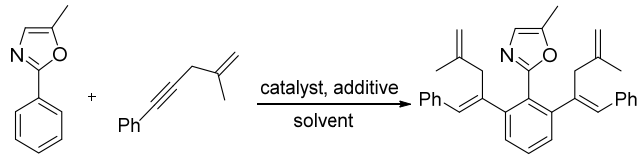


1a **2a** **3aa**

Entry	Catalyst	Solvent	Yield
1	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	DCE	42%
2	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	DCM	50%
3	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	Toluene	56%
4	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	CH_3OH	22%
5	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	CH_3CN	10%
6	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	THF	36%
7	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	1,4-Dioxane	19%
8	$Cp^*Rh(CH_3CN)_3(SbF_6)_2$	Chlorobenzene	54%

[a]Reaction conditions: **1a** (0.05 mmol), **2a** (2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (8 mol%), $PhOCH_2COOH$ (1.5 equiv), solvent (0.5 mL), 100 °C, 24 h under Ar.

Table S3. The effect of acids, additives and temperature on the reaction[a]

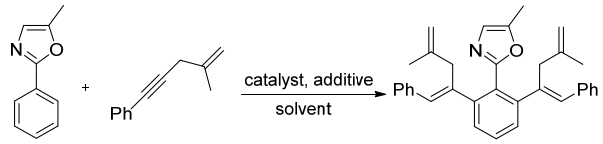


1a **2a** **3aa**

Entry	Acid	Additive	Temp.	Yield
1	$PhOCH_2COOH$	-	100	56%
2	HOAc	-	100	18%
3	PhCOOH	-	100	17%
4	$PhCH_2COOH$	-	100	45%
5	$ClCH_2COOH$	-	100	36%
6	Na_2CO_3	-	100	ND
7	$PhOCH_2COOH$	-	80	61%
8	$PhOCH_2COOH$	-	120	29%
9	$PhOCH_2COOH$	AgO	80	65%
10	$PhOCH_2COOH$	Ag_2O	80	71%
11	$PhOCH_2COOH$	AgOAc	80	66%
12	$PhOCH_2COOH$	$Cu(OAc)_2$	80	39%
13	$PhOCH_2COOH$	CuO	80	65%
14	$PhOCH_2COOH$	Cu_2O	80	52%
15	$PhOCH_2COOH$	MnO_2	80	72%

[a]Reaction conditions: conditions:**1a** (0.05 mmol), **1a** (2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (8 mol%), $PhOCH_2COOH$ (1.5 equiv), additive (0.3 equiv), toluene (0.5 mL), 100 °C, 24 h under Ar.

Table S4. The effect of equivalant on the reaction[a]

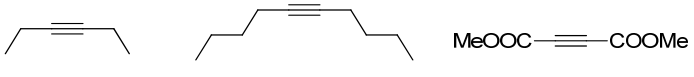


1a 2a 3aa

Entry	Catalyst	Acid	Additive	Yield
1	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1	MnO_2/0.3	69%
2	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1.5	MnO_2/0.3	77%
3	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/3	MnO_2/0.3	75%
4	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1.5	MnO_2/0.5	71%
5	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1.5	MnO_2/1	72%
6[b]	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1.5	MnO_2/0.3	75%
7[c]	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1.5	MnO_2/0.3	75%
8	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/9	$PhOCH_2COOH$/1.5	MnO_2/0.3	76%
9	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/7	$PhOCH_2COOH$/1.5	MnO_2/0.3	80%
10	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/6	$PhOCH_2COOH$/1.5	MnO_2/0.3	75%
11[d]	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1.5	MnO_2/0.3	72%
12[e]	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	$PhOCH_2COOH$/1.5	MnO_2/0.3	51%
13	Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$/8	-	-	NR

[a]Reaction conditions: conditions:**1a** (0.05 mmol), **2a** (2.5 equiv), toluene (0.5 mL), 80 °C, 34 h under Ar. [b]**2a** (3 equiv). [c] under Air. [d] 60 °C, [e] 100 °C.

Table S5. The scope of alkynes[a]

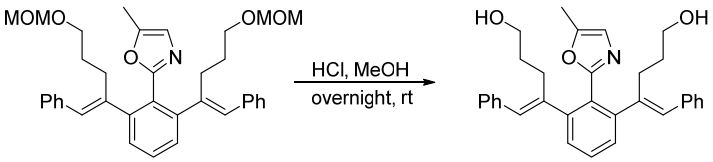


ND ND ND

[a]Reaction conditions: **1a** (0.1 mmol), **2** (2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (7 mol%), MnO_2 (0.3 equiv), $PhOCH_2COOH$ (1.5 equiv), toluene, 80 °C, under Ar, isolated yield.

5. Synthetic Applications

Synthesis of 4

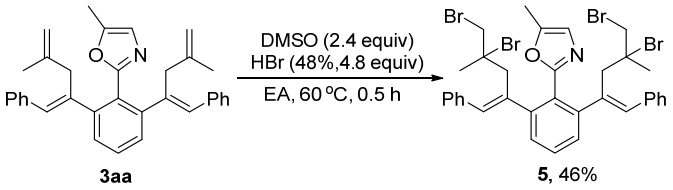


3as **4**, 79%

To a stirred solution of **3as** (0.026 mmol, 15.0 mg, 1.0 equiv) in MeOH (1.0 mL), con HCl (0.1 mL) was added, and the mixture was stirred at room temperature. After completion of the reaction (monitored by TLC), the mixture was quenched with water and extracted with ethyl acetate (3 × 20 mL), the combined organic layer was washed with brine and then the combined organic layers were dried ($MgSO_4$), filtered, and concentrated in vacuo. Purification of the residue by column

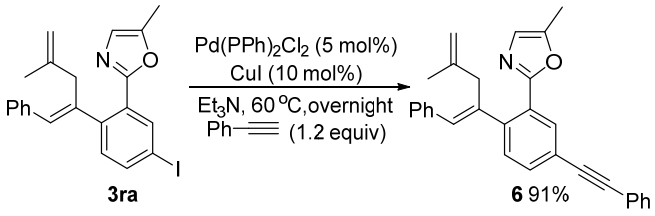
chromatography (petroleum ether/ethyl acetate = 1/1, v/v) afforded the product **4** as a colorless oil (9.8 mg, 79% yield).

Synthesis of 5



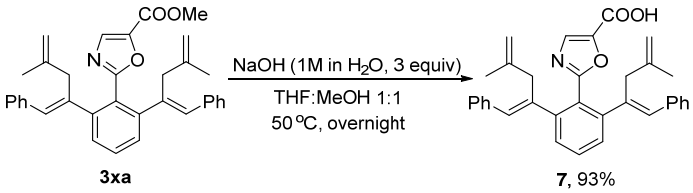
To a stirred solution of **3aa** (0.05 mmol, 23.6 mg, 1.0 equiv) in EA (1.0 mL), DMSO (8.6 μL, 1.2 mmol) and aqueous hydrobromic acid (48%, 40.4 mg, 2.4 mmol) was added at 60 ºC for 0.5 h, after completion of the reaction (monitored by TLC), the mixture was concentrated in vacuo. Purification of the residue by column chromatography (petroleum ether/ethyl acetate = 10/1, v/v) afforded the product **5** as a brownish red solid (18.1 mg, 46% yield) [5].

Synthesis of 6



A mixture of **3ra** (0.057 mmol, 25.4 mg, 1.0 equiv), phenylacetylene (7.0 mg, 1.2 equiv), $Pd(PPh_3)_2Cl_2$ (2.0 mg, 5 mol%), CuI (1.1 mg, 10 mol%), and Et_3N (0.5 mL) were added to an oven dried high pressure tube under Ar atmosphere. The reaction mixture was stirred at 60 ºC until raw materials disappear (monitored by TLC). The mixture was quenched with saturated ammonium chloride and extracted with ethyl acetate (3 × 20 mL), the combined organic layer was washed with brine and then the combined organic layers were dried (MgSO4), filtered, and concentrated in vacuo. Purification of the residue by column chromatography (petroleum ether/ethyl acetate = 10/1, v/v) afforded the product 6 as a colorless oil (21.5 mg, 91% yield)[3].

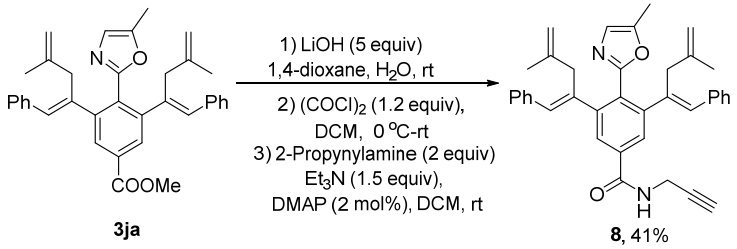
Synthesis of 7



A mixture of **3xa** (0.056 mmol, 29.0 mg, 1.0 equiv), NaOH (1M in H_2O, 0.17 mL, 3 equiv), THF (0.3 mL), MeOH (0.3 mL) were added to an oven dried high-pressure tube under Ar atmosphere. The reaction mixture was stirred at 50 ºC overnight. The mixture was cooled to room temperature, and con HCl (12 M, 14 μL, 3 equiv) was added and the mixture was concentrated in

vacuo. The mixture was quenched with water and extracted with ethyl acetate (3 × 20 mL), the combined organic layer was washed with brine and then the combined organic layers were dried (MgSO4), filtered, and concentrated in vacuo to give the product **7** as a white solid (26.1 mg, 93% yield).

Synthesis of 8



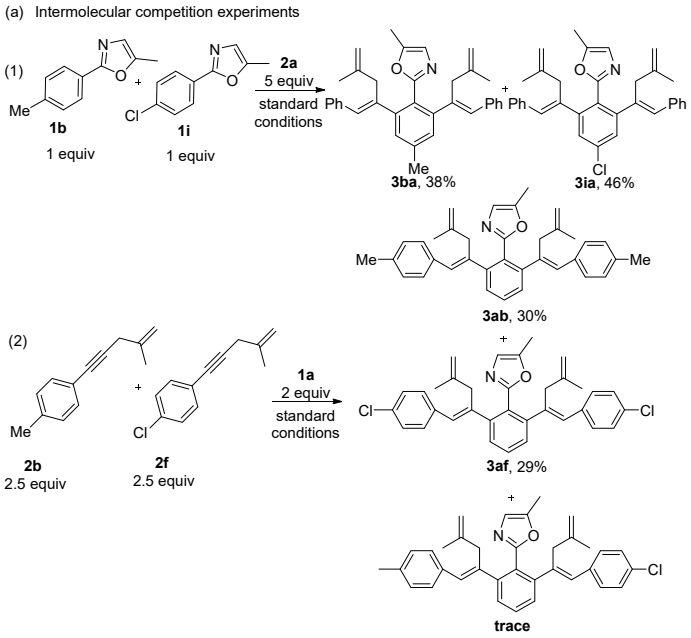
A mixture of **3ja** (0.15 mmol, 79.0 mg, 1.0 equiv), LiOH (18.0 mg, 5 equiv), 1,4-dioxane (0.5 mL), H_2O (0.5 mL) were added to an oven dried high pressure tube under Ar atmosphere. The reaction mixture was stirred at room temperature overnight. The mixture was cooled to 0 °C, and con HCl (12 M, 63 μL, 5 equiv) was added. The mixture was quenched with water and extracted with ethyl acetate (3 × 20 mL), the combined organic layer was washed with brine and then the combined organic layers were dried (MgSO4), filtered, and concentrated in vacuo to give the crude product acid as a white solid (67.2 mg, 87% yield).

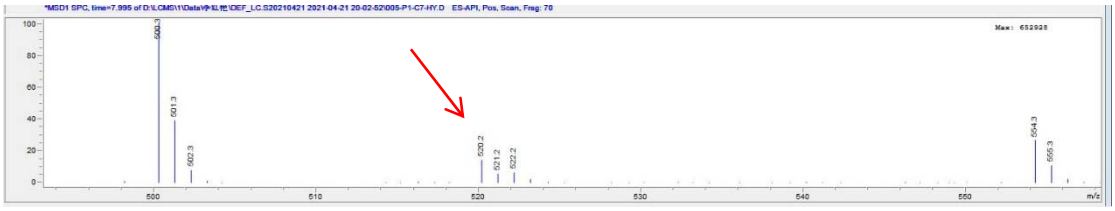
A 25 mL oven-dried tube flask with a stir bar was purged with argon and charged with the crude product acid (0.13 mmol, 67.2 mg) in anhydrous CH_2Cl_2 (1.0 mL), which was added DMF (1 drop) at 0 °C and $(COCl)_2$ (13.2 μL, 1.2 equiv) was subsequently added dropwise by syringe. After 15 min, the reaction mixture was allowed to warm to room temperature overnight. After removal of the volatiles under vacuum, the crude product acid chloride was used directly without any further purification. To a solution of the propargylic amine (16.7 μL, 2 equiv) in anhydrous CH_2Cl_2 (2.0 mL) at 0 °C, Et_3N (27.1 μL, 1.5 equiv) and DMAP (0.3 mg, 2 mol%) were added, and the acid chloride (1.0 equiv) was added dropwise at 0 °C. After 15 min, the mixture was stirred at room temperature overnight. After the reaction was completed, the mixture was quenched with water and extracted with CH_2Cl_2 (3 × 20 mL), the combined organic layer was washed with brine and then the combined organic layers were dried ($MgSO_4$), filtered, and concentrated in vacuo. Purification of the residue by column chromatography (petroleum ether/ethyl acetate = 3/1, v/v) afforded the product **8** as a colorless oil (35.0 mg, 41% yield).

6. Mechanism Study

(1) Intermolecular competition experiments

The intermolecular competition reaction between Me- and Cl- substituent on the para-position of aryl ring with **2a** under standard conditions reveled that the electron-poor substituent exhibited a little bit better reaction activity in this competition reaction (eq 1). Furthermore, **3ab** and **3ae** showed no obvious reactivity difference in this reaction system, and the little mixed product with alkenes that would come from the two alkynes has been obtained, which was determined by LC-MS, exact mass: 520.2407, found: 520.2. (eq 2).

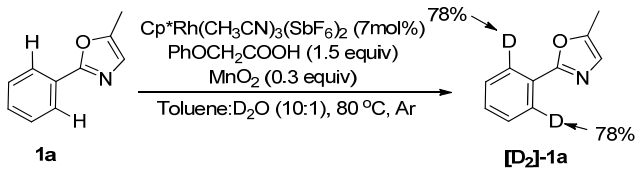


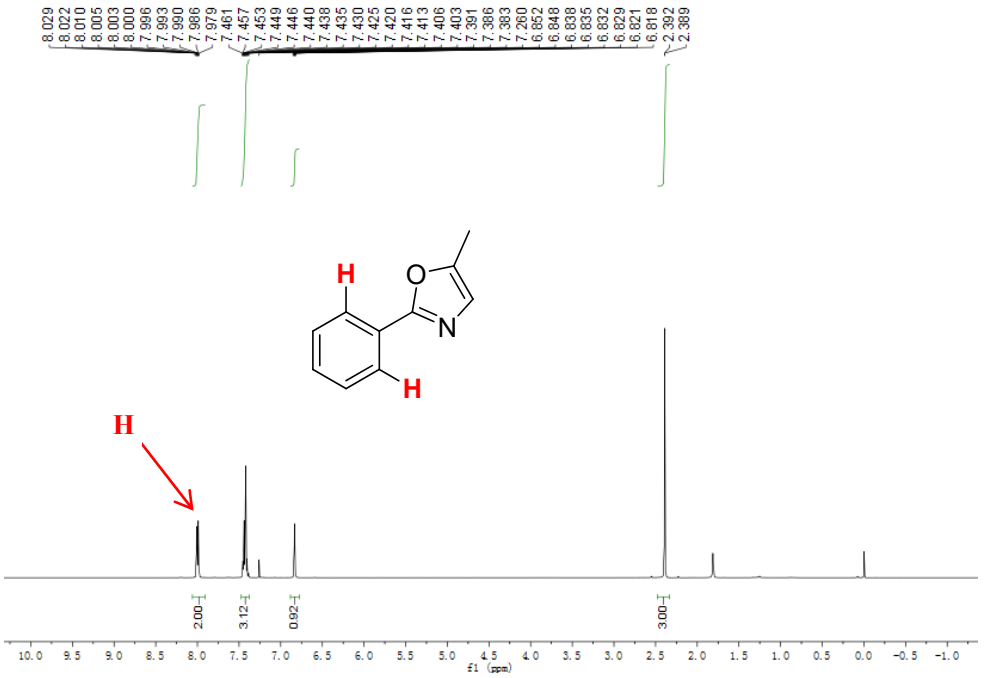


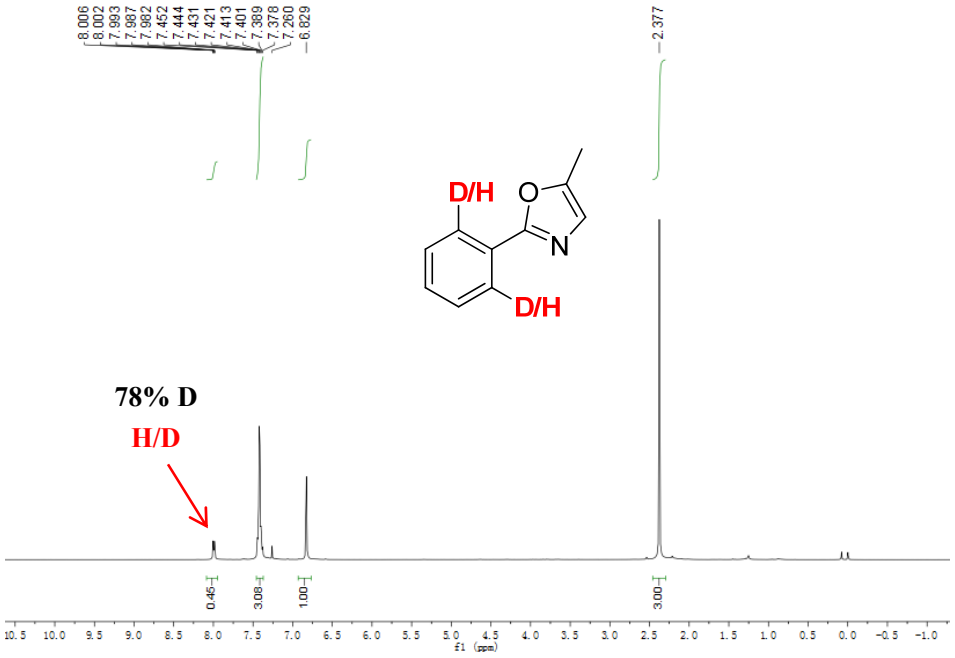
the little mixed product was determined by LC-MS

(1) H/D exchange experiments

Deuterium-labeling experiments were performed to study the mechanism of this reaction. **1a** (15.9 mg, 0.1 mmol), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) were stirred in toluene (1.0 mL) and D_2O (0.1 mL) under Ar atmosphere at 80 °C for 12 h. After completion, the reaction mixture was purified by column chromatography (petroleum ether/ethyl acetate =10/1, v/v) to afford the product **1a**+**[D$_2$]-1a**. The deuterium rate (78%) was obtained from ^{1}H NMR. Deuterium was observed at both *ortho*-positions of phenyl ring, which indicated the possibility of the reaction pathway via *ortho* C–H activation.





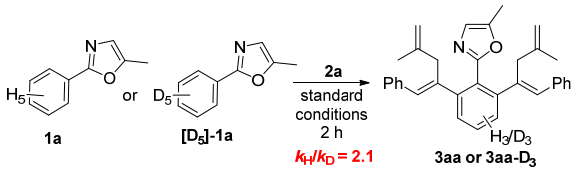


(2) Kinetic isotope experiments

Intermolecular kinetic isotope effect:

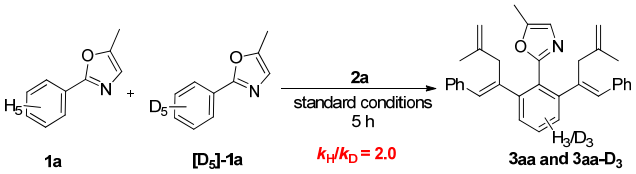
The kinetic isotope effect (KIE) study was conducted. Two oven-dried 25 mL tube were separately charged with **1a** (8.0 mg, 0.05 mmol), or **[D5]-1a** (8.2 mg, 0.05 mmol), and (4-methylpent-4-en-1-yn-1-yl)benzene **2a** (19.5 mg, 2.5 equiv) were stirred at 80 ºC for 2 h under standard conditions. After completion, the reaction mixture was purified by flash chromatography eluting with ethyl acetate and petroleum ether (1:15) to give **3aa** and **[D]-3aa** in 21% and 10% respectively. The KIE value was determined using isolated yields to give kinetic isotopic effect (KIE) k_H/k_D =2.1, thus indicating that the first C-H bond cleavage might be involved in the

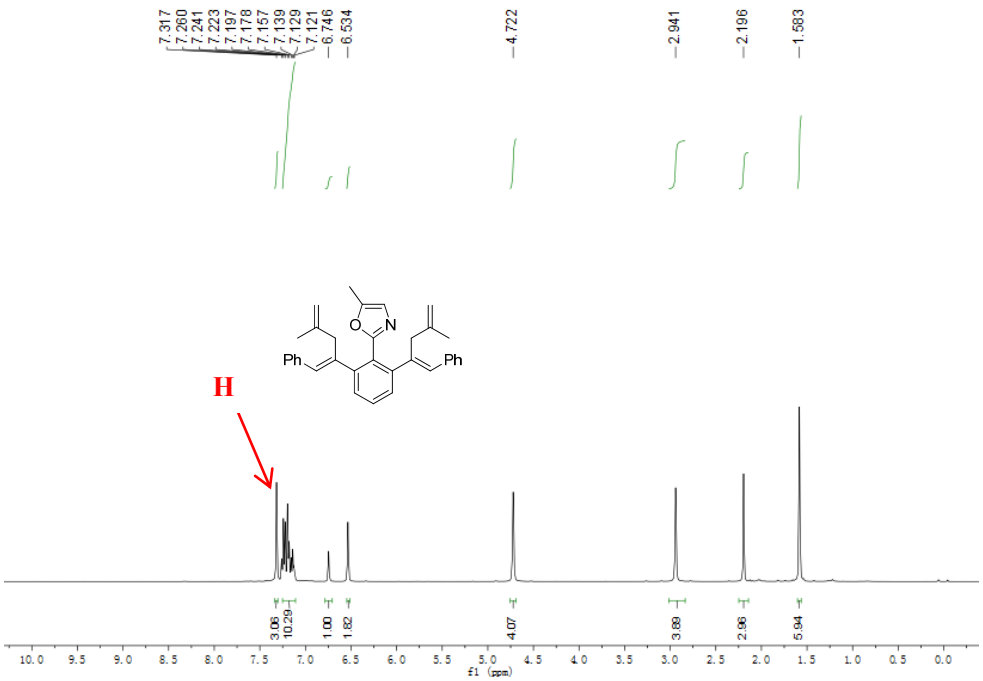
product determining step.

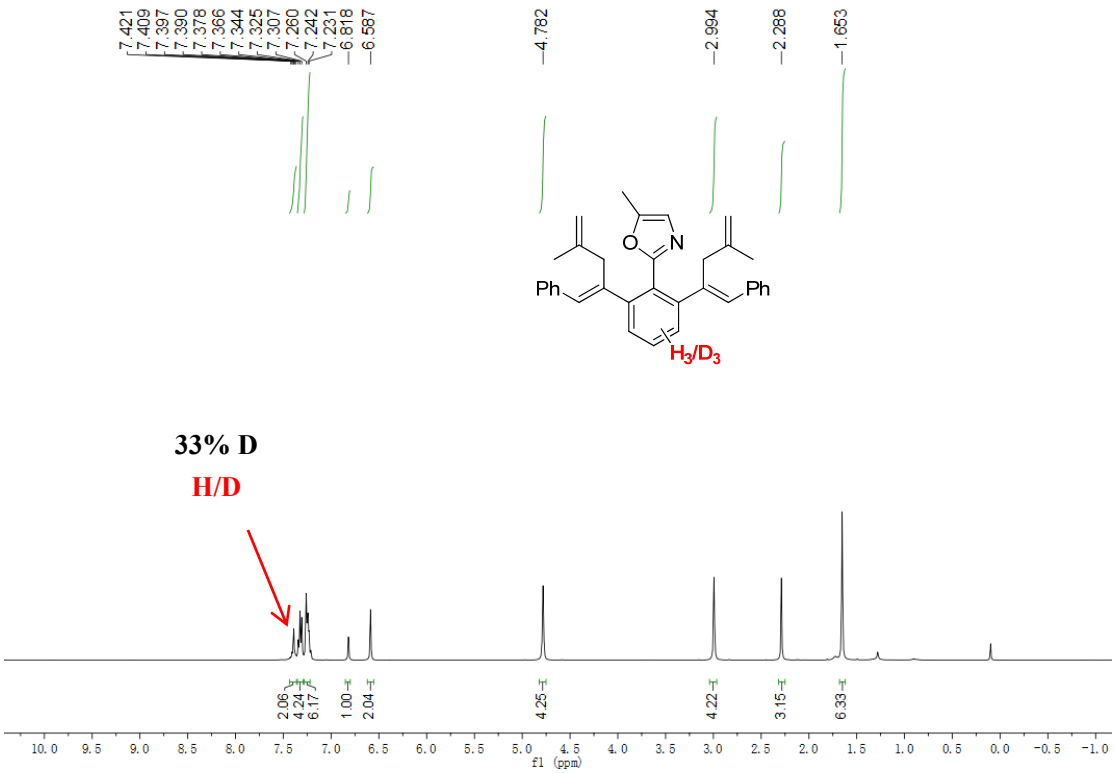


Intramolecular kinetic isotope effect:

In addition, the kinetic isotope effect (KIE) study was conducted. An oven-dried 25 ml tube **1a** (8.0 mg, 0.05 mmol), **[D$_5$]-1a** (8.2 mg, 0.05 mmol), and (4-methylpent-4-en-1-yn-1-yl)benzene **2a** (39.0 mg, 2.5 equiv) were stirred at 80 ºC for 5 h under standard conditions. After completion, the reaction mixture was purified by flash chromatography eluting with ethyl acetate and petroleum ether (1:15) to give **3aa** + **[D]-3aa**. The ratio of two products was determined by ^{1}H NMR integration method to give kinetic isotopic effect (KIE) k_H/k_D =2.0, thus indicating that the first C-H bond cleavage might be involved in the product determining step.







7. References

(1) He, Y.; Liao, X. Z.; Dong, l.; Chen, F. E. *Org. Biomol. Chem*. **2021**, 19, 561–567.

(2) Lin, H.; Dong, L. *Org. Lett.* **2016**, 18, 5524−5527.

(3) Huang, L., Rudolph, M., Rominger, F., Hashmi, A. S. K. *Angew.Chem. Int. Ed.* 2016, 55, 4808–4813.

(4) Xu, J.; Wang, Y. L.; Gong, T. J., Xiao, B., Fu, Y. *Chem. Commun.,* **2014**, 50, 12915−12918.

(5) Song, S.; Li, X. W.; Sun, X., Yuan, Y., Jiao, N. *Green Chem.,* **2015**, 17, 3285–3289.

8. X-ray Data of Compound 3ya and Sample Preparation

8.1 Sample preparation and crystal measurement

Single crystals suitable for X-ray diffraction experiment were obtained by slow evaporation of EA/petroleum ether (1:20, V/V) solution containing the corresponding compound **3ya**. The crystal was kept at 298.0 K during data collection. Using Olex2 [1], the structure was solved with the SHELXT [2] structure solution program using Intrinsic Phasing and refined with the SHELXL [3] refinement package using Least Squares minimisation.

8.2 X-ray data of compound 3ya

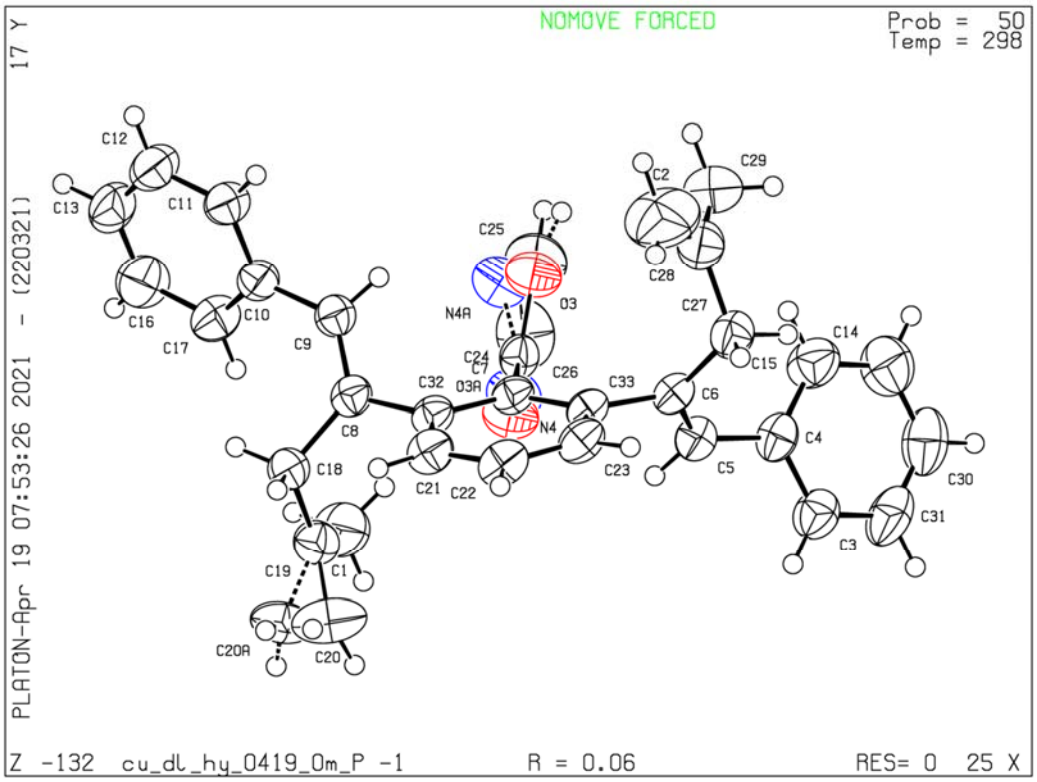


Figure S1: X-ray structure of 3ya.

Table 1 Crystal data and structure refinement for 3ya.

Identification code	**3ya**
Empirical formula	$C_{33}H_{31}NO$
Formula weight	457.59
Temperature/K	298.0
Crystal system	triclinic
Space group	P-1
a/Å	9.8028(4)
b/Å	11.5069(5)
c/Å	12.8022(6)
α/°	65.998(3)
β/°	84.345(3)
γ/°	84.332(3)
Volume/Å^3	1310.06(10)
Z	2
ρ_{calc}g/cm^3	1.160
μ/mm^{-1}	0.529
F(000)	488.0
Crystal size/mm^3	0.53 × 0.44 × 0.24
Radiation	CuKα (λ = 1.54178)

2Θ range for data collection/°	7.574 to 134.106
Index ranges	$-10 \le h \le 11$, $-13 \le k \le 13$, $-15 \le l \le 15$
Reflections collected	33779
Independent reflections	4597 [R_{int} = 0.0718, R_{sigma} = 0.0415]
Data/restraints/parameters	4597/0/337
Goodness-of-fit on F^2	1.112
Final R indexes [I>=2σ (I)]	R_1 = 0.0556, wR_2 = 0.1616
Final R indexes [all data]	R_1 = 0.0659, wR_2 = 0.1707
Largest diff. peak/hole / e $Å^{-3}$	0.25/-0.21

Table 2 Fractional Atomic Coordinates (×10^4) and Equivalent Isotropic Displacement Parameters (Å2×10^3) for 3ya. Ueq is defined as 1/3 of of the trace of the orthogonalised UIJ tensor.

Atom	*x*	*y*	*z*	U(eq)
C1	6496(2)	6880(3)	2929(2)	82.8(7)
C2	8926(3)	-609(3)	3692(3)	123.5(11)
C33	6759.9(14)	1843.4(14)	4041.8(12)	41.3(4)
C32	7991.4(14)	3482.8(14)	4237.2(12)	41.5(4)
O3	8330.8(18)	3319(5)	1640.8(17)	64.3(9)
N4	6675(5)	4693(4)	1716(4)	62.1(8)
C30	2237(2)	1473(2)	663(2)	80.2(7)
C31	1733(2)	1795(2)	1557(2)	75.3(6)
C3	2620.6(18)	1966.7(17)	2250.5(17)	60.2(5)
C4	4035.8(16)	1812.1(15)	2060.9(14)	49.4(4)
C5	4952.7(15)	2072.5(15)	2786.9(13)	47.4(4)
C6	6019.4(15)	1363.3(14)	3340.9(12)	43.6(4)
C7	7386.9(14)	3003.9(14)	3550.9(12)	40.3(4)
C8	8756.3(15)	4667.7(14)	3741.4(12)	42.2(4)
C9	9813.6(15)	4751.7(15)	2974.6(13)	46.1(4)
C10	10771.9(16)	5775.6(16)	2421.2(12)	46.5(4)
C11	12168.6(17)	5443.0(19)	2316.3(15)	56.2(4)
C12	13120(2)	6351(2)	1833.2(17)	68.3(5)
C13	12698(2)	7613(2)	1418.8(17)	69.7(6)
C14	3613(3)	1324(2)	467(2)	83.6(7)
C15	4517(2)	1496(2)	1152.9(17)	69.9(5)
C16	11335(2)	7964(2)	1479.5(18)	73.6(6)
C17	10364.8(19)	7061.3(17)	1968.4(16)	58.8(5)
C18	8356.0(16)	5637.4(16)	4253.5(13)	47.9(4)
C19	6926.2(18)	6263.1(16)	4042.0(15)	55.4(4)
C21	7912.6(16)	2781.1(16)	5419.7(13)	50.1(4)

Atom	*x*	*y*	*z*	U(eq)
C22	7325.5(17)	1626.8(17)	5899.7(13)	52.6(4)
C23	6772.6(16)	1146.0(16)	5219.0(13)	49.9(4)
C24	7437.5(16)	3709.8(15)	2294.2(12)	45.0(4)
C25	8092(3)	4173(3)	545.9(16)	84.2(7)
C26	7089(3)	4980(2)	593.9(17)	84.6(7)
C27	6467.3(17)	36.1(16)	3418.9(16)	54.7(4)
C28	7935(2)	-109.2(19)	2975(2)	71.2(6)
C29	8210(2)	331(3)	1738(2)	93.8(8)
O3A	6470(50)	4760(50)	1900(30)	64.3(9)
N4A	8450(60)	3870(80)	1540(40)	62.1(8)
C20	5981(8)	6043(17)	4981(6)	97(3)
C20A	6323(17)	6638(16)	4933(8)	73(3)

Table 3 Anisotropic Displacement Parameters ($Å^2×10^3$) for 3ya. The Anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+\ldots]$.

Atom	U_{11}	U_{22}	U_{33}	U_{23}	U_{13}	U_{12}
C1	65.2(13)	109.2(17)	83.8(14)	-47.6(13)	-21.9(11)	6.3(12)
C2	70.4(16)	149(3)	152(3)	-65(2)	-31.6(17)	33.9(18)
C33	32.6(7)	44.0(8)	42.1(8)	-12.3(6)	-2.8(6)	-1.4(6)
C32	34.0(7)	48.8(8)	40.1(8)	-16.1(6)	-5.0(6)	-0.5(6)
O3	73.7(10)	75(2)	43.0(8)	-24.9(10)	5.0(7)	-1.7(10)
N4	79(2)	56.5(11)	42.6(18)	-12.3(11)	-10.6(13)	6.2(12)
C30	81.2(15)	79.2(14)	82.6(15)	-26.0(12)	-35.4(12)	-14.3(11)
C31	48.1(11)	72.2(13)	99.0(16)	-22.3(12)	-22.6(10)	-9.1(9)
C3	49.5(10)	57.2(10)	70.4(11)	-20.9(9)	-10.4(8)	-2.3(8)
C4	46.5(9)	45.7(8)	50.0(9)	-10.8(7)	-10.0(7)	-6.5(7)
C5	44.7(9)	46.1(8)	49.0(9)	-15.7(7)	-5.3(7)	-4.7(7)
C6	36.9(8)	45.7(8)	44.0(8)	-13.3(6)	0.7(6)	-7.2(6)
C7	34.5(7)	46.2(8)	37.2(7)	-13.9(6)	-2.9(6)	-1.0(6)
C8	38.0(8)	50.5(9)	38.1(7)	-17.0(6)	-7.1(6)	-2.5(6)
C9	44.2(8)	54.2(9)	44.1(8)	-23.2(7)	-3.7(6)	-5.4(7)
C10	45.0(8)	60.1(10)	38.4(8)	-23.3(7)	0.6(6)	-8.9(7)
C11	47.3(9)	67.4(11)	57.9(10)	-29.7(8)	2.3(7)	-6.9(8)
C12	48.9(10)	94.6(15)	68.2(12)	-39.3(11)	7.3(8)	-17.6(10)
C13	66.4(12)	83.8(15)	62.9(11)	-31.9(10)	17.0(9)	-32.5(10)
C14	87.5(16)	105.9(18)	69.6(13)	-43.9(13)	-17.9(11)	-10.2(13)
C15	56.0(11)	96.3(15)	60.9(11)	-33.9(11)	-6.1(8)	-7.8(10)
C16	81.9(15)	60.1(11)	69.9(12)	-18.1(10)	11.4(10)	-15.2(10)
C17	51.5(10)	60.2(11)	58.2(10)	-17.5(8)	1.7(8)	-6.2(8)

Table 3 Anisotropic Displacement Parameters ($Å^2×10^3$) for 3ya. The Anisotropic displacement factor exponent takes the form: $-2\pi^2[h^2a^{*2}U_{11}+2hka^*b^*U_{12}+\ldots]$.

Atom	U_{11}	U_{22}	U_{33}	U_{23}	U_{13}	U_{12}
C18	46.1(9)	59.1(9)	44.2(8)	-26.0(7)	-3.3(6)	-5.6(7)
C19	52.8(10)	55.6(10)	61.3(10)	-27.6(8)	-5.2(8)	0.3(8)
C21	46.2(9)	63.4(10)	38.3(8)	-16.6(7)	-8.4(6)	-3.2(7)
C22	48.4(9)	61.3(10)	36.5(8)	-6.8(7)	-6.2(6)	-3.5(7)
C23	42.8(9)	52.5(9)	43.9(8)	-7.9(7)	-2.3(6)	-6.4(7)
C24	48.9(9)	47.4(9)	38.4(8)	-15.0(7)	-2.1(6)	-12.0(7)
C25	107.7(19)	103.2(18)	36.8(10)	-23.2(10)	6.7(10)	-18.0(15)
C26	124(2)	75.1(14)	39.7(10)	-1.6(9)	-21.1(11)	-16.6(14)
C27	49.1(9)	47.6(9)	64.4(10)	-18.4(8)	-6.6(8)	-4.7(7)
C28	52.2(11)	59.8(11)	109.6(17)	-42.6(11)	-10.3(11)	3.5(8)
C29	71.8(15)	108.6(19)	116(2)	-64.9(16)	20.7(13)	-9.5(13)
O3A	73.7(10)	75(2)	43.0(8)	-24.9(10)	5.0(7)	-1.7(10)
N4A	79(2)	56.5(11)	42.6(18)	-12.3(11)	-10.6(13)	6.2(12)
C20	69(3)	117(8)	90(3)	-34(4)	13(2)	19(4)
C20A	77(6)	61(6)	71(4)	-25(4)	9(4)	18(5)

Table 4 Bond Lengths for 3ya.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
C1	C19	1.397(3)	C8	C18	1.512(2)
C2	C28	1.324(3)	C9	C10	1.477(2)
C33	C6	1.499(2)	C10	C11	1.393(2)
C33	C7	1.400(2)	C10	C17	1.384(2)
C33	C23	1.390(2)	C11	C12	1.377(3)
C32	C7	1.410(2)	C12	C13	1.364(3)
C32	C8	1.493(2)	C13	C16	1.362(3)
C32	C21	1.394(2)	C14	C15	1.387(3)
O3	C24	1.324(3)	C16	C17	1.388(3)
O3	C25	1.373(4)	C18	C19	1.508(2)
N4	C24	1.283(5)	C19	C20	1.395(7)
N4	C26	1.365(5)	C19	C20A	1.433(10)
C30	C31	1.375(4)	C21	C22	1.375(2)
C30	C14	1.355(3)	C22	C23	1.380(2)
C31	C3	1.383(3)	C24	O3A	1.41(5)
C3	C4	1.391(2)	C24	N4A	1.28(5)
C4	C5	1.485(2)	C25	C26	1.299(3)
C4	C15	1.381(3)	C25	N4A	1.25(5)
C5	C6	1.330(2)	C26	O3A	1.65(3)

Table 4 Bond Lengths for 3ya.

Atom	Atom	Length/Å	Atom	Atom	Length/Å
C6	C27	1.512(2)	C26	N4A	1.89(5)
C7	C24	1.476(2)	C27	C28	1.513(3)
C8	C9	1.338(2)	C28	C29	1.459(3)

Table 5 Bond Angles for 3ya.

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
C7	C33	C6	121.76(12)	C4	C15	C14	120.9(2)
C23	C33	C6	119.16(14)	C13	C16	C17	121.2(2)
C23	C33	C7	119.01(14)	C10	C17	C16	120.25(17)
C7	C32	C8	122.52(13)	C19	C18	C8	115.53(12)
C21	C32	C7	117.91(14)	C1	C19	C18	120.64(17)
C21	C32	C8	119.51(13)	C1	C19	C20A	120.4(4)
C24	O3	C25	104.0(3)	C20	C19	C1	120.3(3)
C24	N4	C26	105.6(4)	C20	C19	C18	118.4(3)
C14	C30	C31	119.37(18)	C20A	C19	C18	113.9(6)
C30	C31	C3	120.4(2)	C22	C21	C32	121.19(14)
C31	C3	C4	120.8(2)	C21	C22	C23	120.51(14)
C3	C4	C5	119.01(16)	C22	C23	C33	120.37(15)
C15	C4	C3	117.68(15)	O3	C24	C7	119.6(2)
C15	C4	C5	123.19(15)	N4	C24	O3	113.05(18)
C6	C5	C4	129.24(15)	N4	C24	C7	127.3(3)
C33	C6	C27	116.44(13)	O3A	C24	C7	114.5(14)
C5	C6	C33	118.38(14)	N4A	C24	C7	130.5(19)
C5	C6	C27	124.88(14)	N4A	C24	O3A	109(3)
C33	C7	C32	120.87(13)	C26	C25	O3	108.6(2)
C33	C7	C24	118.94(13)	N4A	C25	C26	96(3)
C32	C7	C24	120.18(13)	C25	C26	N4	108.7(3)
C32	C8	C18	115.99(13)	C25	C26	O3A	114.7(16)
C9	C8	C32	119.13(14)	C25	C26	N4A	41.1(18)
C9	C8	C18	124.54(14)	O3A	C26	N4A	76(2)
C8	C9	C10	129.29(14)	C6	C27	C28	114.31(14)
C11	C10	C9	118.82(15)	C2	C28	C27	120.6(3)
C17	C10	C9	123.89(15)	C2	C28	C29	121.8(2)
C17	C10	C11	117.26(16)	C29	C28	C27	117.61(18)
C12	C11	C10	121.74(18)	C24	O3A	C26	86.8(17)
C13	C12	C11	119.92(19)	C24	N4A	C26	81(2)
C16	C13	C12	119.53(19)	C25	N4A	C24	114(4)
C30	C14	C15	120.9(2)	C25	N4A	C26	43.0(15)

Table 6 Torsion Angles for 3ya.

A	B	C	D	Angle/°	A	B	C	D	Angle/°
C33	C6	C27	C28	-63.7(2)	C8	C9	C10	C17	-44.9(2)
C33	C7	C24	O3	-76.2(3)	C8	C18	C19	C1	-54.8(2)
C33	C7	C24	N4	102.5(3)	C8	C18	C19	C20	115.3(9)
C33	C7	C24	O3A	102(2)	C8	C18	C19	C20A	150.2(9)
C33	C7	C24	N4A	-107(6)	C9	C8	C18	C19	120.22(17)
C32	C7	C24	O3	102.4(3)	C9	C10	C11	C12	-178.48(15)
C32	C7	C24	N4	-79.0(3)	C9	C10	C17	C16	178.90(16)
C32	C7	C24	O3A	-79(2)	C10	C11	C12	C13	-1.5(3)
C32	C7	C24	N4A	72(6)	C11	C10	C17	C16	-2.8(3)
C32	C8	C9	C10	-175.88(13)	C11	C12	C13	C16	-0.5(3)
C32	C8	C18	C19	-66.55(18)	C12	C13	C16	C17	0.8(3)
C32	C21	C22	C23	-1.3(2)	C13	C16	C17	C10	0.9(3)
O3	C25	C26	N4	1.5(4)	C14	C30	C31	C3	0.0(3)
C30	C31	C3	C4	-0.3(3)	C15	C4	C5	C6	-52.8(3)
C30	C14	C15	C4	0.7(4)	C17	C10	C11	C12	3.1(2)
C31	C30	C14	C15	-0.2(4)	C18	C8	C9	C10	-2.9(2)
C31	C3	C4	C5	176.79(17)	C21	C32	C7	C33	-1.6(2)
C31	C3	C4	C15	0.7(3)	C21	C32	C7	C24	179.86(13)
C3	C4	C5	C6	131.29(19)	C21	C32	C8	C9	121.28(16)
C3	C4	C15	C14	-0.9(3)	C21	C32	C8	C18	-52.33(18)
C4	C5	C6	C33	-178.72(15)	C21	C22	C23	C33	-2.2(2)
C4	C5	C6	C27	-5.2(3)	C23	C33	C6	C5	117.18(17)
C5	C4	C15	C14	-176.82(19)	C23	C33	C6	C27	-56.90(19)
C5	C6	C27	C28	122.70(19)	C23	C33	C7	C32	-1.7(2)
C6	C33	C7	C32	175.35(13)	C23	C33	C7	C24	176.78(14)
C6	C33	C7	C24	-6.1(2)	C24	O3	C25	C26	-1.4(4)
C6	C33	C23	C22	-173.48(14)	C24	N4	C26	C25	-0.9(4)
C6	C27	C28	C2	99.6(3)	C25	O3	C24	N4	0.9(4)
C6	C27	C28	C29	-79.9(2)	C25	O3	C24	C7	179.7(2)
C7	C33	C6	C5	-59.91(19)	C25	C26	O3A	C24	-1(3)
C7	C33	C6	C27	126.01(15)	C25	C26	N4A	C24	-141(7)
C7	C33	C23	C22	3.7(2)	C26	N4	C24	O3	0.0(4)
C7	C32	C8	C9	-55.86(19)	C26	N4	C24	C7	-178.74(19)
C7	C32	C8	C18	130.53(14)	C26	C25	N4A	C24	42(7)
C7	C32	C21	C22	3.2(2)	O3A	C24	N4A	C25	-49(8)
C7	C24	O3A	C26	-179.0(7)	O3A	C24	N4A	C26	-21(4)
C7	C24	N4A	C25	159(3)	O3A	C26	N4A	C24	18(4)
C7	C24	N4A	C26	-173.0(15)	O3A	C26	N4A	C25	159(4)

Table 6 Torsion Angles for 3ya.

A	B	C	D	Angle/°	A	B	C	D	Angle/°
C8	C32	C7	C33	175.54(13)	N4A	C24	O3A	C26	24(5)
C8	C32	C7	C24	-3.0(2)	N4A	C25	C26	O3A	-23(5)
C8	C32	C21	C22	-174.07(14)	N4A	C26	O3A	C24	-16(3)
C8	C9	C10	C11	136.74(17)					

Table 7 Hydrogen Atom Coordinates (Å×10^4) and Isotropic Displacement Parameters (Å^2×10^3) for 3ya.

Atom	*x*	*y*	*z*	U(eq)
H1A	7003	7624	2520	124
H1B	5533	7128	2957	124
H1C	6655	6313	2543	124
H2A	9826	-688	3411	148
H2B	8721	-882	4477	148
H30	1639	1358	198	96
H31	789	1899	1697	90
H3	2267	2188	2851	72
H5	4752	2841	2865	57
H9	9967	4067	2759	55
H11	12466	4585	2579	67
H12	14049	6104	1790	82
H13	13338	8230	1097	84
H14	3957	1102	-135	100
H15	5458	1399	999	84
H16	11049	8826	1188	88
H17	9437	7321	1992	71
H18A	8441	5221	5074	57
H18B	9006	6297	3948	57
H21	8263	3100	5892	60
H22	7301	1167	6689	63
H23	6406	351	5549	60
H25	8568	4174	-119	101
H25A	8431	3908	-32	101
H26	6715	5644	-32	101
H27A	5862	-195	2989	66
H27B	6361	-558	4214	66
H29A	9167	163	1569	141
H29B	7977	1230	1380	141
H29C	7668	-112	1450	141

Table 7 Hydrogen Atom Coordinates (Å×10^4) and Isotropic Displacement Parameters (Å^2×10^3) for 3ya.

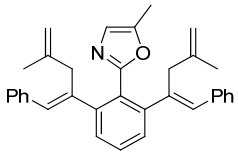
Atom	*x*	*y*	*z*	U(eq)
H20A	5060	6308	4866	117
H20B	6272	5632	5721	117
H20C	5640	7297	4771	87
H20D	6614	6223	5672	87

Table 8 Atomic Occupancy for 3ya.

Atom	*Occupancy*	Atom	*Occupancy*	Atom	*Occupancy*
O3	0.905(14)	N4	0.953(16)	H25	0.905(14)
H25A	0.047(16)	H26	0.953(16)	O3A	0.095(14)
N4A	0.047(16)	C20	0.64(3)	H20A	0.64(3)
H20B	0.64(3)	C20A	0.36(3)	H20C	0.36(3)
H20D	0.36(3)				

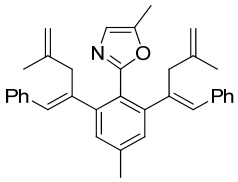
9. Characterization Data and NMR Spectra of Oxazole Derivatives

2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (3aa)



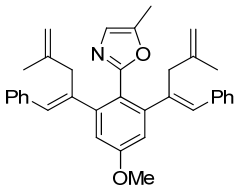
The general procedure was applied to **1a** (8.0 mg, 0.05 mmol), **2a** (19.5 mg, 2.5 equiv), Cp*Rh(CH$_3$CN)$_3$(SbF$_6$)$_2$ (2.9 mg, 7 mol%), PhOCH$_2$COOH (11.4 mg, 1.5 equiv), MnO$_2$ (1.3 mg, 0.3 equiv) in toluene (0.5 mL) at 80 °C for 34 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3aa** as a white solid (18.8 mg, 80% yield). Melting point: 81.4–82.8°C; ^{1}H NMR (400 MHz, CDCl$_3$): δ = 7.32 (s, 3H), 7.25 – 7.11 (m, 10H), 6.75 (s, 1H), 6.53 (s, 2H), 4.72 (s, 4H), 2.94 (s, 4H), 2.20 (s, 3H), 1.58 (s, 6H); ^{13}C NMR (100 MHz, CDCl$_3$): δ = 159.7, 148.3, 145.5, 142.8, 139.5, 137.7, 132.5, 129.1, 128.6, 128.2, 128.1, 126.7, 125.7, 123.6, 112.5,40.3, 23.2, 10.9. HRMS (ESI): m/z calcd for C$_{34}$H$_{33}$ONNa [M+Na]$^+$: 494.2454, found: 494.2464.

5-methyl-2-(4-methyl-2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)oxazole (3ba)



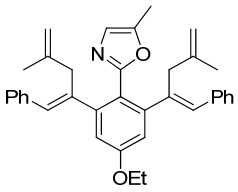
The general procedure was applied to **1b** (17.3 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), Cp*Rh(CH$_3$CN)$_3$(SbF$_6$)$_2$ (5.9 mg, 7 mol%), PhOCH$_2$COOH (22.8 mg, 1.5 equiv), MnO$_2$ (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 24 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ba** as a colorless oil (33.1 mg, 68% yield). ^{1}H NMR (400 MHz, CDCl$_3$): δ = 7.23 (d, *J* = 7.5 Hz, 4H), 7.21 – 7.10 (m, 8H), 6.72 (s, 1H), 6.51 (s, 2H), 4.71 (s, 4H), 2.90 (s, 4H), 2.35 (s, 3H), 2.19 (s, 3H), 1.58 (s, 6H); ^{13}C NMR (100 MHz, CDCl$_3$): δ = 160.0, 148.2, 145.5, 142.9, 139.8, 139.0, 137.9, 132.4, 128.9, 128.7, 128.2, 126.7, 123.6, 123.0, 112.4, 40.3, 23.3, 21.7, 11.0. HRMS (ESI): m/z calcd for C$_{35}$H$_{35}$ONNa [M+Na]$^+$: 508.2611, found: 508.2614.

2-(4-methoxy-2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (3ca)



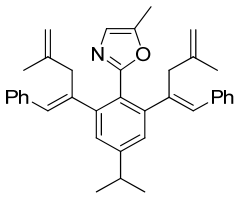
The general procedure was applied to **1c** (18.9 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), Cp*Rh(CH$_3$CN)$_3$(SbF$_6$)$_2$ (5.9 mg, 7 mol%), PhOCH$_2$COOH (22.8 mg, 1.5 equiv), MnO$_2$ (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 25 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ca** as a white solid (31.7 mg, 63% yield). Melting point: 61.9–63.2°C; ^{1}H NMR (400 MHz, CDCl$_3$): δ = 7.35 – 7.28 (m, 4H), 7.25 – 7.23 (m, 3H), 7.23 – 7.20 (m, 3H), 6.92 (s, 2H), 6.78 (d, *J* = 1.3 Hz, 1H), 6.59 (s, 2H), 4.79 (s, 4H), 3.87 (s, 3H), 2.98 (s, 4H), 2.26 (d, *J* = 1.3 Hz, 3H), 1.66 (s, 6H); ^{13}C NMR (100 MHz, CDCl$_3$): δ = 159.9, 159.6, 148.2, 147.1, 143.0, 139.5, 137.7, 132.5, 128.7, 128.2, 126.8, 123.6, 118.6, 113.6, 112.5, 55.4, 40.3, 23.3, 11.0. HRMS (ESI): m/z calcd for $C_{35}H_{35}O_2NNa$ $[M+Na]^+$: 524.2560, found: 524.2563.

2-(4-ethoxy-2,6-bis((E)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3da**)



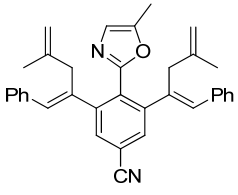
The general procedure was applied to **1d** (20.3 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), Cp*Rh(CH$_3$CN)$_3$(SbF$_6$)$_2$ (5.9 mg, 7 mol%), PhOCH$_2$COOH (22.8 mg, 1.5 equiv), MnO$_2$ (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 25 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3da** as a white solid (31.5 mg, 61% yield). Melting point: 71.4–72.6°C; ^{1}H NMR (400 MHz, CDCl$_3$): δ = 7.34 – 7.29 (m, 4H), 7.26 – 7.20 (m, 6H), 6.92 (s, 2H), 6.78 (d, J = 1.4 Hz, 1H), 6.59 (s, 2H), 4.79 (s, 4H), 4.10 (q, *J* = 7.0 Hz, 2H), 2.98 (s, 4H), 2.27 (d, *J* = 1.2 Hz, 3H), 1.66 (s, 6H), 1.46 (t, *J* = 7.0 Hz, 3H). ^{13}C NMR (100 MHz, CDCl$_3$): δ = 160.0, 159.0, 148.2, 147.1, 143.0, 139.6, 137.8, 132.4, 128.7, 128.2, 126.8, 123.5, 118.4, 114.1, 112.5, 63.6, 40.3, 23.3, 14.9, 11.0. HRMS (ESI): m/z calcd for $C_{36}H_{37}O_2NNa$ $[M+Na]^+$: 538.2717, found: 538.2721.

2-(4-isopropyl-2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ea**)



The general procedure was applied to **1e** (20.1 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), Cp*Rh(CH$_3$CN)$_3$(SbF$_6$)$_2$ (5.9 mg, 7 mol%), PhOCH$_2$COOH (22.8 mg, 1.5 equiv), MnO$_2$ (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 40 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ea** as a colorless oil (26.7 mg, 52% yield). ^{1}H NMR (400 MHz, CDCl$_3$): δ = 7.35 – 7.28 (m, 4H), 7.26 – 7.19 (m, 8H), 6.79 (d, *J* = 1.4 Hz, 1H), 6.57 (s, 2H), 4.77 (s, 4H), 3.05 – 2.92 (m, 5H), 2.27 (d, *J* = 1.2 Hz, 3H), 1.65 (s, 6H), 1.31 (d, *J* = 6.9 Hz, 6H). ^{13}C NMR (100 MHz, CDCl$_3$): δ = 160.1, 149.7, 148.2, 145.4, 143.1, 139.9, 137.9, 132.3, 128.7, 128.2, 126.7, 126.3, 123.5, 123.3, 112.4, 40.4, 34.1, 23.9, 23.3, 11.0. HRMS (ESI): m/z calcd for $C_{37}H_{39}ONNa$ $[M+Na]^+$: 536.2924, found: 536.2927.

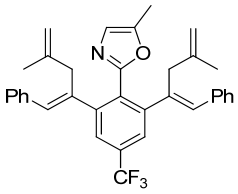
3,5-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)-4-(5-methyloxazol-2-yl)benzonitrile (**3fa**)



The general procedure was applied to **1f** (18.4 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), Cp*Rh(CH$_3$CN)$_3$(SbF$_6$)$_2$ (5.9 mg, 7 mol%), PhOCH$_2$COOH (22.8 mg, 1.5 equiv), MnO$_2$ (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 25 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 15/1, v/v) afforded **3fa** as a colorless oil

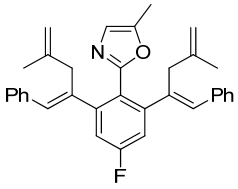
(31.1 mg, 63% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.64 (s, 2H), 7.33 (t, *J* = 7.3 Hz, 4H), 7.28 – 7.26 (m, 1H), 7.26 – 7.20 (m, 5H), 6.86 (d, *J* = 1.4 Hz, 1H), 6.58 (s, 2H), 4.76 (d, *J* = 31.7 Hz, 4H), 2.96 (s, 4H), 2.30 (d, *J* = 1.2 Hz, 3H), 1.64 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 157.9, 149.2, 146.6, 142.2, 137.8, 137.0, 133.9, 131.5, 130.3, 128.6, 128.4, 127.3, 124.1, 118.7, 113.1, 40.1, 23.2, 11.0. HRMS (ESI): m/z calcd for $C_{35}H_{32}ON_2Na$ $[M+Na]^+$: 519.2407, found: 519.2411.

2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)-4-(trifluoromethyl)phenyl)-5-methyloxazole (**3ga**)



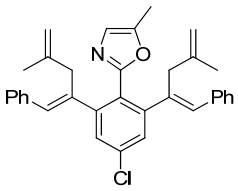
The general procedure was applied to **1g** (22.7 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 51 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ga** as a colorless oil (34.6 mg, 64% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.61 (s, 2H), 7.36 – 7.30 (m, 4H), 7.26 – 7.22 (m, 6H), 6.85 (d, *J* = 1.3 Hz, 1H), 6.61 (s, 2H), 4.76 (d, *J* = 20.6 Hz, 4H), 3.00 (s, 4H), 2.30 (d, *J* = 1.2 Hz, 3H), 1.64 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 158.5, 149.0, 146.3, 142.4, 138.5, 137.3, 133.6, 131.1 (q, *J* = 32.1 Hz), 129.3 (d, *J* = 0.9 Hz), 128.7, 128.3, 127.1, 124.8 (q, *J* = 3.8 Hz), 124.0 (q, *J* = 271.3 Hz),123.9, 113.0, 40.2, 23.1, 11.0. ^{19}F NMR (376 MHz, $CDCl_3$): δ = -62.79. HRMS (ESI): m/z calcd for $C_{35}H_{32}ONF_3Na$ $[M+Na]^+$: 562.2328, found: 562.2338.

2-(4-fluoro-2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ha**)



The general procedure was applied to **1h** (17.7 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 24 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ha** as a colorless oil (36.7 mg, 75% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.36 – 7.29 (m, 4H), 7.26 – 7.20 (m, 6H), 7.10 (d, *J* = 9.3 Hz, 2H), 6.81 (s, 1H), 6.58 (s, 2H), 4.80 (d, *J* = 13.5 Hz, 4H), 2.98 (s, 4H), 2.28 (s, 3H), 1.66 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 162.5 (d, *J* = 248.2 Hz), 159.0, 148.4, 147.9 (d, *J* = 8.5 Hz), 142.5, 138.4 (d, *J* = 1.6 Hz), 137.3, 133.1, 128.5, 128.2, 126.9, 123.6, 122.1 (d, *J* = 2.8 Hz), 114.9 (d, *J* = 21.7 Hz), 112.7, 40.1, 23.1, 10.9. ^{19}F NMR (376 MHz, $CDCl_3$): δ = -111.51 (t, *J* = 9.3 Hz). HRMS (ESI): m/z calcd for $C_{34}H_{32}ONFNa$ $[M+Na]^+$: 512.2360, found: 512.2362.

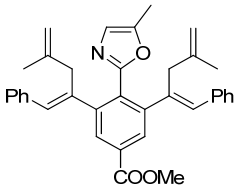
2-(4-chloro-2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ia**)



The general procedure was applied to **1i** (19.3 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ia** as a white solid (38.4 mg, 76% yield). Melting point: 74.1–75.3°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.29 (s, 2H), 7.23 (d, *J* = 7.4 Hz, 3H), 7.19 – 7.11 (m, 7H), 6.74 (s, 1H), 6.51 (s, 2H), 4.70 (d, *J* = 17.5 Hz, 4H), 2.88 (s, 4H), 2.19 (s, 3H), 1.57 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 158.8, 148.7, 147.1,

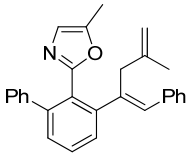
142.5, 138.5, 137.4, 135.0, 133.3, 128.6, 128.3, 128.0, 127.0, 124.5, 123.8, 112.8, 40.1, 23.2, 11.0. HRMS (ESI): m/z calcd for $C_{34}H_{32}ONClNa$ $[M+Na]^+$: 528.2065, found: 528.2070.

methyl 3,5-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)-4-(5-methyloxazol-2-yl)benzoate (3ja)



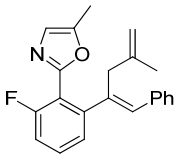
The general procedure was applied to **1j** (21.7 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ja** as a white solid (44.2 mg, 84% yield). Melting point: 104.0–104.9°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.98 (s, 2H), 7.32 – 7.27 (m, 3H), 7.24 – 7.15 (m, 7H), 6.81 (s, 1H), 6.57 (s, 2H), 4.69 (d, *J* = 8.0 Hz, 4H), 3.92 (s, 3H), 2.92 (s, 4H), 2.25 (s, 3H), 1.57 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 166.8, 158.8, 148.9, 145.8, 142.5, 139.1, 137.5, 133.2, 130.6, 130.0, 129.2, 128.7, 128.3, 126.9, 123.9, 112.8, 52.5, 40.1, 23.2, 11.0. HRMS (ESI): m/z calcd for $C_{36}H_{35}O_3NNa$ $[M+Na]^+$: 552.2509, found: 552.2512.

(*E*)-5-methyl-2-(3-(4-methyl-1-phenylpenta-1,4-dien-2-yl)-[1,1'-biphenyl]-2-yl)oxazole (3ka)



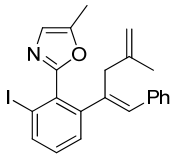
The general procedure was applied to **1k** (23.5 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ka** as a colorless oil (32.1 mg, 82% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.46 – 7.36 (m, 2H), 7.34 – 7.28 (m, 1H), 7.25 – 7.09 (m, 10H), 6.57 (d, *J* = 14.9 Hz, 2H), 4.71 (s, 2H), 2.91 (s, 2H), 2.06 (s, 3H), 1.58 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.4, 148.3, 145.7, 143.5, 142.8, 141.2, 139.5, 137.8, 132.9, 129.6, 128.9, 128.8, 128.7, 128.5, 128.2, 128.0, 126.9, 126.8, 126.4, 123.3, 112.5, 40.2, 23.3, 10.8. HRMS (ESI): m/z calcd for $C_{28}H_{25}ONNa$ $[M+Na]^+$: 414.1828, found: 414.1835.

(*E*)-2-(2-fluoro-6-(4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (3la)



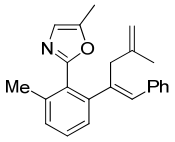
The general procedure was applied to **1l** (17.7 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3la** as a colorless oil (29.0 mg, 87% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.47 – 7.40 (m, 1H), 7.40 – 7.33 (m, 2H), 7.32 – 7.27 (m, 4H), 7.14 (t, *J* = 8.9 Hz, 1H), 6.94 (s, 1H), 6.64 (s, 1H), 4.75 (d, *J* = 17.3 Hz, 2H), 3.01 (s, 2H), 2.38 (s, 3H), 1.65 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ = 161.1 (d, *J* = 250.2 Hz), 155.4, 149.5, 146.8, 142.6, 138.7 (d, *J* = 2.3 Hz), 137.5, 133.1, 131.1 (d, *J* = 9.1 Hz), 128.7, 128.3, 127.1, 125.3 (d, *J* = 3.1 Hz), 124.2, 115.7 (d, *J* = 13.9 Hz), 114.6 (d, *J* = 22 Hz), 112.7, 40.0, 23.1, 11.1. ^{19}F NMR (376 MHz, $CDCl_3$): δ = -113.13. HRMS (ESI): m/z calcd for $C_{22}H_{20}ONFNa$ $[M+Na]^+$: 356.1421, found: 356.1427.

(*E*)-2-(2-iodo-6-(4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (3ma)



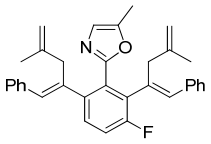
The general procedure was applied to **1m** (28.4 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 33 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ma** as a white solid (33.8 mg, 77% yield). Melting point: 64.5–65.8°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.85 (d, *J* = 7.9 Hz, 1H), 7.42 (d, *J* = 7.7 Hz, 1H), 7.31 (t, *J* = 7.5 Hz, 2H), 7.25 – 7.16 (m, 3H), 7.13 (t, *J* = 7.8 Hz, 1H), 6.87 (s, 1H), 6.55 (s, 1H), 4.76 (d, *J* = 15.7 Hz, 2H), 2.94 (s, 2H), 2.36 (s, 3H), 1.63 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 160.4, 148.8, 147.3, 142.5, 138.5, 137.9, 137.3, 133.6, 133.1, 131.1, 129.0, 128.6, 128.3, 127.1, 123.5, 112.8, 99.4, 40.0, 23.2, 11.1. HRMS (ESI): m/z calcd for $C_{22}H_{21}ONI$ $[M+H]^+$:442.0662, found:442.0661.

(*E*)-5-methyl-2-(2-methyl-6-(4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)oxazole (3na)



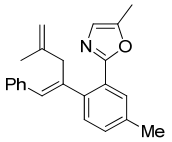
The general procedure was applied to **1n** (17.3 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3na** as a colorless oil (19.9 mg, 60% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.36 – 7.27 (m, 4H), 7.25 – 7.18 (m, 4H), 6.86 (d, *J* = 1.5 Hz, 1H), 6.56 (s, 1H), 4.76 (s, 2H), 2.94 (s, 2H), 2.33 (s, 6H), 1.63 (s, 3H).^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.9, 148.5, 145.3, 142.9, 139.8, 138.8, 137.9, 132.5, 129.5, 129.1, 128.6, 128.2, 127.0, 126.9, 126.7, 123.4, 112.5, 40.0, 23.2, 20.5, 11.0. HRMS (ESI): m/z calcd for $C_{23}H_{23}ONNa$ $[M+Na]^+$:352.1672, found:352.1677.

2-(3-fluoro-2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (3oa)



The general procedure was applied to **1o** (17.7 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 24 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3oa** as a colorless oil (36.5 mg, 75% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.42 – 7.33 (m, 5H), 7.33 – 7.27 (m, 6H), 7.21 (t, *J* = 8.9 Hz, 1H), 6.88 (s, 1H), 6.70 (s, 1H), 6.61 (s, 1H), 4.81 (d, *J* = 12.8 Hz, 2H), 4.69 (d, *J* = 8.3 Hz, 2H), 3.06 (s, 2H), 3.00 (s, 2H), 2.34 (s, 3H), 1.66 (d, *J* = 16.0 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 158.9 (d, *J* = 243.3 Hz), 158.5 (d, *J* = 1.2 Hz), 148.7, 142.7 (d, *J* = 21.7 Hz), 141.5 (d, *J* = 3.7 Hz), 138.9, 137.6 (d, *J* = 21.7 Hz), 134.5, 133.2, 132.8, 132.3 (d, *J* = 17.2 Hz), 129.4 (d, *J* = 8.6 Hz), 128.7 (d, *J* = 19.9 Hz), 128.2 (d, *J* = 2.9 Hz), 126.9 (d, *J* = 7.2 Hz), 123.7, 116.8 (d, *J* = 23.5 Hz), 112.7, 112.6 (d, *J* = 1.6 Hz), 40.3, 23.2, 22.8 (d, *J* = 1.7 Hz), 11.0. ^{19}F NMR (376 MHz, $CDCl_3$): δ = -114.17 (dd, *J* = 9.1, 5.3 Hz). HRMS (ESI): m/z calcd for $C_{34}H_{32}ONFNa$ $[M+Na]^+$: 512.2360, found: 512.2371.

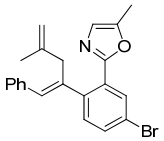
(*E*)-5-methyl-2-(5-methyl-2-(4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)oxazole (3pa)



The general procedure was applied to **1p** (17.3 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 18 h under Ar.

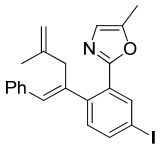
Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3pa** as a colorless oil (23.4 mg, 71% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.68 (s, 1H), 7.31 (d, *J* = 4.4 Hz, 4H), 7.25 – 7.15 (m, 3H), 6.80 (s, 1H), 6.54 (s, 1H), 4.64 (d, *J* = 15.0 Hz, 2H), 3.11 (s, 2H), 2.32 (d, *J* = 27.6 Hz, 6H), 1.55 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 161.3, 148.9, 143.0, 140.7, 140.6, 138.1, 137.0, 131.3, 130.5, 130.4, 129.9, 128.7, 128.3, 126.7, 126.0, 124.1, 112.3, 40.7, 23.2, 21.1, 11.1. HRMS (ESI): m/z calcd for $C_{23}H_{23}ONNa$ $[M+Na]^+$: 352.1672, found: 352.1677.

(*E*)-2-(5-bromo-2-(4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3qa**)



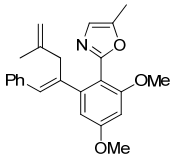
The general procedure was applied to **1q** (23.6 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3qa** as a colorless oil (37.2 mg, 95% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.52 (d, *J* = 8.0 Hz, 1H), 7.33 (d, *J* = 6.7 Hz, 1H), 7.25 – 7.09 (m, 6H), 6.81 (s, 1H), 6.50 (s, 1H), 4.69 (d, *J* = 15.0 Hz, 2H), 2.88 (s, 2H), 2.28 (s, 3H), 1.57 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 158.6, 149.0, 147.6, 142.5, 138.4, 137.3, 133.6, 131.5, 130.9, 129.0, 128.6, 128.3, 128.2, 127.1, 124.8, 123.6, 112.8, 39.9, 23.2, 11.1. HRMS (ESI): m/z calcd for $C_{22}H_{20}ONBrNa$ $[M+Na]^+$: 416.0620, found: 416.0625.

(*E*)-2-(5-iodo-2-(4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ra**)



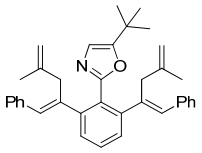
The general procedure was applied to **1r** (28.4 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ra** as a colorless oil (35.5 mg, 80% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 8.13 (d, *J* = 2.0 Hz, 1H), 7.59 (dd, *J* = 8.1, 2.0 Hz, 1H), 7.25 – 7.20 (m, 4H), 7.18 – 7.09 (m, 1H), 6.99 (d, *J* = 8.1 Hz, 1H), 6.73 (s, 1H), 6.46 (s, 1H), 4.54 (d, *J* = 32.4 Hz, 2H), 3.03 (s, 2H), 2.22 (s, 3H), 1.46 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.4, 149.4, 142.8, 142.7, 139.9, 138.4, 137.8, 137.6, 132.4, 131.8, 128.7, 128.4, 128.1, 127.0, 124.4, 112.6, 92.2, 40.5, 23.2, 11.1. HRMS (ESI): m/z calcd for $C_{22}H_{20}ONINa$ $[M+Na]^+$: 464.0482, found: 464.0489.

(*E*)-2-(2,4-dimethoxy-6-(4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3sa**)



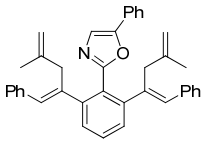
The general procedure was applied to **1s** (21.9 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 39 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 5/1, v/v) afforded **3sa** as a white solid (16.0 mg, 43% yield). Melting point: 79.1–80.3°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.34 – 7.27 (m, 2H), 7.24 – 7.18 (m, 3H), 6.83 (d, *J* = 1.4 Hz, 1H), 6.59 (s, 2H), 6.46 (d, *J* = 2.3 Hz, 1H), 4.76 (s, 2H), 3.86 (s, 3H), 3.80 (s, 3H), 2.91 (s, 2H), 2.31 (d, *J* = 1.2 Hz, 3H), 1.63 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 161.5, 159.9, 157.8, 148.6, 147.8, 143.0, 139.3, 137.7, 132.6, 128.7, 128.2, 126.8, 123.6, 112.5, 109.6, 106.3, 97.2, 56.2, 55.5, 39.9, 23.3, 11.2. HRMS (ESI): m/z calcd for $C_{24}H_{25}O_3NNa$ $[M+Na]^+$: 398.1727, found: 398.1732.

2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-(tert-butyl)oxazole (3ta)



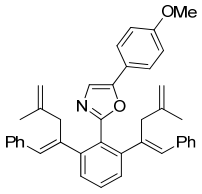
The general procedure was applied to **1t** (20.1 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ta** as a white solid (36.7 mg, 71% yield). Melting point: 88.2–90.4°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.37 – 7.30 (m, 3H), 7.25 – 7.12 (m, 10H), 6.70 (s, 1H), 6.55 (s, 2H), 4.76 (d, *J* = 7.3 Hz, 4H), 2.89 (s, 4H), 1.61 (s, 6H), 1.10 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 160.9, 159.4, 145.6, 143.0, 139.5, 137.7, 132.7, 129.2, 128.7, 128.2, 128.2, 126.8, 125.8, 120.4, 112.4, 40.2, 31.4, 28.8, 23.4. HRMS (ESI): m/z calcd for $C_{37}H_{39}ONNa$ $[M+Na]^+$:536.2924, found:536.2931.

2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-phenyloxazole (3ua)



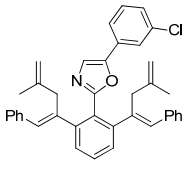
The general procedure was applied to **1u** (22.1 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ua** as a white solid (35.6 mg, 67% yield). Melting point: 103.4–104.8°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.59 (d, *J* = 7.5 Hz, 2H), 7.51 – 7.41 (m, 4H), 7.38 – 7.27 (m, 11H), 7.25 – 7.19 (m, 2H), 6.72 (s, 2H), 4.81 (s, 4H), 3.03 (s, 4H), 1.66 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ = 160.4, 151.2, 145.7, 142.9, 139.9, 137.7, 132.7, 129.5, 129.0, 128.7, 128.6, 128.4, 128.2, 128.1, 126.8, 125.0, 124.3, 122.9, 112.5, 40.4, 23.3. HRMS (ESI): m/z calcd for $C_{39}H_{35}ONNa$ $[M+Na]^+$: 556.2611, found: 556.2619.

2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-(4-methoxyphenyl)oxazole (3va)



The general procedure was applied to **1v** (25.1 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3va** as a white solid (34.7 mg, 62% yield). Melting point: 102.1–103.3°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.50 (d, *J* = 7.0 Hz, 2H), 7.47 – 7.40 (m, 3H), 7.34 – 7.25 (m, 9H), 7.25 – 7.19 (m, 2H), 6.87 (d, *J* = 7.8 Hz, 2H), 6.70 (d, *J* = 1.8 Hz, 2H), 4.80 (s, 4H), 3.82 (s, 3H), 3.01 (s, 4H), 1.64 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 159.7, 151.2, 145.6, 142.9, 140.0, 137.7, 132.6, 129.4, 128.7, 128.6, 128.2, 126.8, 125.8, 125.2, 121.4, 121.0, 114.4, 112.5, 55.4, 40.4, 23.3. HRMS (ESI): m/z calcd for $C_{40}H_{37}O_2NNa$ $[M+Na]^+$:586.2717, found:586.2725.

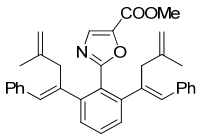
2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)-5-(3-chlorophenyl)oxazole (3wa)



The general procedure was applied to **1w** (25.5 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 18 h under Ar. Purification by column chromatography on silica gel (petroleum

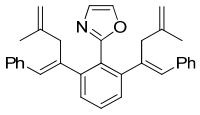
ether/ethyl acetate = 20/1, v/v) afforded **3wa** as a white solid (30.7 mg, 54% yield). Melting point: 107.8–109.9°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.52 (s, 1H), 7.45 – 7.35 (m, 5H), 7.25 – 7.19 (m, 10H), 7.16 (t, *J* = 7.1 Hz, 2H), 6.62 (s, 2H), 4.74 (s, 4H), 2.95 (s, 4H), 1.59 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 161.0, 149.8, 145.7, 142.8, 139.7, 137.6, 135.1, 132.8, 130.3, 129.7, 129.7, 128.7, 128.6, 128.3, 128.3, 126.9, 124.8, 124.2, 123.8, 122.3, 112.6, 40.5, 23.3. HRMS (ESI): m/z calcd for $C_{39}H_{34}ONNa$ $[M+Na]^+$:590.2221, found:590.2227.

methyl 2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)oxazole-5-carboxylate (3xa)



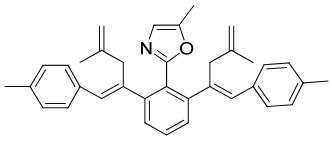
The general procedure was applied to **1x** (20.3 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 39 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3xa** as a white solid (17.5 mg, 34% yield). Melting point: 91.1–92.3°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.82 (s, 1H), 7.48 – 7.39 (m, 3H), 7.34 – 7.30 (m, 3H), 7.29 (s, 1H), 7.25 – 7.19 (m, 6H), 6.55 (s, 2H), 4.80 (d, *J* = 4.2 Hz, 4H), 3.87 (s, 3H), 3.03 (s, 4H), 1.66 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 164.4, 158.3, 145.8, 142.6, 142.1, 139.0, 137.4, 134.9, 133.1, 130.0, 128.6, 128.3, 128.1, 127.0, 124.5, 112.8, 52.2, 40.6, 23.3. HRMS (ESI): m/z calcd for $C_{35}H_{34}O_3NNa$ $[M+Na]^+$:538.2353, found:538.2359.

2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)oxazole (3ya)



The general procedure was applied to **1y** (14.5 mg, 0.1 mmol), **2a** (39.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ya** as a white solid (32.8 mg, 72% yield). Melting point: 85.1–86.9°C; ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.68 (s, 1H), 7.46 – 7.37 (m, 3H), 7.31 (t, *J* = 7.6 Hz, 4H), 7.25 – 7.19 (m, 7H), 6.56 (s, 2H), 4.80 (s, 4H), 2.98 (s, 4H), 1.66 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 161.4, 145.8, 142.8, 139.4, 138.4, 137.7, 132.8, 129.4, 128.7, 128.2, 128.1, 128.0, 126.8, 125.5, 112.6, 40.4, 23.3. HRMS (ESI): m/z calcd for $C_{33}H_{32}ON$ $[M+H]^+$:458.2478, found:458.2481.

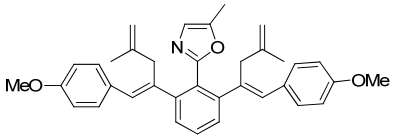
2-(2,6-bis((*E*)-4-methyl-1-(p-tolyl)penta-1,4-dien-2-yl)phenyl)-5-methyloxazole (3ab)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2b** (42.5 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 17 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ab** as a colorless oil (33.1 mg, 66% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.43 – 7.35 (m, 3H), 7.21 – 7.09 (m, 8H), 6.80 (s, 1H), 6.55 (s, 2H), 4.79 (s, 4H), 3.00 (s, 4H), 2.35 (s, 6H), 2.22 (s, 3H), 1.66 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.9, 148.3, 145.7, 143.0, 138.9, 136.4, 134.9, 132.5, 129.1, 128.9, 128.6, 128.0, 125.8, 123.6, 112.4, 40.4, 23.3, 21.3, 11.0. HRMS (ESI): m/z calcd for $C_{36}H_{38}ON$ $[M+H]^+$: 500.2948, found: 500.2949.

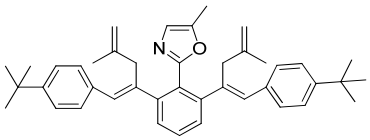
22-(2,6-bis((*E*)-1-(4-methoxyphenyl)-4-methylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole

(**3ac**)



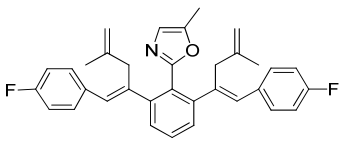
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2c** (46.5 mg, 2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 18 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ac** as a colorless oil (32.9 mg, 62% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.41 – 7.33 (m, 3H), 7.22 – 7.14 (m, 4H), 6.88 – 6.83 (m, 4H), 6.79 (d, *J* = 1.3 Hz, 1H), 6.51 (s, 2H), 4.79 (s, 4H), 3.81 (s, 6H), 2.97 (s, 4H), 2.26 (d, *J* = 1.2 Hz, 3H), 1.66 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.9, 158.5, 148.3, 145.9, 143.0, 138.1, 132.2, 130.4, 129.9, 129.2, 128.0, 125.8, 123.6, 113.6, 112.3, 55.3, 40.4, 23.4, 11.0. HRMS (ESI): m/z calcd for $C_{36}H_{37}O_3NNa$ $[M+Na]^+$: 554.2666, found: 554.2672.

2-(2,6-bis((*E*)-1-(4-(tert-butyl)phenyl)-4-methylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ad**)



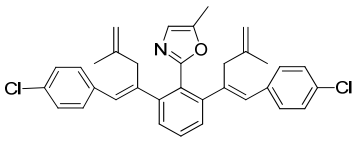
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2d** (53.0 mg, 2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 19 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ad** as a white solid (40.9 mg, 70% yield). Melting point: 112.6–114.7°C. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.44 – 7.33 (m, 7H), 7.22 (d, *J* = 8.0 Hz, 4H), 6.80 (s, 1H), 6.57 (s, 2H), 4.82 (s, 4H), 3.02 (s, 4H), 2.30 (m, 3H), 1.70 (s, 6H), 1.35 (s, 18H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 149.6, 148.3, 145.8, 143.0, 138.9, 134.9, 132.5, 129.2, 128.4, 128.1, 125.7, 125.1, 123.6, 112.4, 40.5, 34.6, 31.5, 23.4, 11.1. HRMS (ESI): m/z calcd for $C_{42}H_{49}ONNa$ $[M+Na]^+$: 606.3706, found: 606.3710.

2-(2,6-bis((*E*)-1-(4-fluorophenyl)-4-methylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ae**)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2e** (43.5 mg, 2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 23 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ae** as a colorless oil (31.4 mg, 62% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.43 – 7.33 (m, 3H), 7.22 – 7.15 (m, 4H), 7.04 – 6.95 (m, 4H), 6.81 (d, *J* = 1.3 Hz, 1H), 6.51 (s, 2H), 4.76 (d, *J* = 8.7 Hz, 4H), 2.93 (s, 4H), 2.27 (d, *J* = 1.3 Hz, 3H), 1.63 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 161.8 (d, *J* = 244.6 Hz), 159.8, 148.4, 145.5, 142.8, 139.6, 133.7 (d, *J* = 3.2 Hz), 131.5, 130.2 (d, *J* = 7.8 Hz), 129.3, 128.2, 125.7, 123.6, 115.2 (d, *J* = 21.2 Hz), 112.5, 40.3, 23.3, 11.0. ^{19}F NMR (376 MHz, $CDCl_3$): δ = -115.49. HRMS (ESI): m/z calcd for $C_{34}H_{32}F_2ON$ $[M+H]^+$: 508.2446, found: 508.2454.

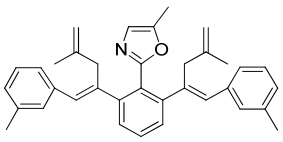
2-(2,6-bis((*E*)-1-(4-chlorophenyl)-4-methylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3af**)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2f** (47.5 mg, 2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7

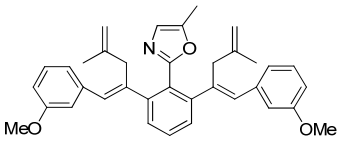
mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 20 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3af** as a colorless oil (32.9 mg, 61% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.57 (d, *J* = 8.0 Hz, 4H), 7.46 – 7.38 (m, 3H), 7.34 (d, *J* = 8.0 Hz, 4H), 6.83 (s, 1H), 6.58 (s, 2H), 4.78 (d, *J* = 13.8 Hz, 4H), 2.96 (s, 4H), 2.28 (s, 3H), 1.64 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.6, 148.6, 145.2, 142.5, 141.6, 141.3, 131.4, 129.4, 129.0, 128.9, 128.3, 125.6, 125.3 (q, *J* = 3.7 Hz), 123.7, 112.8, 40.5, 23.3, 11.0. HRMS (ESI): m/z calcd for $C_{34}H_{31}Cl_2ONNa$ $[M+Na]^+$: 562.1675, found: 562.1676.

2-(2,6-bis((*E*)-4-methyl-1-(m-tolyl)penta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ag**)



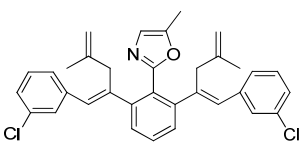
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2g** (42.5 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 34 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ag** as a colorless oil (31.5 mg, 63% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.43 – 7.33 (m, 3H), 7.21 (t, *J* = 7.7 Hz, 2H), 7.10 – 7.02 (m, 6H), 6.81 (s, 1H), 6.55 (s, 2H), 4.76 (s, 4H), 2.98 (s, 4H), 2.34 (s, 6H), 2.29 (s, 3H), 1.64 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 148.3, 145.6, 143.0, 139.5, 137.8, 137.7, 132.7, 129.6, 129.1, 128.1, 127.5, 125.8, 125.7, 123.7, 112.5, 40.4, 23.2, 21.6, 11.0. HRMS (ESI): m/z calcd for $C_{36}H_{37}ONNa$ $[M+Na]^+$: 522.2767, found: 536.2777.

2-(2,6-bis((*E*)-1-(3-methoxyphenyl)-4-methylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ah**)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2h** (46.5 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 24 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ah** as a colorless oil (31.3 mg, 59% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.44 – 7.33 (m, 3H), 7.22 (t, *J* = 7.9 Hz, 2H), 6.85 – 6.76 (m, 7H), 6.55 (s, 2H), 4.78 (s, 4H), 3.79 (s, 6H), 2.98 (s, 4H), 2.28 (s, 3H), 1.65 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 159.5, 148.4, 145.5, 143.0, 139.8, 139.2, 132.5, 129.2, 129.2, 128.1, 125.8, 123.6, 121.2, 113.9, 112.6, 112.5, 55.2, 40.5, 23.3, 11.0. HRMS (ESI): m/z calcd for $C_{36}H_{37}O_3NNa$ $[M+Na]^+$: 554.2666, found: 554.2672.

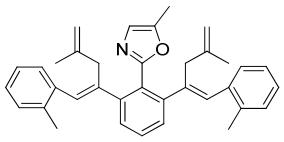
2-(2,6-bis((*E*)-1-(3-chlorophenyl)-4-methylpenta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ai**)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2i** (47.5 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 24 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ai** as a colorless oil (29.7 mg, 55% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.45 – 7.33 (m, 3H), 7.25 – 7.17 (m, 6H), 7.11 (d, *J* = 7.3 Hz, 2H), 6.83 (s, 1H), 6.50 (s, 2H), 4.76 (d, *J* = 16.7 Hz, 4H), 2.94 (s, 4H), 2.30 (s, 3H), 1.63 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.6, 148.6, 145.2, 142.6, 141.0,

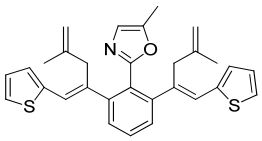
139.5, 134.1, 131.2, 129.5, 129.3, 128.7, 128.2, 126.9, 126.8, 125.7, 123.8, 112.8, 40.4, 23.2, 11.0. HRMS (ESI): m/z calcd for $C_{34}H_{31}ONCl_2Na$ $[M+Na]^+$: 562.1675, found: 562.1681.

2-(2,6-bis((*E*)-4-methyl-1-(o-tolyl)penta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3aj**)



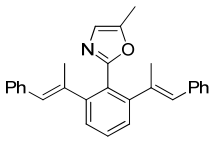
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2j** (42.5 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 60 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3aj** as a colorless oil (13.5 mg, 27% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.44 – 7.39 (m, 1H), 7.35 (s, 1H), 7.34 (d, *J* = 1.5 Hz, 1H), 7.18 – 7.13 (m, 8H), 6.85 (d, *J* = 1.3 Hz, 1H), 6.54 (s, 2H), 4.64 (s, 2H), 4.60 (s, 2H), 2.82 (s, 4H), 2.33 (d, *J* = 0.8 Hz, 3H), 2.23 (s, 6H), 1.53 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 148.5, 144.8, 143.0, 140.5, 137.2, 136.7, 131.4, 129.8, 129.1, 128.9, 128.4, 127.1, 126.0, 125.5, 123.8, 112.8, 40.2, 22.9, 20.1, 11.1. HRMS (ESI): m/z calcd for $C_{36}H_{37}ONNa$ $[M+Na]^+$: 522.2767, found: 522.2769.

2-(2,6-bis((*E*)-4-methyl-1-(thiophen-2-yl)penta-1,4-dien-2-yl)phenyl)-5-methyloxazole (**3ak**)



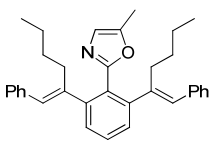
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2k** (40.5 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 42 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ak** as a colorless oil (16.9 mg, 35% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.41 – 7.32 (m, 3H), 7.23 (dd, *J* = 5.0, 1.3 Hz, 2H), 7.00 – 6.94 (m, 4H), 6.75 (s, 1H), 6.68 (s, 2H), 4.76 (s, 4H), 3.11 (s, 4H), 2.24 (s, 3H), 1.72 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.5, 148.7, 145.7, 141.7, 140.3, 137.8, 129.5, 128.2, 127.8, 126.9, 125.4, 125.3, 123.7, 111.9, 41.3, 23.4, 11.0. HRMS (ESI): m/z calcd for $C_{30}H_{29}ONS_2Na$ $[M+Na]^+$: 506.1583, found: 506.1588.

2-(2,6-bis((*E*)-1-phenylprop-1-en-2-yl)phenyl)-5-methyloxazole (**3al**)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2l** (29.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 13 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3al** as a white solid (28.2 mg, 72% yield). Melting point: 104.6–105.5°C. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.44 – 7.38 (m, 1H), 7.32 – 7.27 (m, 5H), 7.21 – 7.13 (m, 7H), 6.74 (d, *J* = 1.3 Hz, 1H), 6.33 (s, 2H), 2.23 (d, *J* = 1.2 Hz, 3H), 1.97 (d, *J* = 1.5 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 148.5, 147.2, 138.2, 138.1, 129.8, 129.7, 129.0, 128.2, 127.2, 126.5, 125.6, 123.6, 19.8, 11.0. HRMS (ESI): m/z calcd for $C_{28}H_{25}ONNa$ $[M+Na]^+$: 414.1828, found: 414.1837.

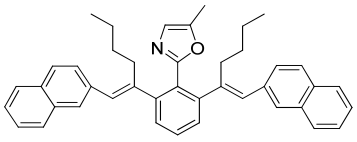
2-(2,6-bis((*E*)-1-phenylhex-1-en-2-yl)phenyl)-5-methyloxazole (**3am**)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2m** (39.5 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 17

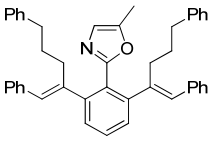
h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3am** as a colorless oil (30.4 mg, 64% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.47 (t, *J* = 8.4 Hz, 1H), 7.39 – 7.30 (m, 6H), 7.26 – 7.20 (m, 6H), 6.81 (s, 1H), 6.43 (s, 2H), 2.38 – 2.32 (m, 4H), 2.31 (s, 3H), 1.42 – 1.32 (m, 4H), 1.31 – 1.20 (m, 4H), 0.83 (t, *J* = 7.2 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.7, 148.2, 145.7, 143.2, 138.3, 130.1, 129.3, 128.8, 128.2, 127.7, 126.5, 126.5, 123.5, 31.8, 30.5, 22.9, 14.0, 11.0. HRMS (ESI): m/z calcd for $C_{34}H_{37}ONNa$ $[M+Na]^+$: 498.2767, found: 498.2764.

2-(2,6-bis((*E*)-1-phenylhex-1-en-2-yl)phenyl)-5-methyloxazole (3an)



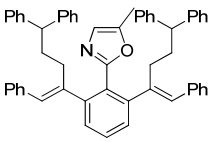
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2n** (52.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 19 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3an** as a colorless oil (39.1 mg, 68% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.84 – 7.78 (m, 6H), 7.67 (s, 2H), 7.54 – 7.39 (m, 7H), 7.35 (dd, *J* = 8.5, 1.7 Hz, 2H), 6.82 (d, *J* = 1.3 Hz, 1H), 6.57 (s, 2H), 2.41 (d, *J* = 8 Hz, 4H), 2.31 (d, *J* = 1.2 Hz, 3H), 1.46 – 1.36 (m, 4H), 1.30 – 1.22 (m, 4H), 0.83 (t, *J* = 7.3 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 148.3, 145.8, 143.6, 135.8, 133.5, 132.3, 130.2, 129.4, 128.0, 127.7, 127.6, 127.5, 127.4, 126.6, 126.1, 125.7, 123.6, 31.9, 30.6, 22.9, 14.0, 11.1. HRMS (ESI): m/z calcd for $C_{42}H_{41}ONNa$ $[M+Na]^+$: 598.3080, found: 598.3085.

2-(2,6-bis((*E*)-1,5-diphenylpent-1-en-2-yl)phenyl)-5-methyloxazole (3ao)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2o** (55.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 21 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ao** as a white solid (36.0 mg, 60% yield). Melting point: 57.9–59.8°C. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.41 – 7.34 (m, 1H), 7.25 – 7.17 (m, 5H), 7.17 – 7.03 (m, 13H), 7.01 – 6.96 (m, 4H), 6.71 (s, 1H), 6.34 (s, 2H), 2.45 (t, *J* = 7.6 Hz, 4H), 2.33 (t, *J* = 7.6 Hz, 4H), 2.18 (s, 3H), 1.69 – 1.57 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.6, 148.3, 145.5, 142.5, 142.3, 138.0, 130.6, 129.5, 128.8, 128.5, 128.3, 128.2, 127.8, 126.5, 125.7, 123.5, 35.8, 31.5, 30.0, 11.0. HRMS (ESI): m/z calcd for $C_{44}H_{41}ONNa$ $[M+Na]^+$: 622.3080, found: 622.3083.

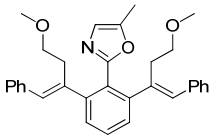
2-(2,6-bis((*E*)-1,5,5-triphenylpent-1-en-2-yl)phenyl)-5-methyloxazole (3ap)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2p** (74.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 °C for 20 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 20/1, v/v) afforded **3ap** as a white solid (52.6 mg, 70% yield). Melting point: 130.4–131.9°C. ^{1}H NMR (400 MHz, $CDCl_3$): δ = δ 7.43 – 7.35 (m, 1H), 7.24 (s, 1H), 7.21 – 7.11 (m, 15H), 7.10 – 7.03 (m, 12H), 7.00 (d, *J* = 6.7 Hz, 4H), 6.67 (s, 1H), 6.35 (s, 2H), 3.77 (t, *J* = 7.6 Hz, 2H), 2.38 – 2.27 (m, 4H), 2.19 – 2.04 (m, 7H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.4,

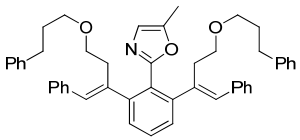
148.1, 145.5, 144.8, 142.2, 137.9, 130.7, 129.4, 128.6, 128.4, 128.2, 127.9, 127.8, 126.6, 126.5, 126.1, 123.5, 51.2, 34.2, 30.6, 11.0. HRMS (ESI): m/z calcd for $C_{56}H_{49}ONNa$ $[M+Na]^+$: 774.3706, found: 774.3712.

2-(2,6-bis((*E*)-4-methoxy-1-phenylbut-1-en-2-yl)phenyl)-5-methyloxazole (**3aq**)



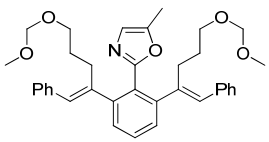
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2q** (40.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 100 ºC for 20 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 5/1, v/v) afforded **3aq** as a colorless oil (29.7 mg, 62% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.51 – 7.45 (m, 1H), 7.39 – 7.28 (m, 6H), 7.25 – 7.18 (m, 6H), 6.78 (s, 1H), 6.46 (s, 2H), 3.37 (t, *J* = 7.2 Hz, 4H), 3.23 (s, 6H), 2.66 (t, *J* = 7.3 Hz, 4H), 2.28 (d, *J* = 1.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.4, 148.5, 145.0, 138.9, 137.7, 132.1, 129.5, 128.8, 128.3, 127.9, 126.8, 126.6, 123.6, 70.8, 58.6, 32.5, 11.1. HRMS (ESI): m/z calcd for $C_{32}H_{33}O_3NNa$ $[M+Na]^+$: 502.2353, found: 502.2357.

2-(2,6-bis((*E*)-1-phenyl-4-(3-phenylpropoxy)but-1-en-2-yl)phenyl)-5-methyloxazole (**3ar**)



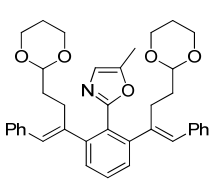
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2r** (66.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 36 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 5/1, v/v) afforded **3ar** as a colorless oil (37.1 mg, 54% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.37 – 7.31 (m, 1H), 7.25 – 7.19 (m, 5H), 7.18 – 7.09 (m, 11H), 7.09 – 7.01 (m, 6H), 6.66 (s, 1H), 6.35 (s, 2H), 3.29 (t, *J* = 7.2 Hz, 4H), 3.19 (t, *J* = 6.4 Hz, 4H), 2.58 – 2.48 (m, 8H), 2.16 (s, 3H), 1.75 – 1.65 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.5, 148.5, 145.1, 142.2, 139.2, 137.8, 132.0, 129.5 128.9, 128.6, 128.4, 128.3, 128.0, 126.8, 126.5, 125.8, 123.6, 70.0, 68.9, 32.6, 32.5, 31.5, 11.1. HRMS (ESI): m/z calcd for $C_{48}H_{49}O_3NNa$ $[M+Na]^+$: 710.3605, found: 710.3609.

2-(2,6-bis((*E*)-5-(methoxymethoxy)-1-phenylpent-1-en-2-yl)phenyl)-5-methyloxazole (**3as**)



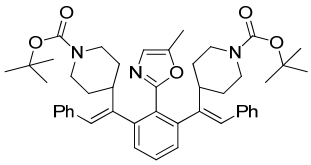
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2s** (51.0 mg, 2.5 equiv), $Cp^*Rh(CH_3CN)_3(SbF_6)_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 17 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 5/1, v/v) afforded **3as** as a colorless oil (36.3 mg, 64% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.49 – 7.43 (m, 1H), 7.38 – 7.28 (m, 6H), 7.24 – 7.15 (m, 6H), 6.78 (s, 1H), 6.40 (s, 2H), 4.48 (s, 4H), 3.41 (t, *J* = 6.5 Hz, 4H), 3.26 (s, 6H), 2.41 (t, *J* = 8 Hz, 4H), 2.28 (s, 3H), 1.71 – 1.58 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.6, 148.4, 145.4, 141.9, 137.9, 130.9, 129.5, 128.8, 128.2, 127.7, 126.7, 126.6, 123.5, 96.4, 67.6, 55.2, 28.6, 28.4, 11.0. HRMS (ESI): m/z calcd for $C_{36}H_{41}O_5NNa$ $[M+Na]^+$: 590.2877, found: 590.2881.

2-(2,6-bis((*E*)-4-(1,3-dioxan-2-yl)-1-phenylbut-1-en-2-yl)phenyl)-5-methyloxazole (**3at**)



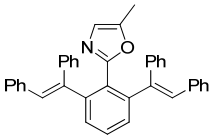
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2t** (54.0 mg, 2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 19 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 4/1, v/v) afforded **3at** as a white solid (39.0 mg, 66% yield). Melting point: 93.4–95.1°C. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.43 (t, *J* = 7.7 Hz, 1H), 7.35 – 7.27 (m, 6H), 7.23 – 7.15 (m, 6H), 6.74 (s, 1H), 6.35 (s, 2H), 4.40 (t, *J* = 5.2 Hz, 2H), 4.00 (dd, *J* = 11.5, 4.8 Hz, 4H), 3.62 (t, *J* = 11.3 Hz, 4H), 2.50 (t, *J* = 7.6 Hz, 4H), 2.26 (s, 3H), 2.07 – 1.94 (m, 2H), 1.77 – 1.63 (m, 4H), 1.26 (d, *J* = 12.9 Hz, 2H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.5, 148.2, 145.3, 141.5, 137.9, 130.9, 129.4, 128.8, 128.2, 127.6, 126.9, 126.5, 123.4, 102.0, 66.9, 33.7, 26.5, 25.9, 11.1. HRMS (ESI): m/z calcd for $C_{38}H_{42}O_5N$ $[M+H]^+$: 592.3057, found: 592.3067.

di-tert-butyl 4,4'-((1*E*,1'*E*)-(2-(5-methyloxazol-2-yl)-1,3-phenylene)bis(2-phenylethene-1,1-diyl))bis(piperidine-1-carboxylate) (3au)



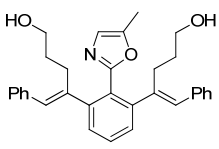
The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2u** (71.3 mg, 2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 100 ºC for 26 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 4/1, v/v) afforded **3au** as a white solid (40.8 mg, 56% yield). Melting point: 156.7–157.9 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.44 – 7.39 (m, 1H), 7.35 – 7.29 (m, 4H), 7.27 (s, 1H), 7.26 – 7.20 (m, 3H), 7.10 (d, *J* = 7.5 Hz, 4H), 6.78 (d, *J* = 1.4 Hz, 1H), 6.42 (s, 2H), 4.21 – 3.92 (m, 4H), 2.82 (tt, *J* = 12.1, 3.2 Hz, 2H), 2.56 (t, *J* = 12.8 Hz, 4H), 2.29 (d, *J* = 1.3 Hz, 3H), 1.61 (d, *J* = 12.7 Hz, 4H), 1.40 (s, 22H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.8, 154.9, 148.1, 144.1, 143.7, 137.5, 132.1, 128.9, 128.6, 128.3, 128.1, 128.1, 126.8, 123.1, 79.4, 43.9, 39.2, 31.0, 28.6, 11.0. HRMS (ESI): m/z calcd for $C_{46}H_{55}O_5N_3Na$ $[M+Na]^+$: 752.4034, found: 752.4040.

2-(2,6-bis((*E*)-1,2-diphenylvinyl)phenyl)-5-methyloxazole (3av)



The general procedure was applied to **1a** (15.9 mg, 0.1 mmol), **2v** (44.5 mg, 2.5 equiv), Cp*Rh(CH_3CN)$_3$(SbF_6)$_2$ (5.9 mg, 7 mol%), $PhOCH_2COOH$ (22.8 mg, 1.5 equiv), MnO_2 (2.6 mg, 0.3 equiv) in toluene (1.0 mL) at 80 ºC for 30 h under Ar. Purification by column chromatography on silica gel (petroleum ether/ethyl acetate = 8/1, v/v) afforded **3av** as a colorless oil (15.4 mg, 30% yield). ^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.51 – 7.40 (m, 3H), 7.17 – 7.06 (m, 12H), 7.04 – 6.95 (m, 8H), 6.65 (s, 2H), 6.32 (s, 1H), 1.84 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.0, 147.9, 146.4, 141.8, 139.9, 137.5, 130.7, 130.1, 129.6, 129.4, 128.0, 127.9, 126.8, 126.8, 123.0, 10.5. HRMS (ESI): m/z calcd for $C_{38}H_{30}ON$ $[M+H]^+$: 516.2322, found: 516.2324.

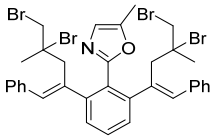
(4*E*,4'*E*)-4,4'-(2-(5-methyloxazol-2-yl)-1,3-phenylene)bis(5-phenylpent-4-en-1-ol) (4)



^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.49 (t, *J* = 7.7 Hz, 1H), 7.38 – 7.28 (m, 6H), 7.25 – 7.19 (m, 2H), 7.16 (d, *J* = 7.5 Hz, 4H), 6.81 (s, 1H), 6.38 (s, 2H), 3.46 (t, *J* = 6.3 Hz, 4H), 2.45 (t, *J* = 7.5 Hz, 4H), 2.31 (s, 3H), 1.67 – 1.54 (m,

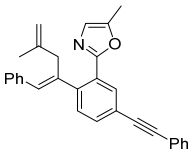
4H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 160.1, 148.9, 145.5, 141.8, 137.8, 131.0, 129.9, 128.8, 128.3, 127.7, 126.8, 126.5, 123.0, 62.3, 31.3, 28.1, 11.1. HRMS (ESI): m/z calcd for $C_{32}H_{34}O_3N$ $[M+H]^+$: 480.2533, found: 480.2530.

2-(2,6-bis((*E*)-4,5-dibromo-4-methyl-1-phenylpent-1-en-2-yl)phenyl)-5-methyloxazole (**5**)



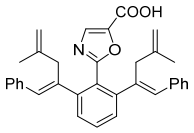
Melting point: 126.1–127.8 °C. ^{1} H NMR (400 MHz, $CDCl_3$): δ = 7.54 (s, 3H), 7.35 (t, *J* = 7.5 Hz, 4H), 7.25 – 7.19 (m, 6H), 6.96 (s, 1H), 6.71 (s, 2H), 3.68 – 3.58 (m, 4H), 3.15 – 2.96 (m, 4H), 2.41 (s, 3H), 1.56 (d, J = 2.8 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 159.2, 149.0, 149.0, 145.2, 137.5, 137.4, 136.6, 130.0, 130.0, 129.0, 129.0, 128.9, 128.5, 127.1, 125.9, 123.8, 123.8, 66.6, 66.5, 45.1, 42.4, 30.6, 30.6, 11.3.

(*E*)-5-methyl-2-(2-(4-methyl-1-phenylpenta-1,4-dien-2-yl)-5-(phenylethynyl)phenyl)oxazole (**6**)



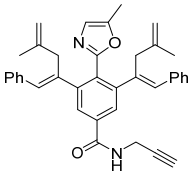
^{1} H NMR (400 MHz, $CDCl_3$): δ = 7.99 (s, 1H), 7.51 – 7.38 (m, 3H), 7.32 – 7.21 (m, 8H), 7.20 – 7.13 (m, 1H), 6.76 (s, 1H), 6.53 (s, 1H), 4.56 (d, *J* = 25.5 Hz, 2H), 3.07 (s, 2H), 2.25 (s, 3H), 1.49 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ =160.3, 149.2, 143.2, 142.8, 140.5, 137.8, 132.6, 132.3, 131.8, 130.9, 128.8, 128.5, 128.4, 126.9, 126.5, 124.4, 123.3, 122.4, 112.6, 90.3, 88.7, 40.5, 23.2, 11.2.

2-(2,6-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)phenyl)oxazole-5-carboxylic acid (**7**)



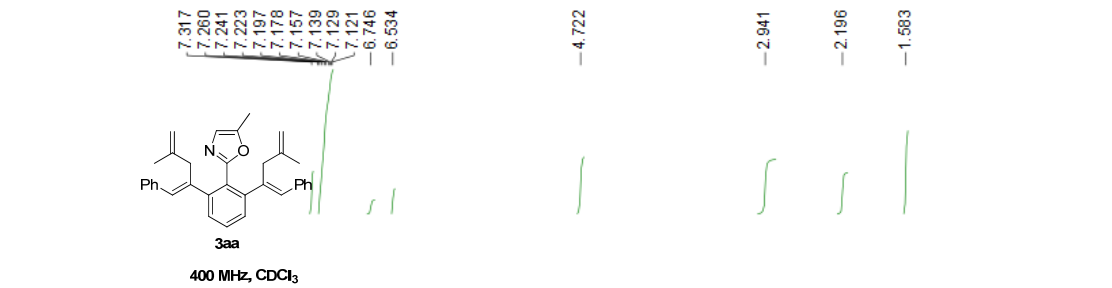
Melting point: 124.1–125.8 °C. ^{1} H NMR (400 MHz, $CDCl_3$): δ = 7.88 (s, 1H), 7.47 – 7.33 (m, 3H), 7.25 – 7.12 (m, 9H), 6.51 (s, 2H), 4.75 (d, *J* = 6.2 Hz, 4H), 2.99 (s, 4H), 1.62 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 165.3, 161.6, 145.9, 142.6, 141.7, 138.8, 137.3, 136.3, 133.3, 130.2, 128.6, 128.3, 128.2, 127.0, 124.2, 112.9, 40.7, 23.3.

3,5-bis((*E*)-4-methyl-1-phenylpenta-1,4-dien-2-yl)-4-(5-methyloxazol-2-yl)-*N*-(prop-2-yn-1-yl)benzamide (**8**)



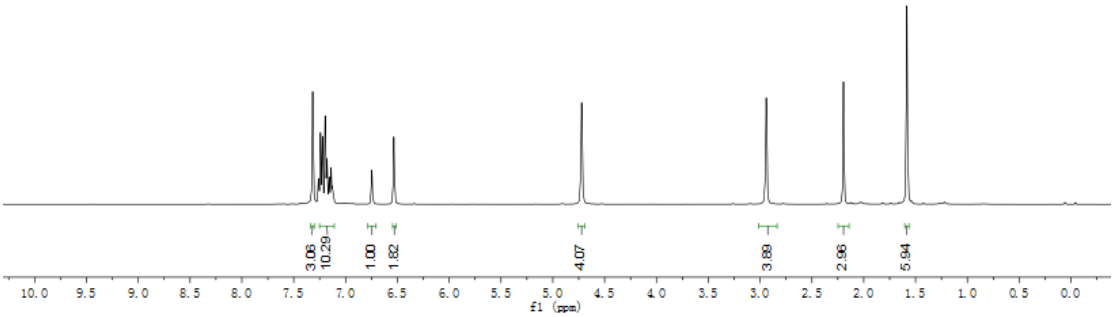
^{1} H NMR (400 MHz, $CDCl_3$): δ = 7.73 (s, 2H), 7.36 – 7.29 (m, 4H), 7.28 – 7.21 (m, 6H), 6.84 (s, 1H), 6.60 (s, 2H), 6.30 (s, 1H), 4.74 (d, *J* = 13.1 Hz, 4H), 4.30 (s, 2H), 2.96 (s, 4H), 2.32 (s, 1H), 2.29 (s, 3H), 1.61 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$): δ = 166.7, 158.8, 148.9, 146.1, 142.6, 139.0, 137.5, 134.3, 133.3, 128.7, 128.3, 127.0, 126.7, 123.9, 112.9, 79.5, 72.2, 40.2, 30.1, 23.2, 11.1.

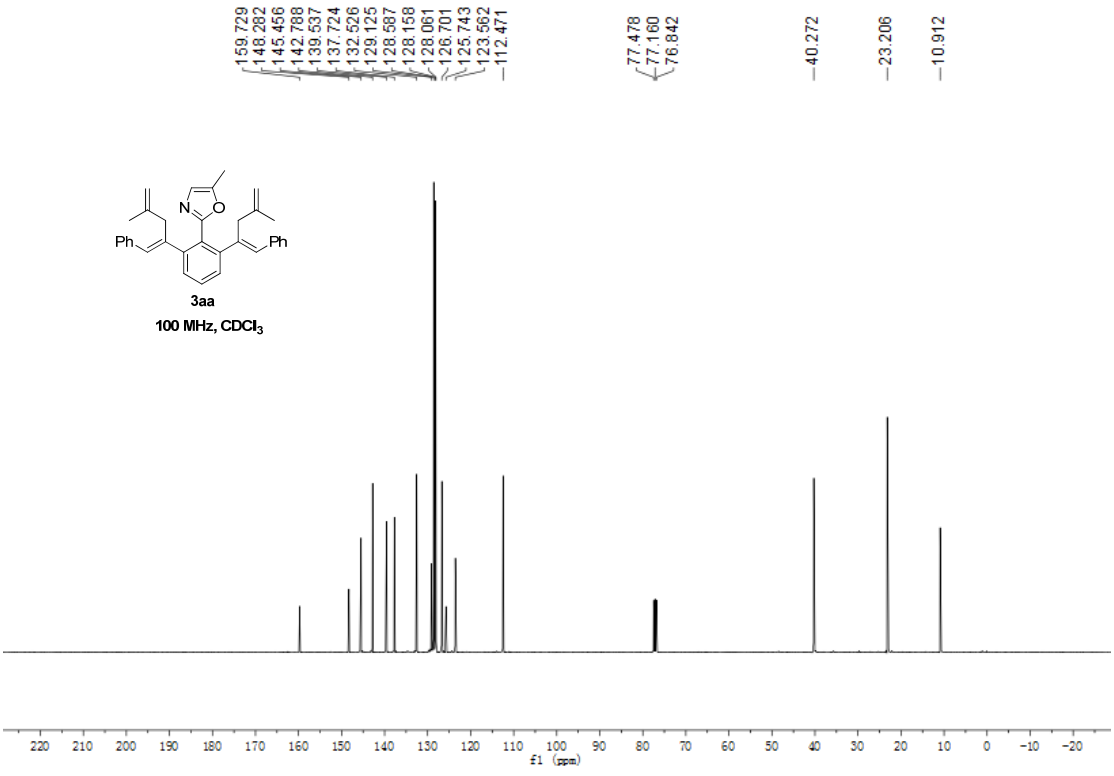
10. ^{1}H , ^{13}C and ^{19}F NMR spectra



3aa

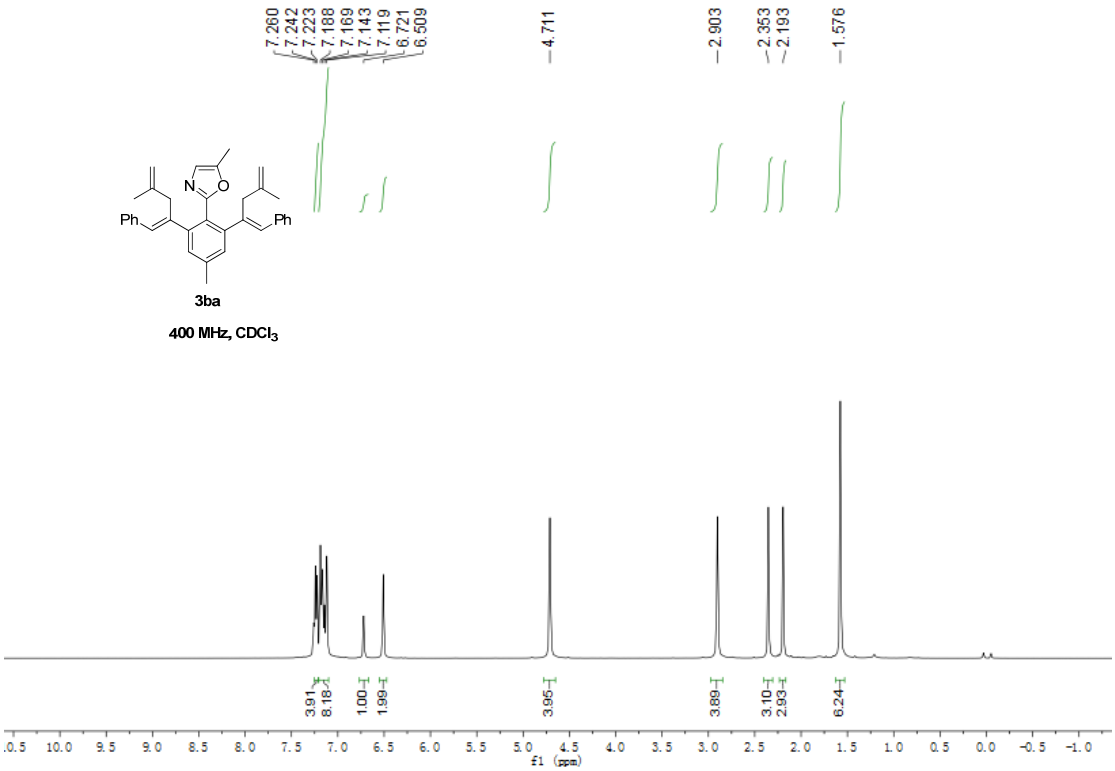
400 MHz, $CDCl_3$

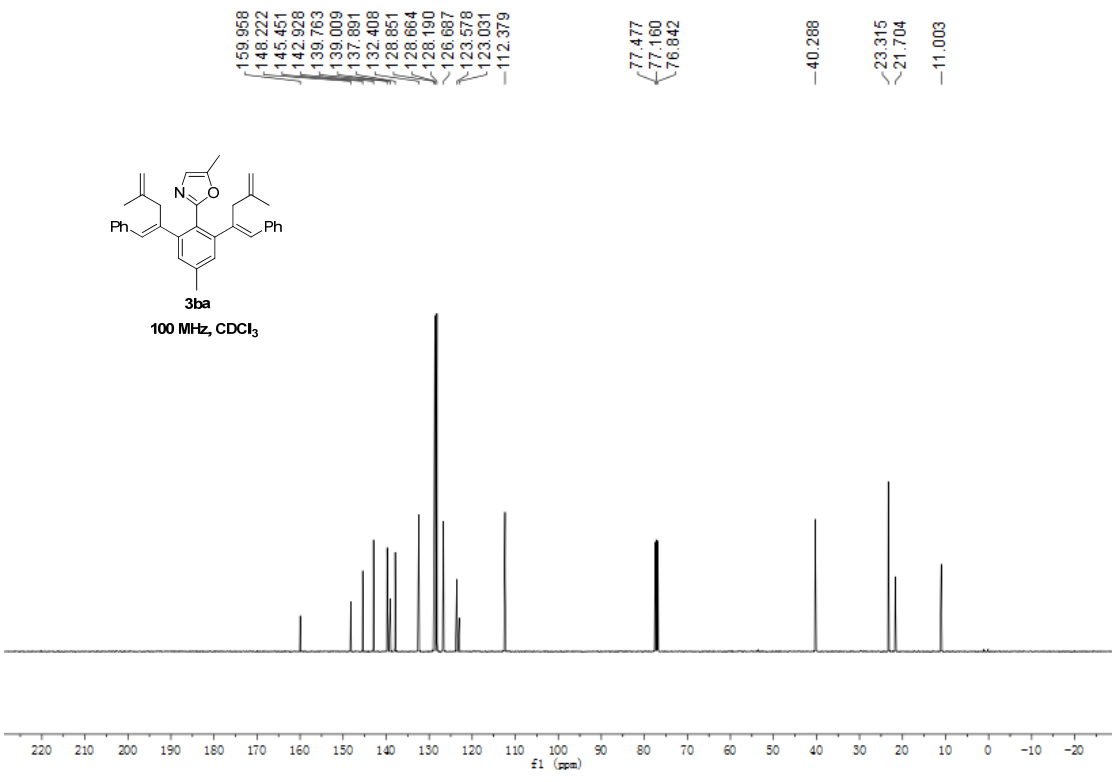


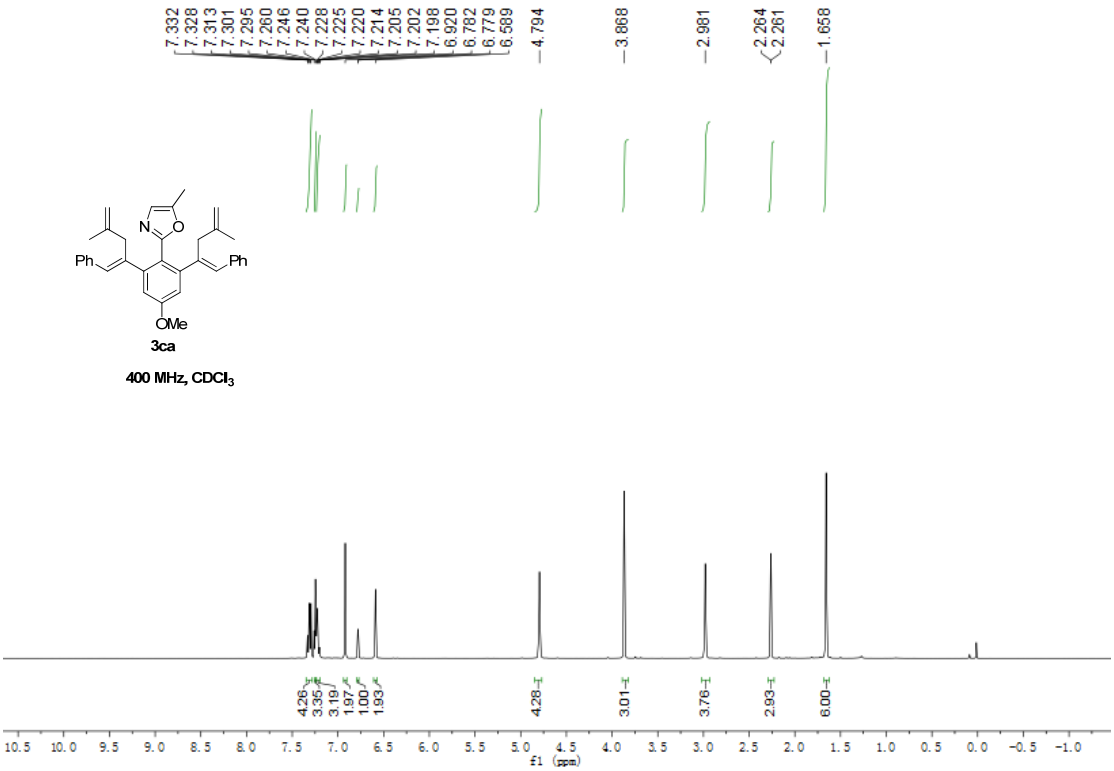


3aa

100 MHz, $CDCl_3$

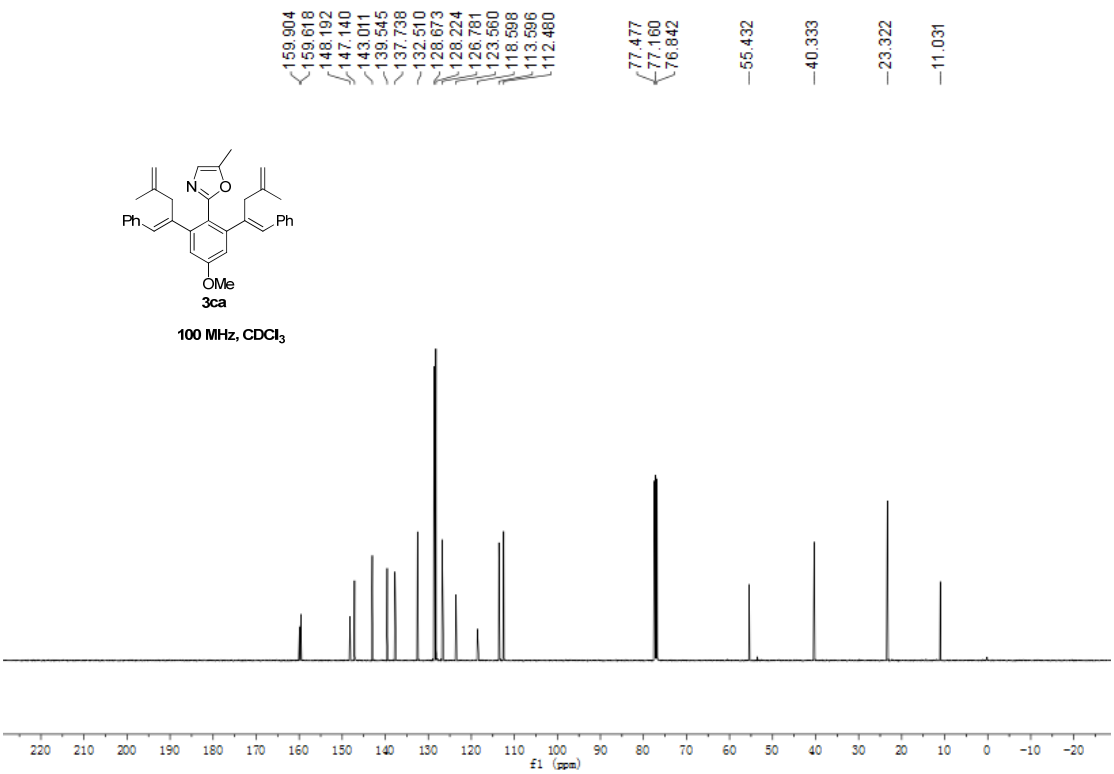

7.260
7.242
7.223
7.188
7.169
7.143
7.119
6.721
6.509
4.711
2.903
2.353
2.193
1.576
Ph
Ph
3ba
400 MHz, CDCl3
3.91
8.18
1.00
1.99
3.95
3.89
3.10
2.93
6.24
f1 (ppm)


159.958
148.222
145.451
142.928
139.763
139.009
137.891
132.408
128.851
128.664
128.190
126.687
123.578
123.031
112.379
77.477
77.160
76.842
40.288
23.315
21.704
11.003
Ph
Ph
3ba
100 MHz, CDCl3
f1 (ppm)



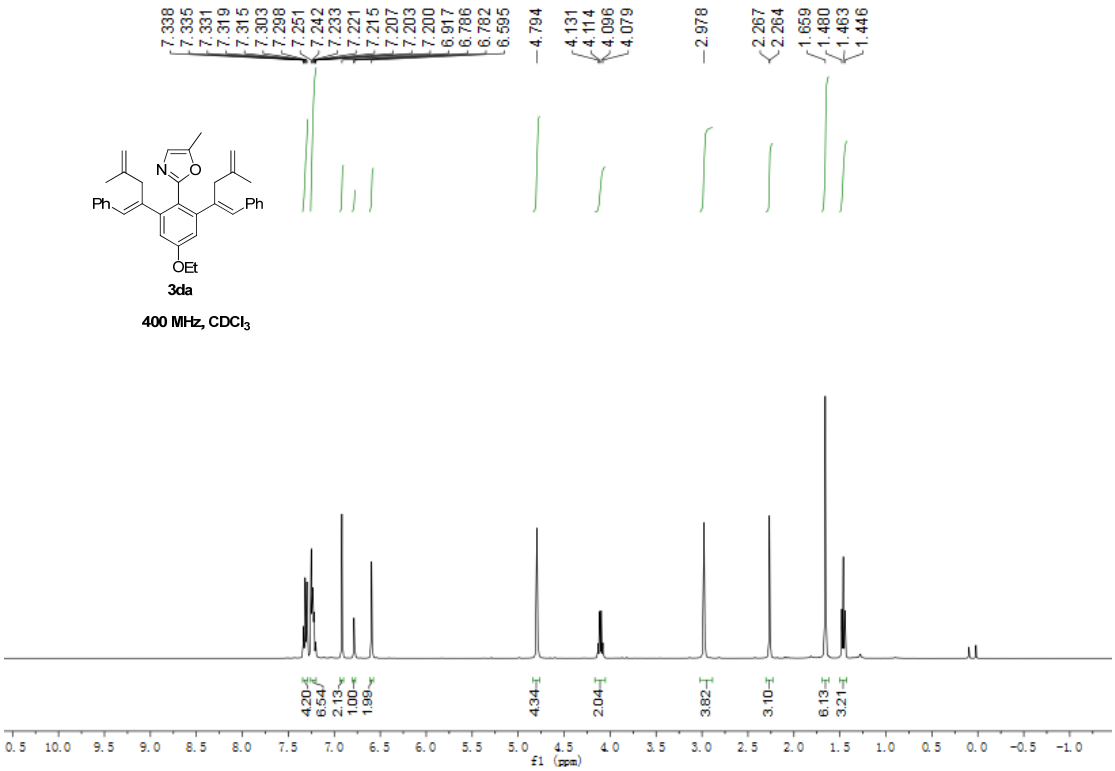
3ca

400 MHz, $CDCl_3$



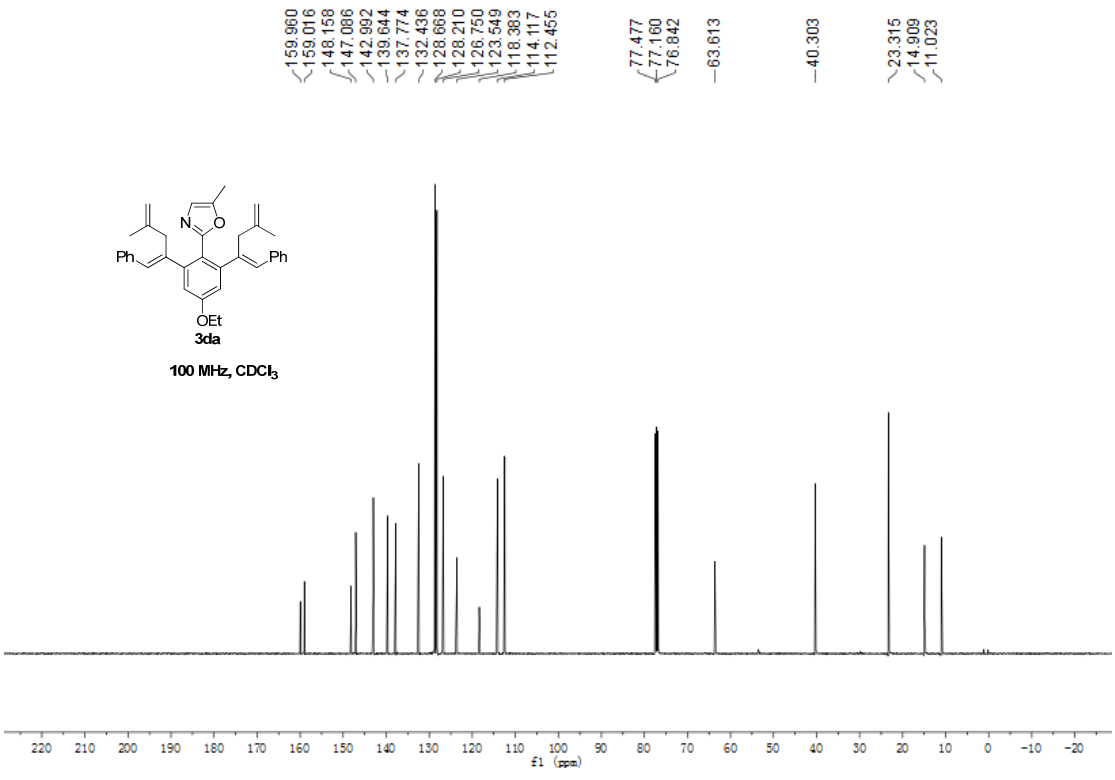
3ca

100 MHz, $CDCl_3$



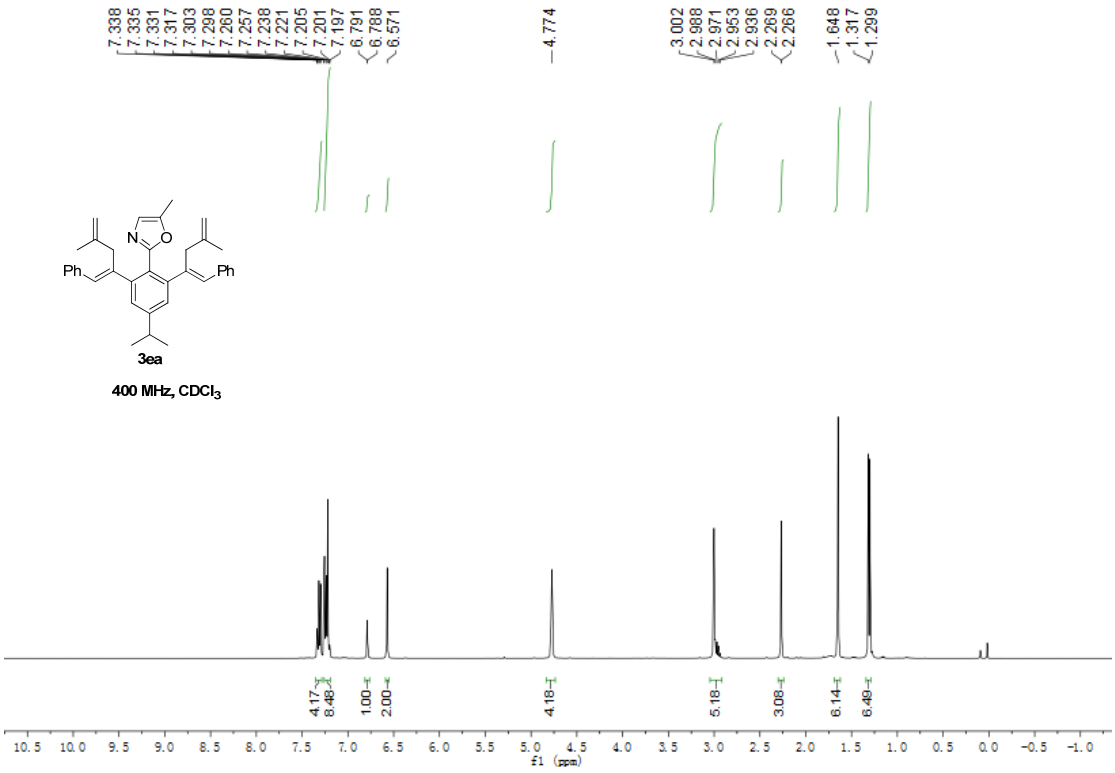
3da

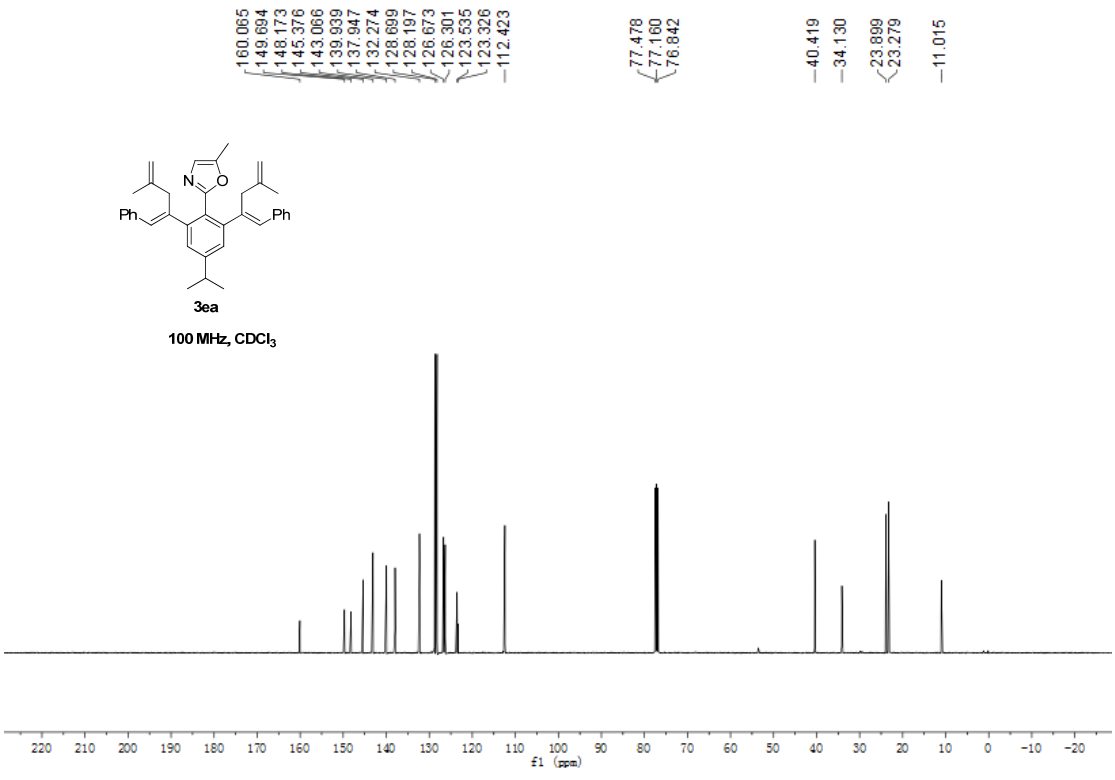
400 MHz, $CDCl_3$

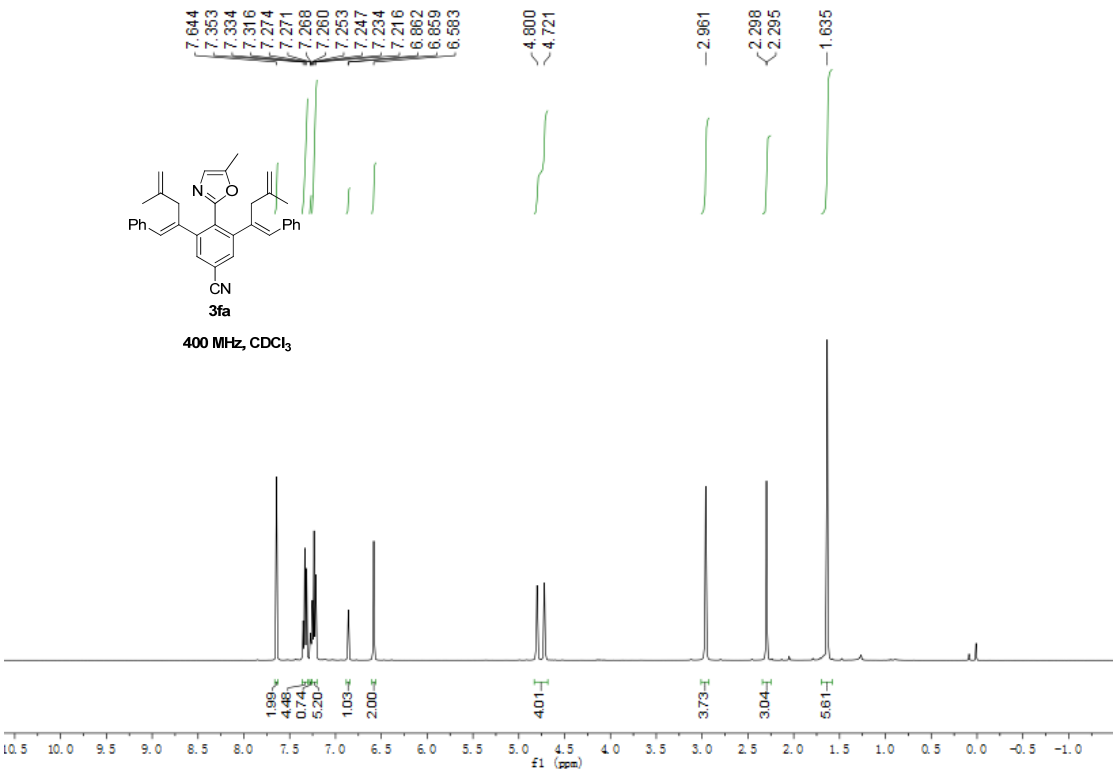


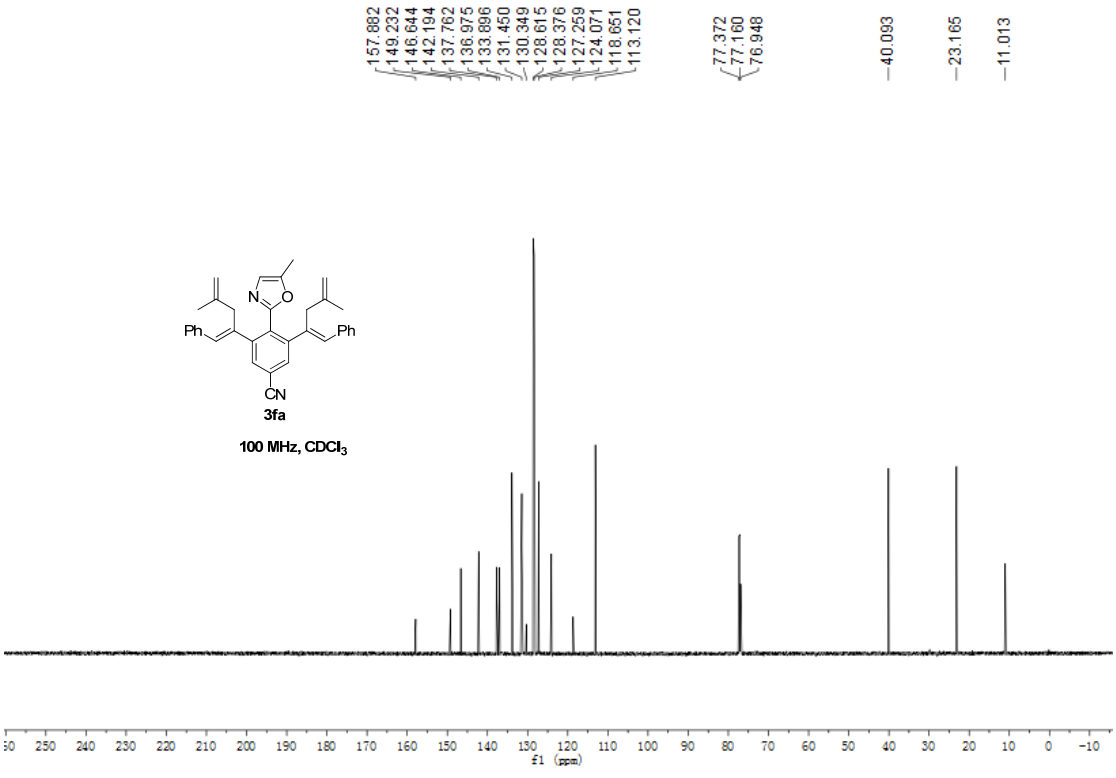
3da

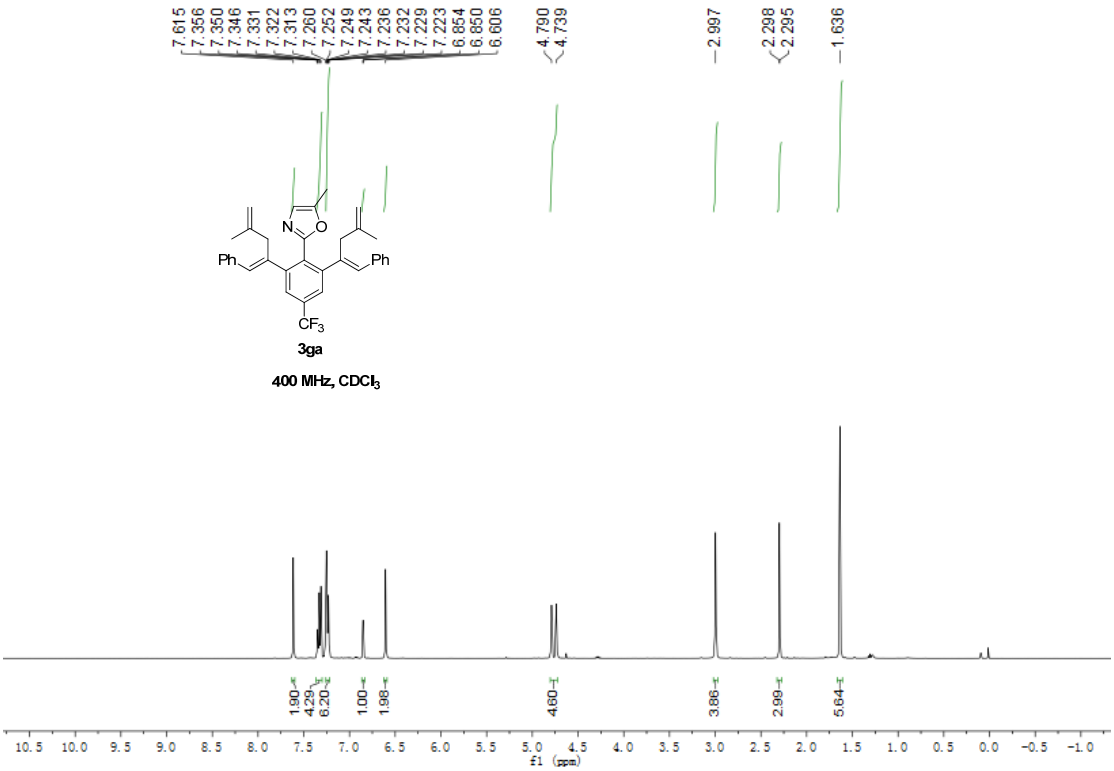
100 MHz, $CDCl_3$


7.338
7.335
7.331
7.317
7.303
7.298
7.260
7.257
7.238
7.221
7.205
7.201
7.197
6.791
6.788
6.571
4.774
3.002
2.988
2.971
2.953
2.936
2.269
2.266
1.648
1.317
1.299
Ph
Ph
3ea
400 MHz, CDCl3
4.17
8.48
1.00
2.00
4.18
5.18
3.08
6.14
6.49
f1 (ppm)


160.065
149.694
148.173
145.376
143.066
139.939
137.947
132.274
128.699
128.197
126.673
126.301
123.535
123.326
112.423
77.478
77.160
76.842
40.419
34.130
23.899
23.279
11.015
Ph
Ph
3ea
100 MHz, CDCl3
f1 (ppm)

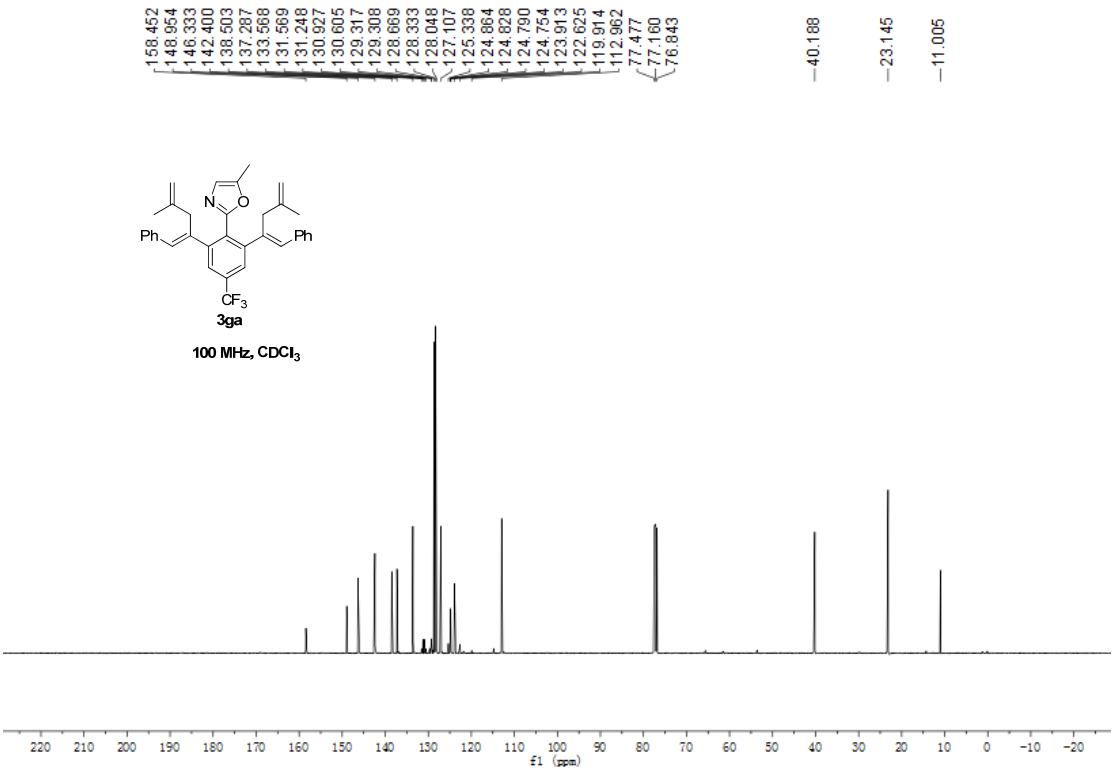

7.644
7.353
7.334
7.316
7.274
7.271
7.268
7.260
7.253
7.247
7.234
7.216
6.862
6.859
6.583
4.800
4.721
2.961
2.298
2.295
1.635
Ph
Ph
N
O
CN
3fa
400 MHz, CDCl3
1.99
4.48
0.74
5.20
1.03
2.00
4.01
3.73
3.04
5.61
f1 (ppm)


157.882
149.232
146.644
142.194
137.762
136.975
133.896
131.450
130.349
128.615
128.376
127.259
124.071
118.651
113.120
77.372
77.160
76.948
40.093
23.165
11.013
Ph
Ph
N
O
CN
3fa
100 MHz, CDCl3
f1 (ppm)



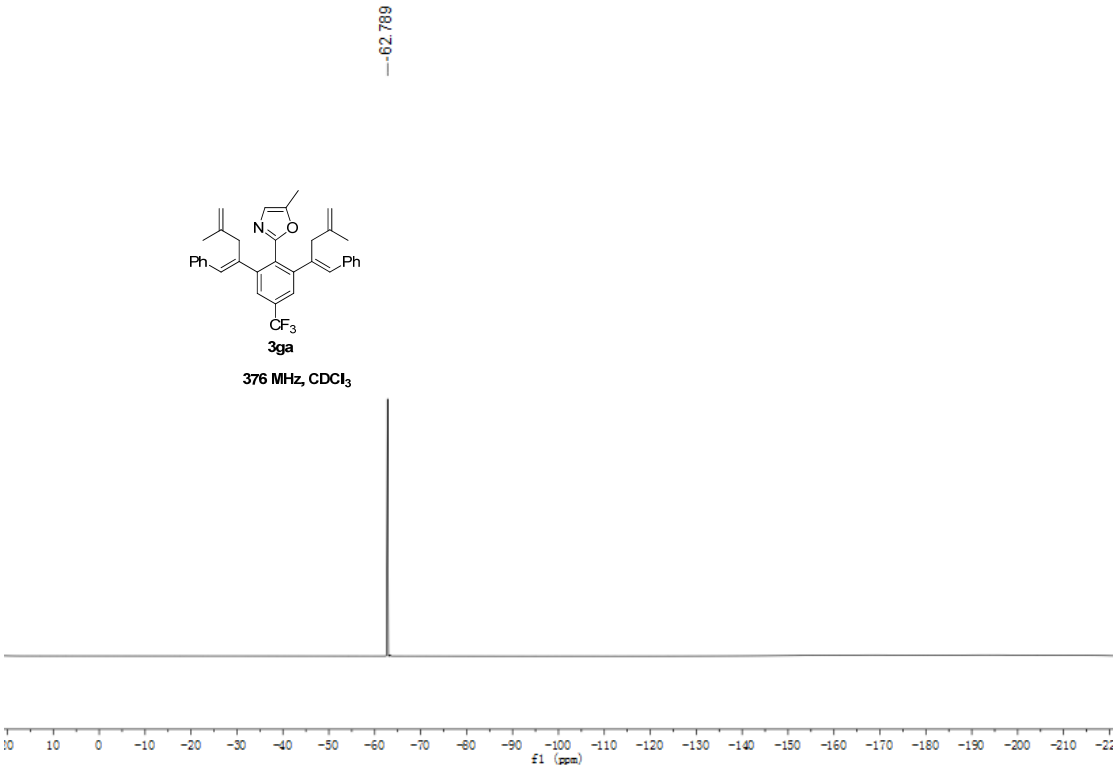
3ga

400 MHz, $CDCl_3$



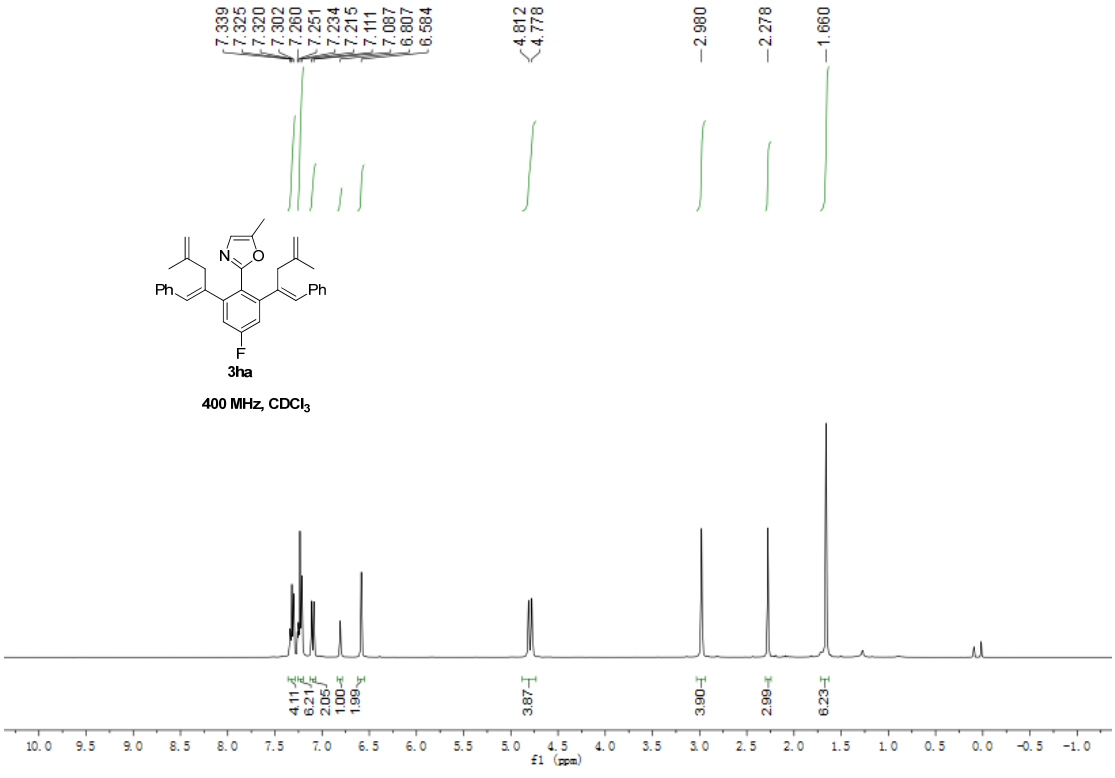
3ga

100 MHz, $CDCl_3$



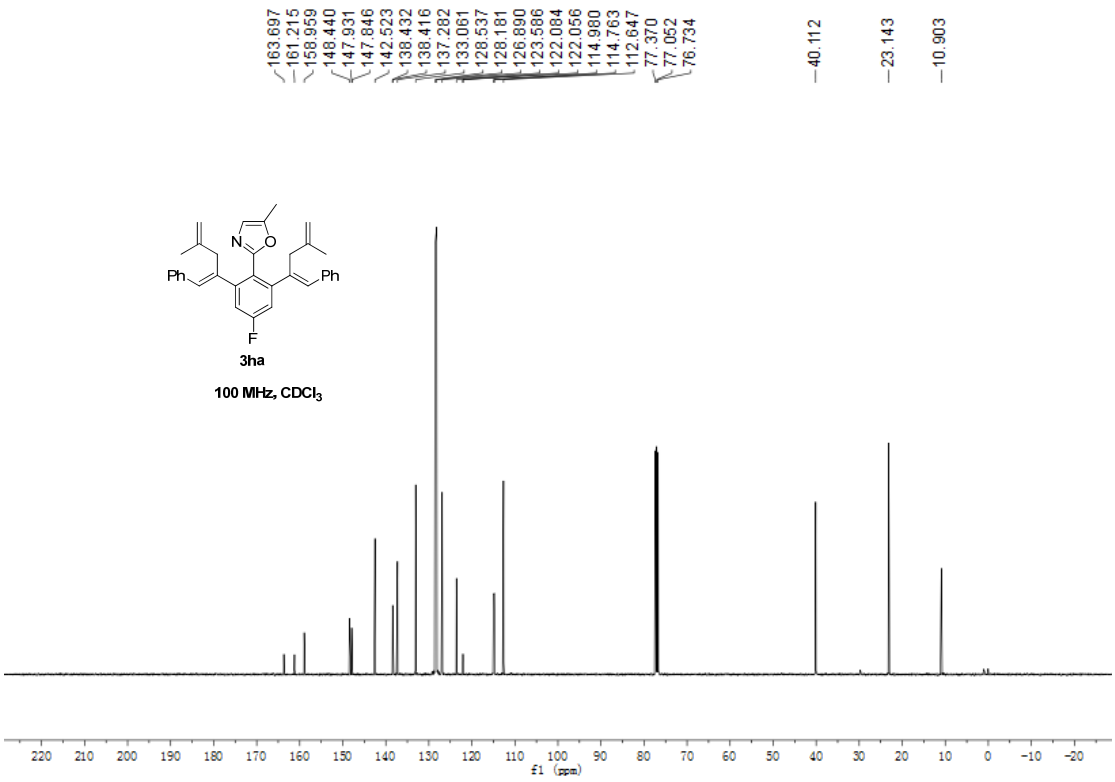
3ga

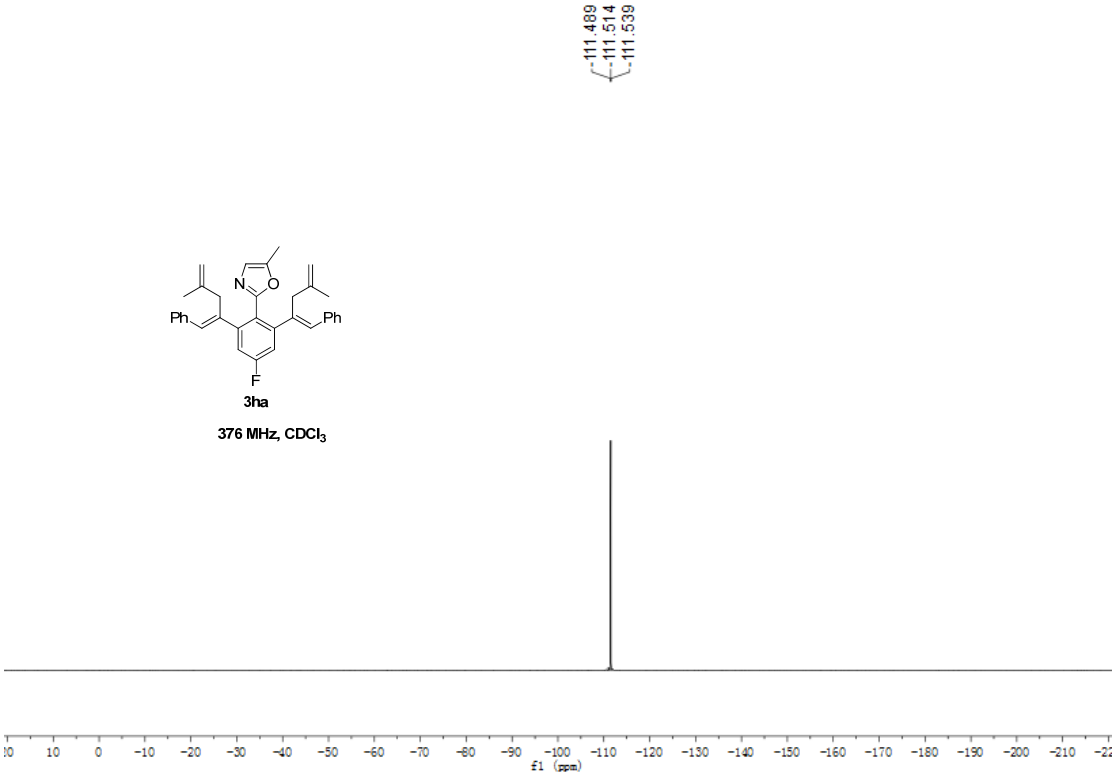
376 MHz, $CDCl_3$

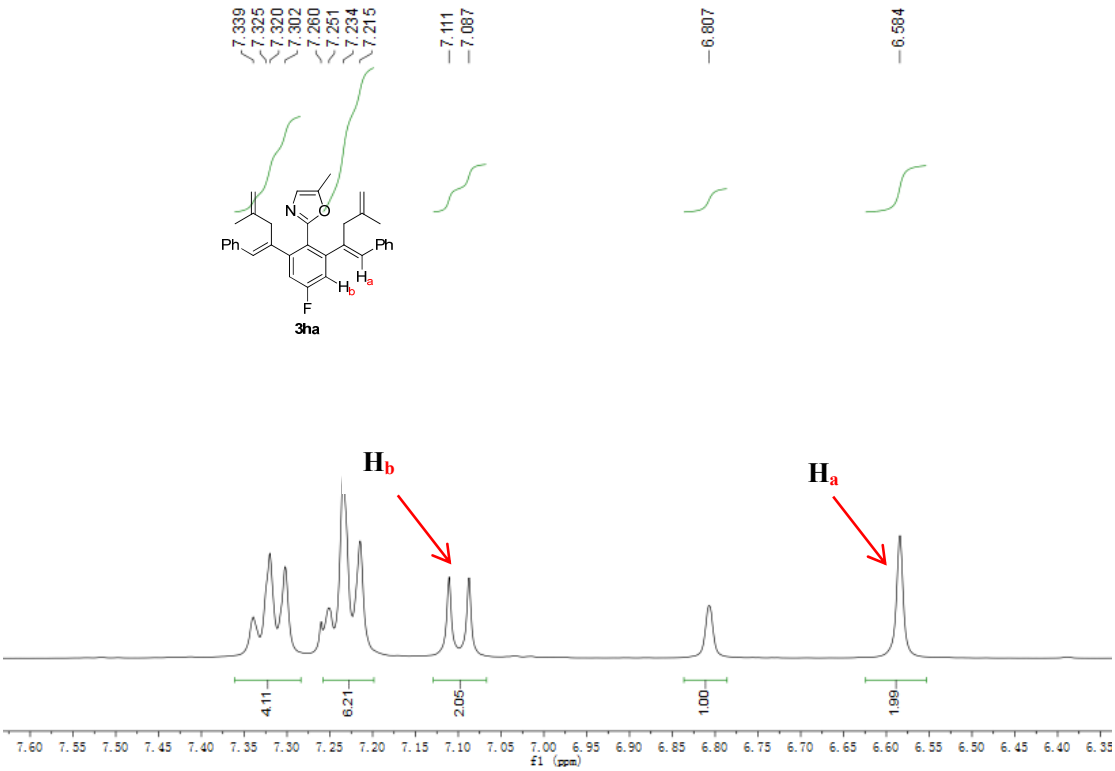


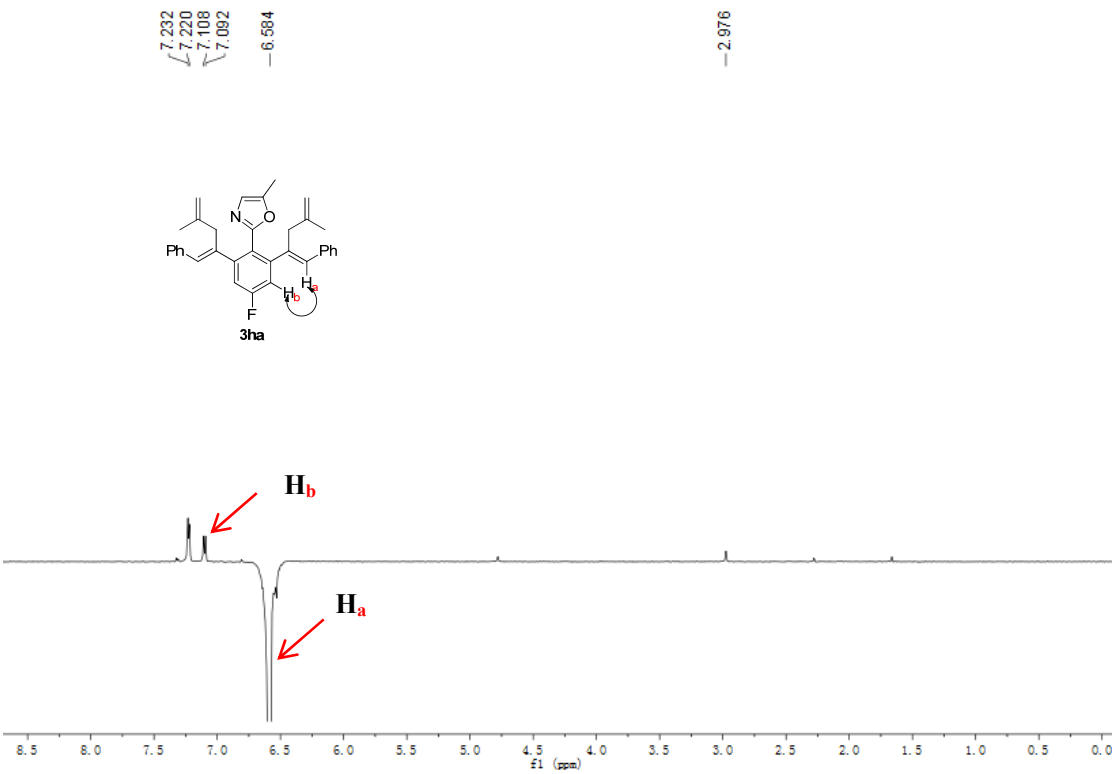
3ha

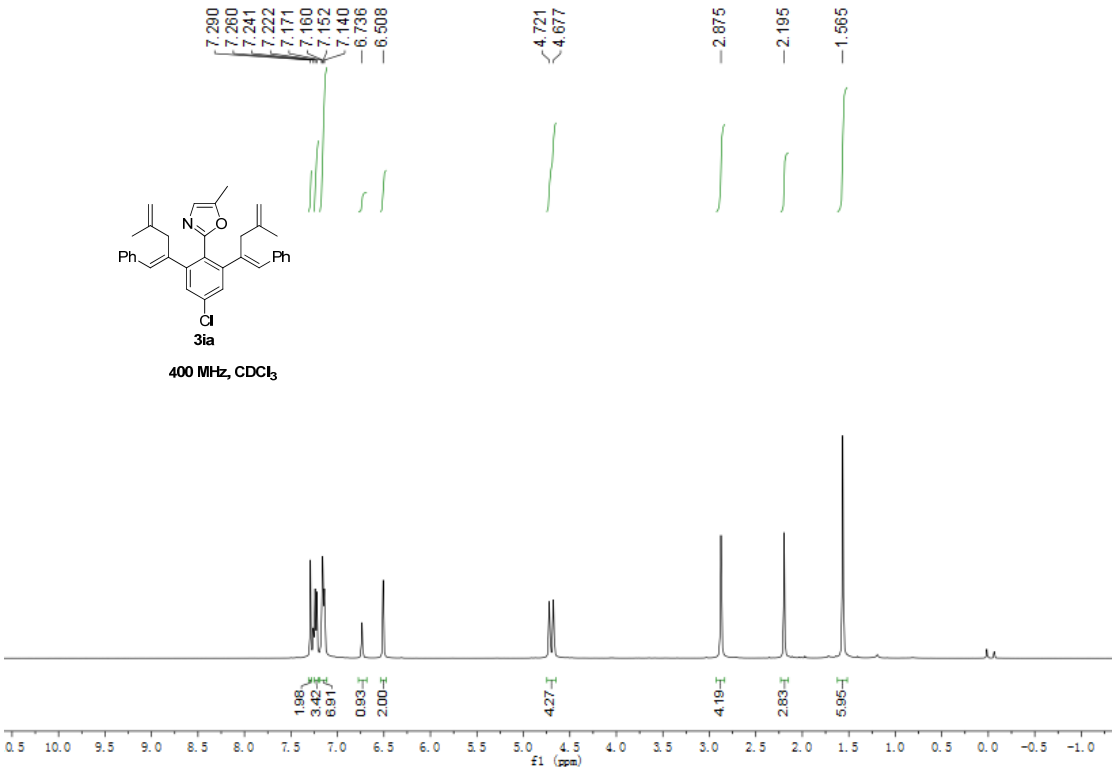
400 MHz, $CDCl_3$


163.697
161.215
158.959
148.440
147.931
147.846
142.523
138.432
138.416
137.282
133.061
128.537
128.181
126.890
123.586
122.084
122.056
114.980
114.763
112.647
77.370
77.052
76.734
40.112
23.143
10.903
N
O
Ph
Ph
F
3ha
100 MHz, CDCl3
f1 (ppm)


111.489
111.514
111.539
N
O
Ph
Ph
F
3ha
376 MHz, CDCl3
f1 (ppm)

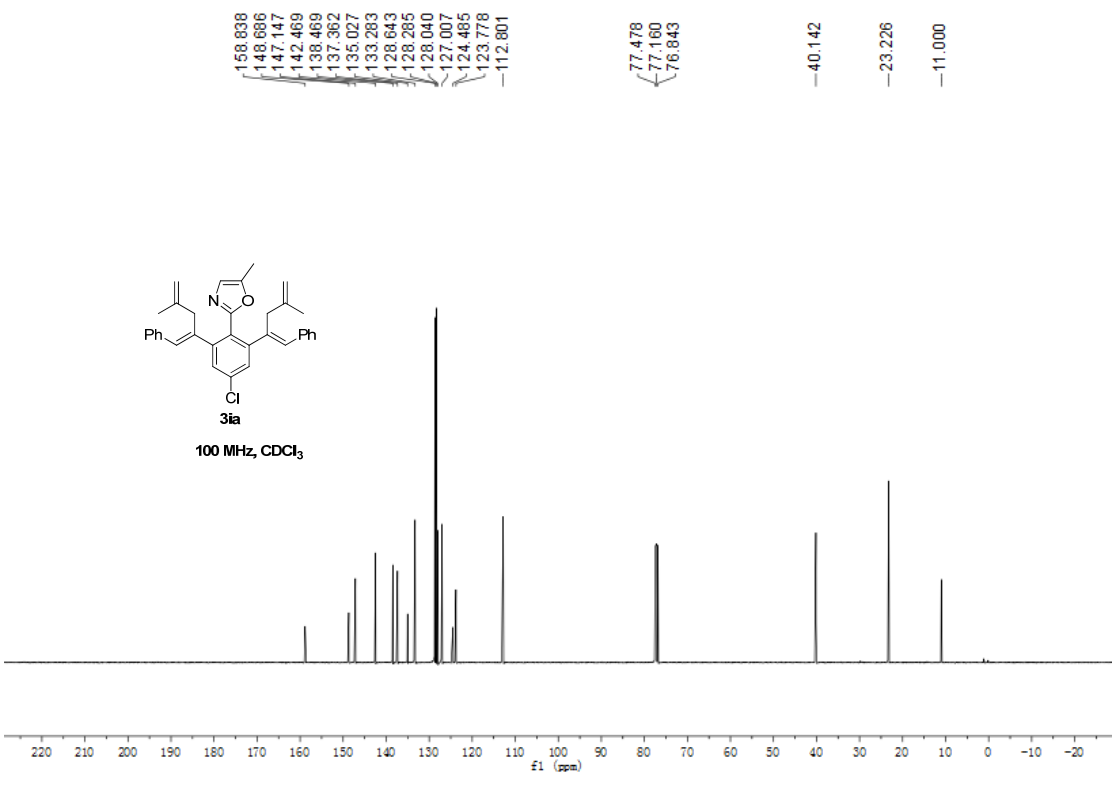

7.339
7.325
7.320
7.302
7.260
7.251
7.234
7.215
7.111
7.087
6.807
6.584
Ph
Ph
N
O
F
Ha
Hb
3ha
Hb
Ha
4.11
6.21
2.05
1.00
1.99
f1 (ppm)


7.232
7.220
7.108
7.092
6.584
2.976
Ph
Ph
N
O
F
Ha
Hb
3ha
Hb
Ha
f1 (ppm)



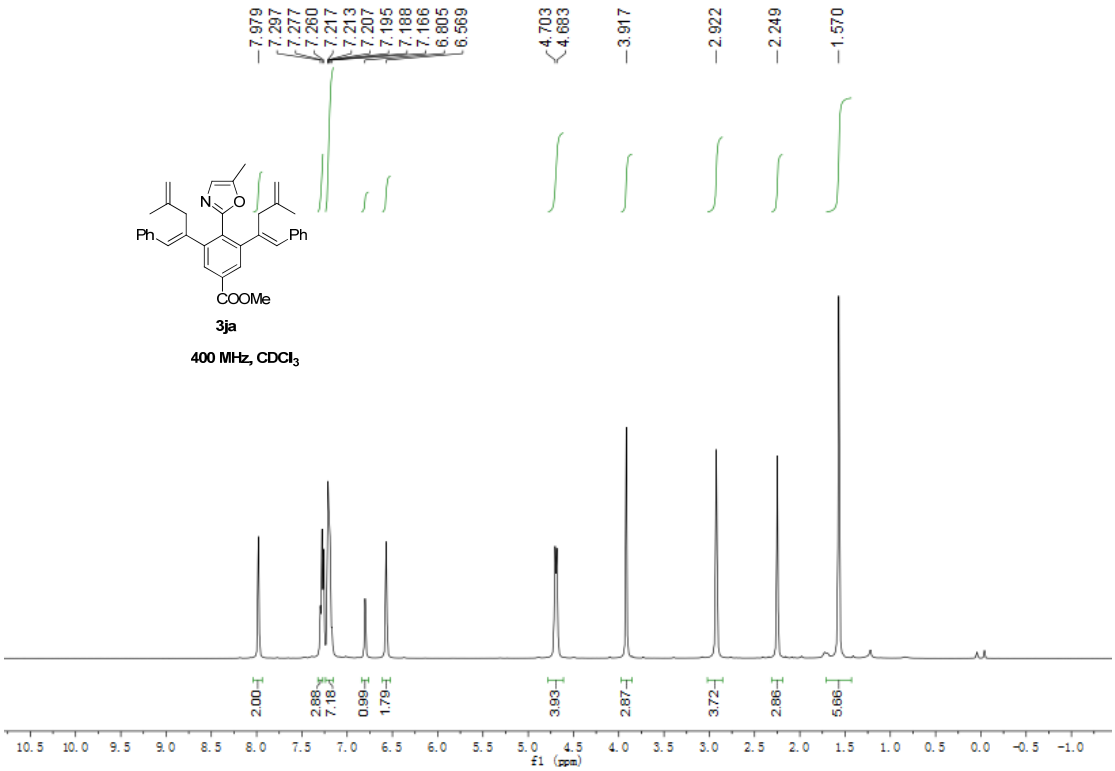
3ia

400 MHz, $CDCl_3$



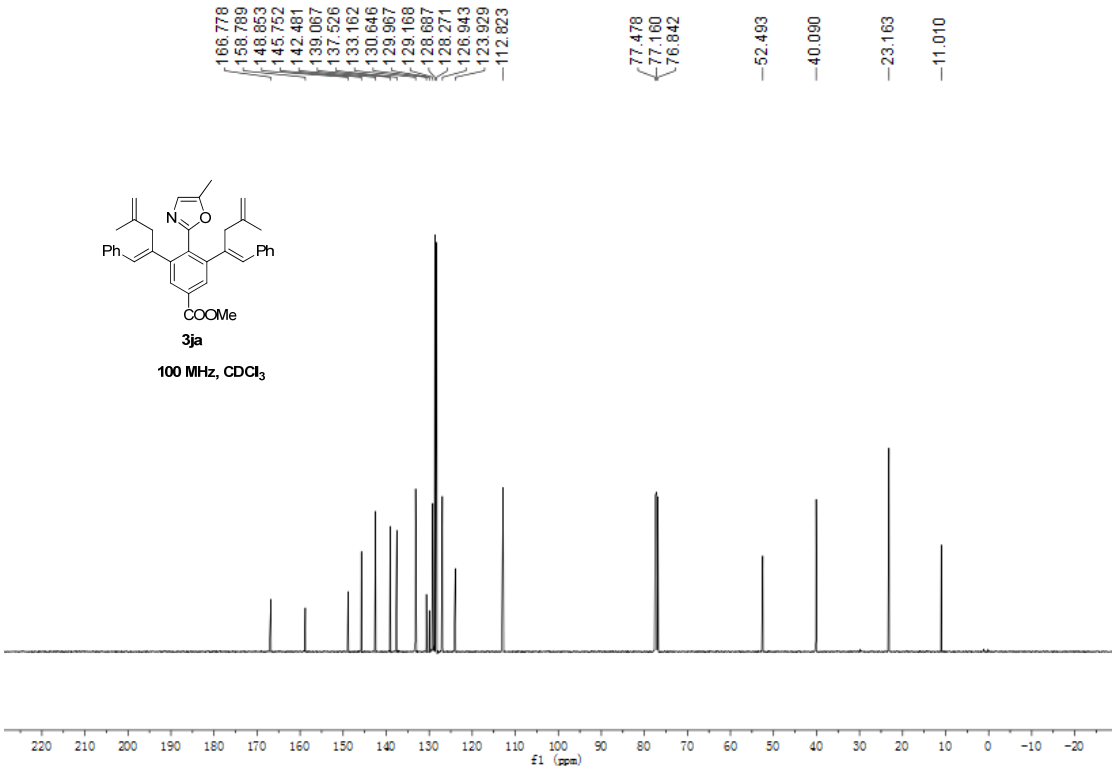
3ia

100 MHz, $CDCl_3$



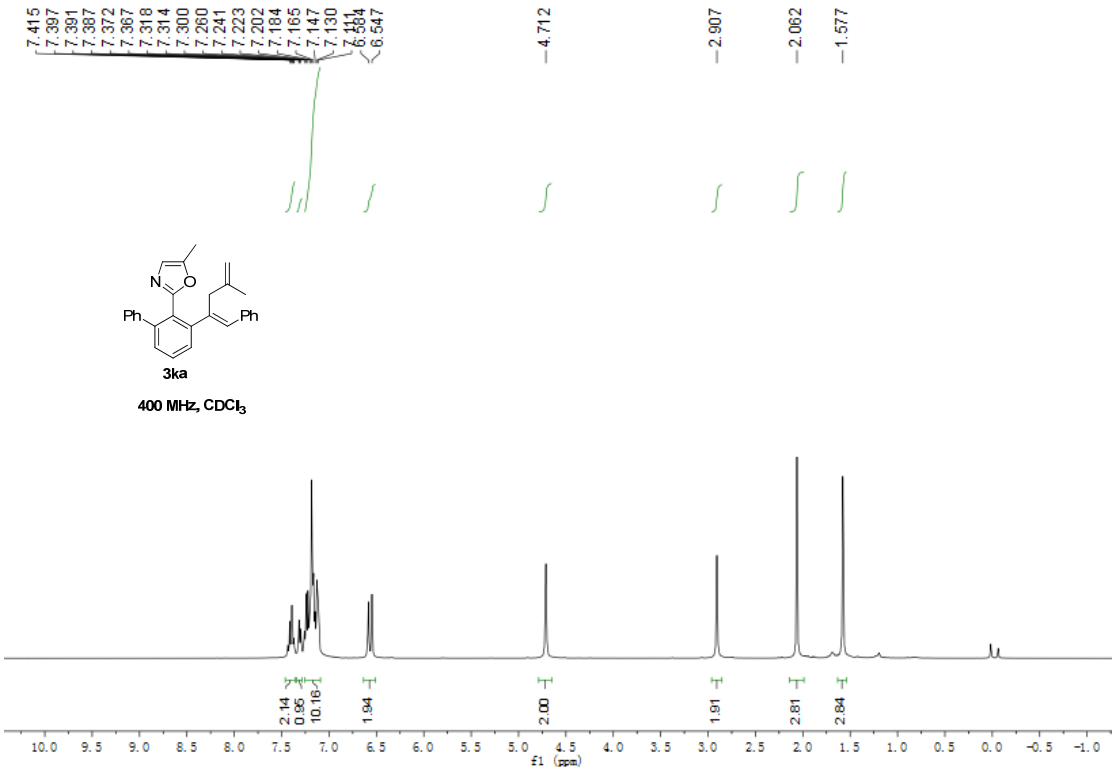
3ja

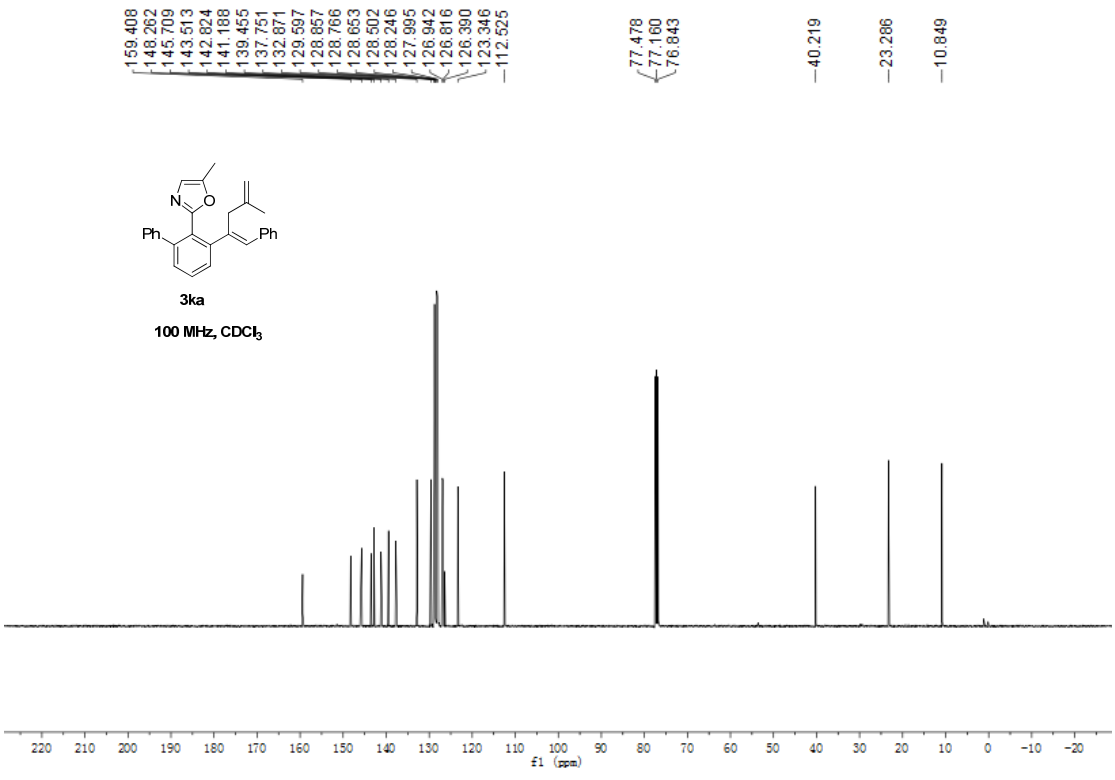
400 MHz, $CDCl_3$

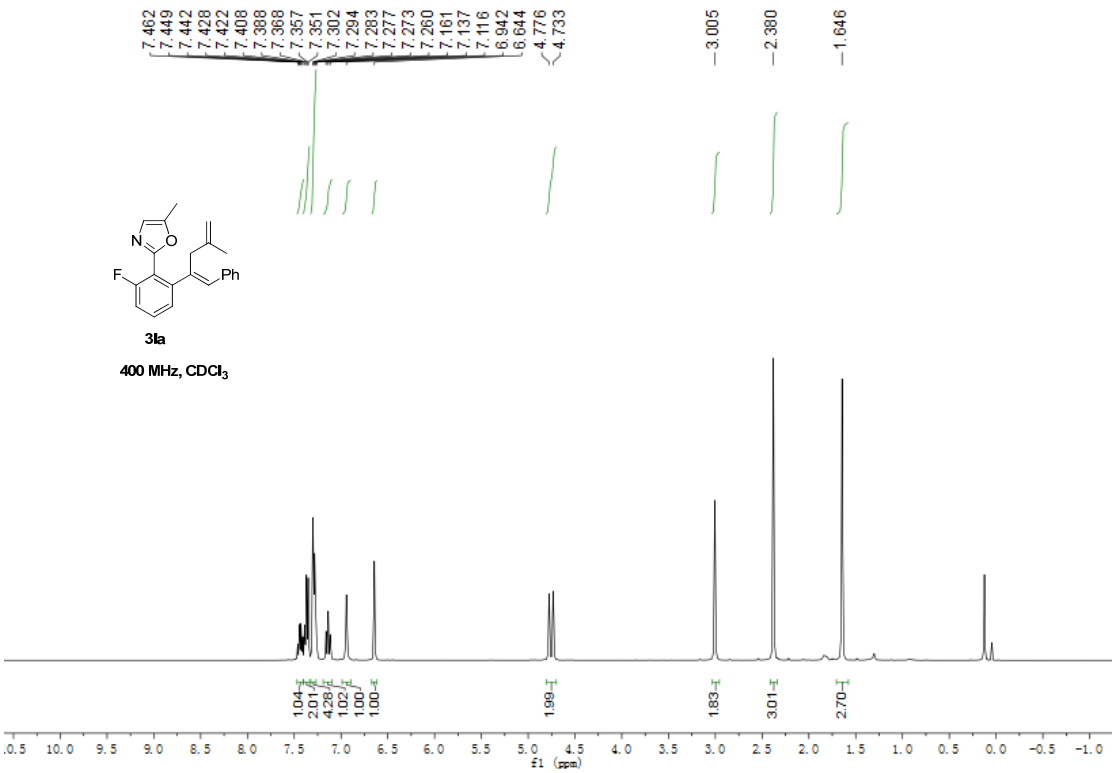


3ja

100 MHz, $CDCl_3$

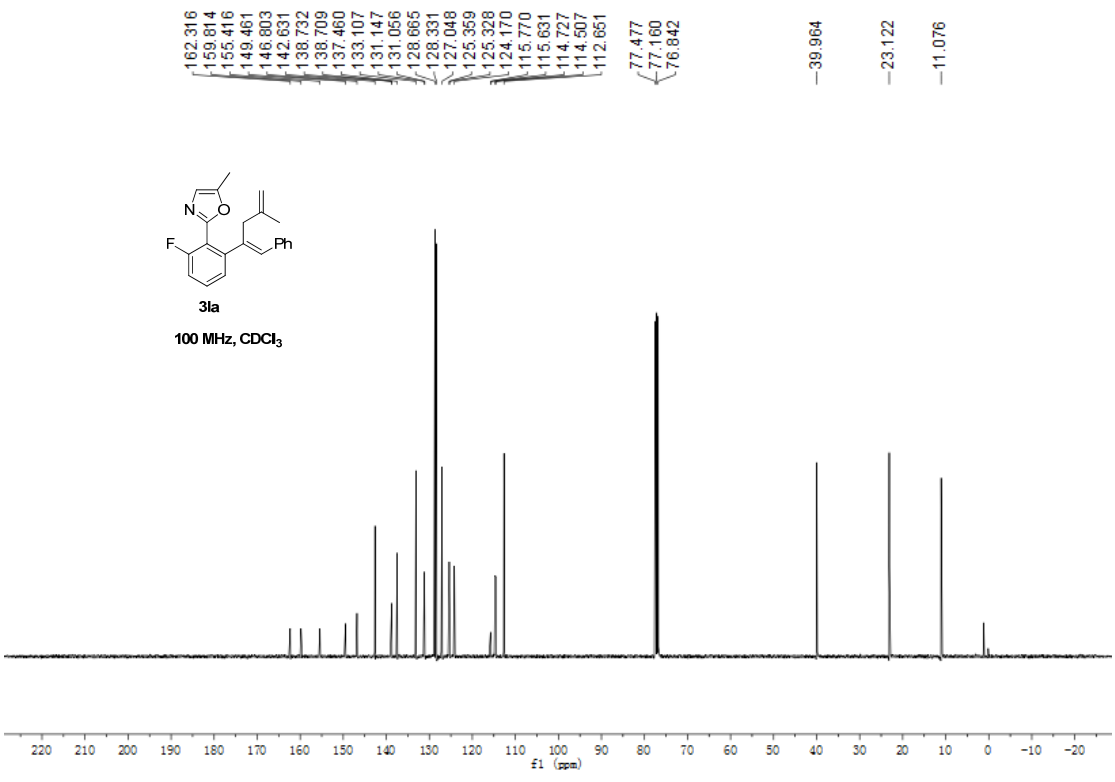

7.415
7.397
7.391
7.387
7.372
7.367
7.318
7.314
7.300
7.260
7.241
7.223
7.202
7.184
7.165
7.147
7.130
7.111
6.584
6.547
4.712
2.907
2.062
1.577
N
O
Ph
Ph
3ka
400 MHz, CDCl3
2.14
0.95
10.16
1.94
2.00
1.91
2.81
2.84
f1 (ppm)


159.408
148.262
145.709
143.513
142.824
141.188
139.455
137.751
132.871
129.597
128.857
128.766
128.653
128.502
128.246
127.995
126.942
126.816
126.390
123.346
112.525
77.478
77.160
76.843
40.219
23.286
10.849
N
O
Ph
Ph
3ka
100 MHz, CDCl3
f1 (ppm)



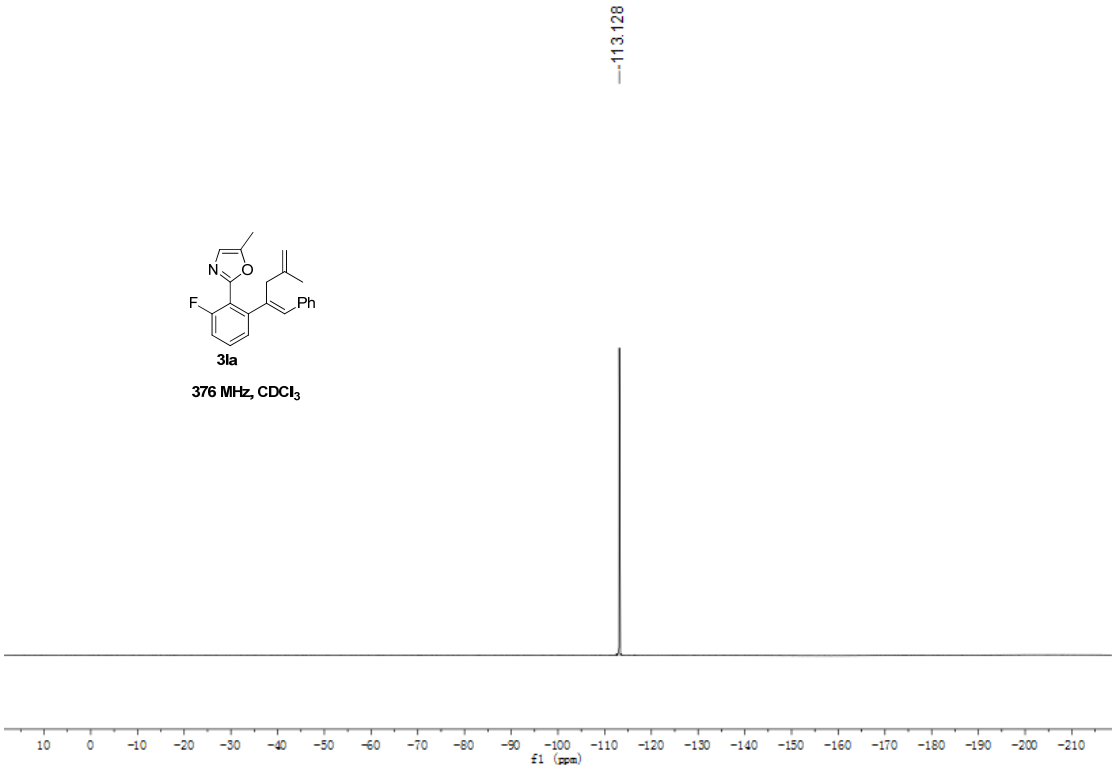
3la

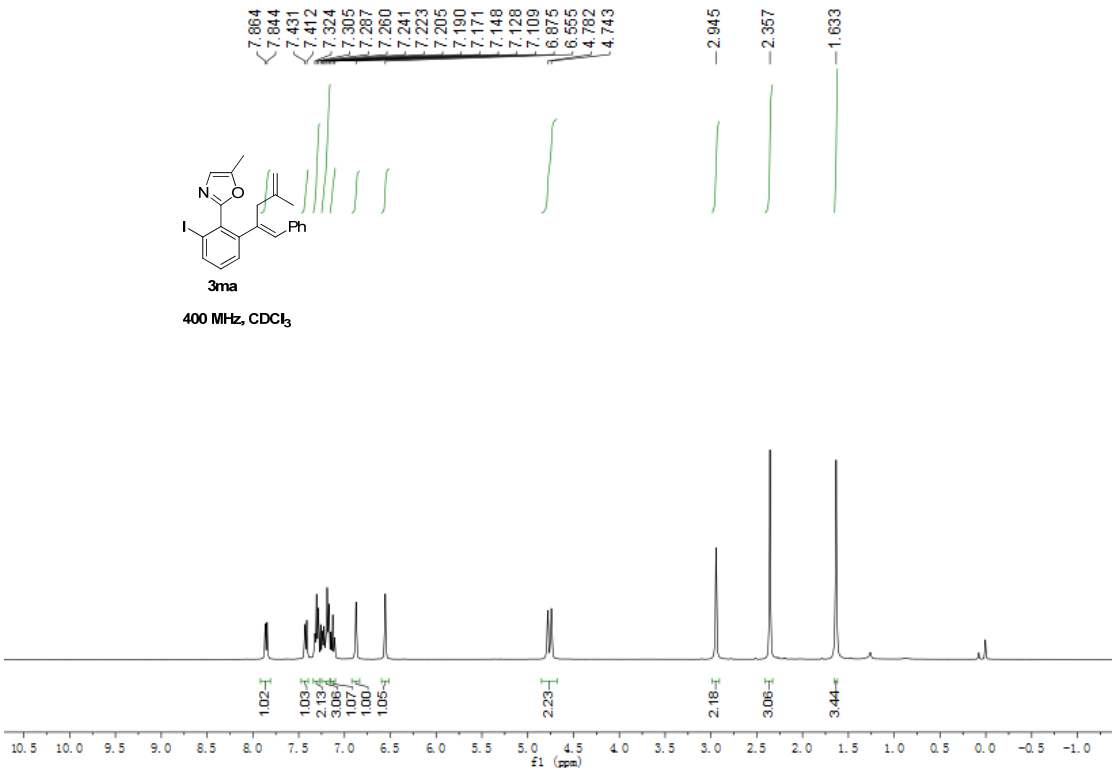
400 MHz, $CDCl_3$

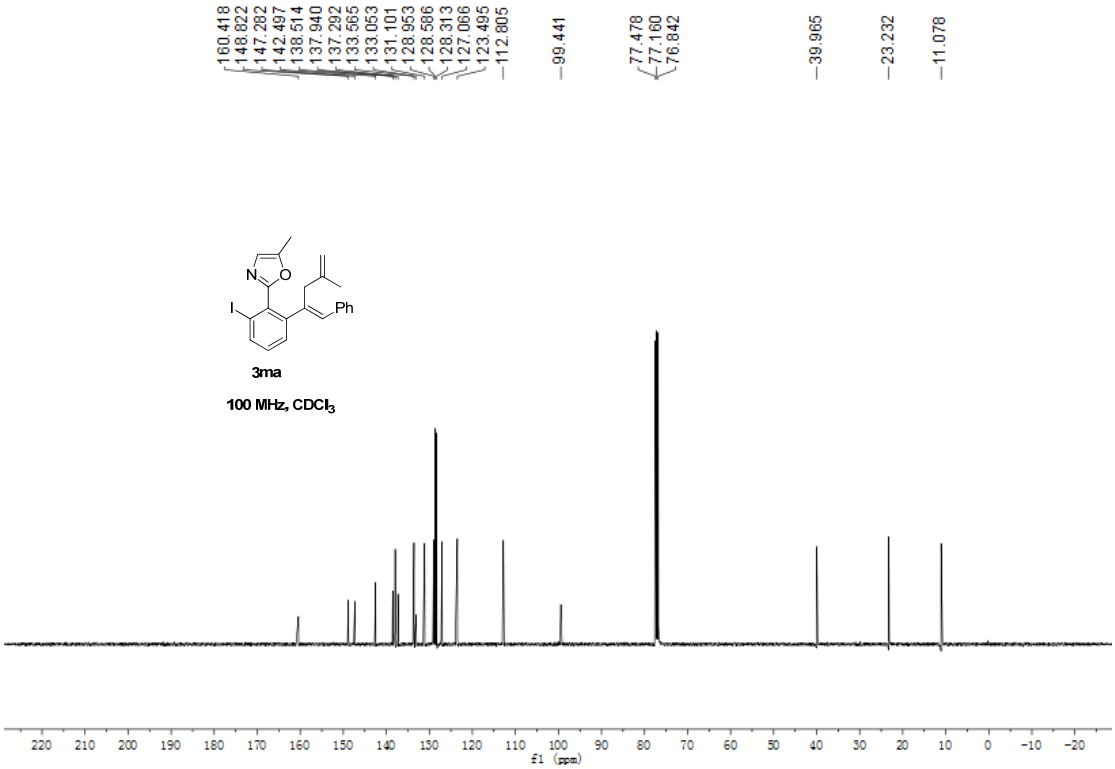


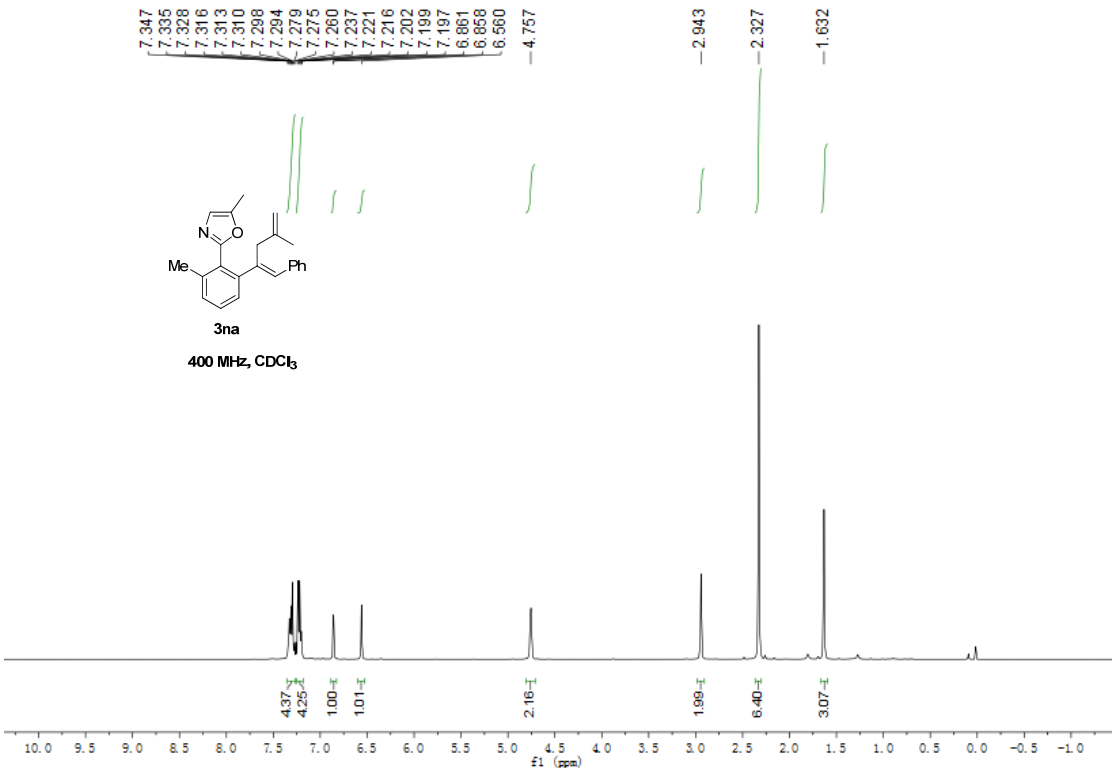
3la

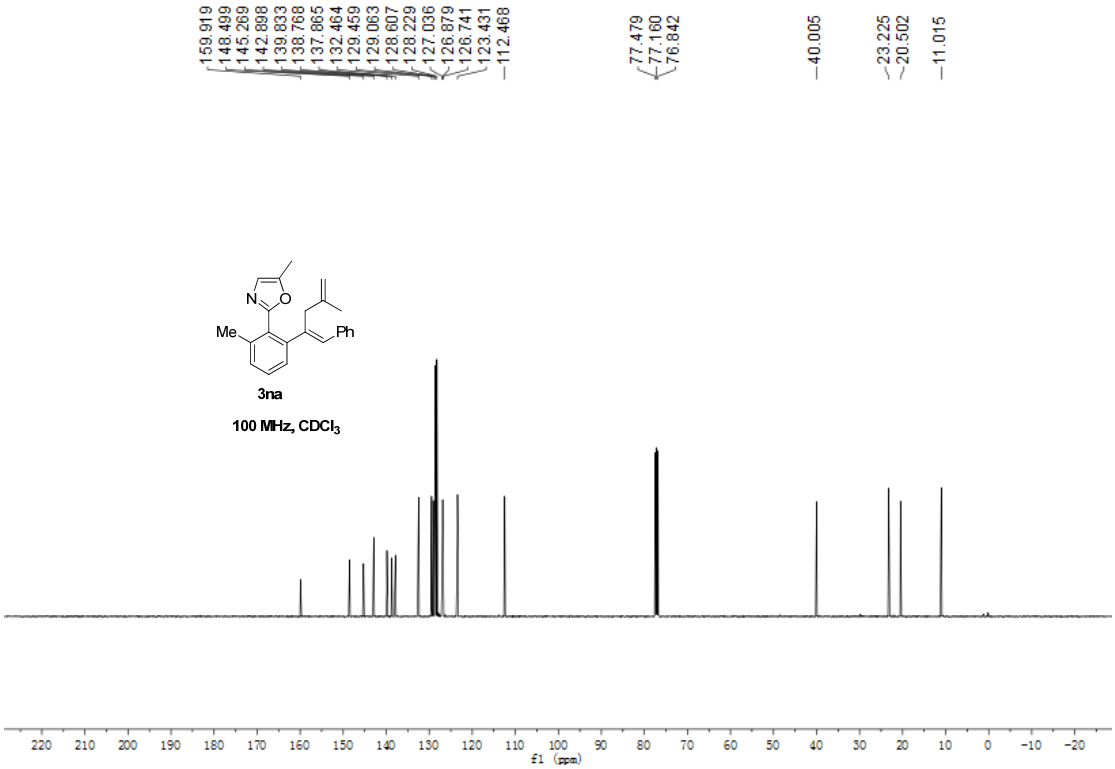
100 MHz, $CDCl_3$

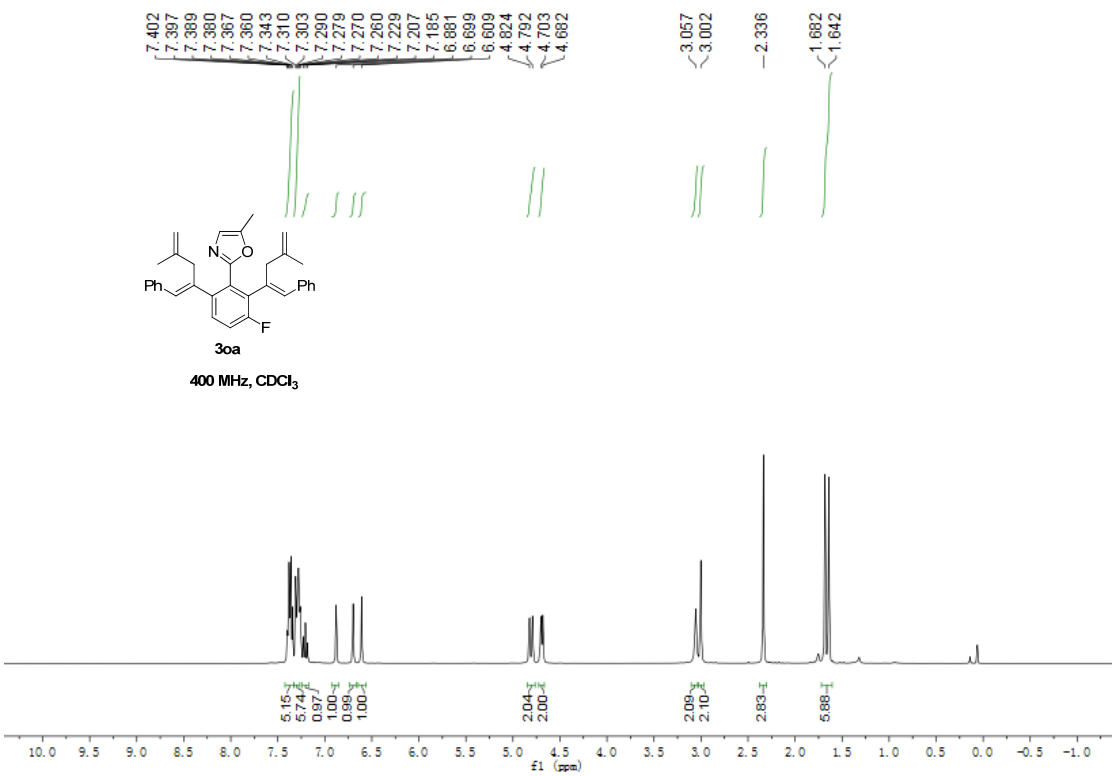

-113.128
N
O
F
Ph
3la
376 MHz, CDCl3
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

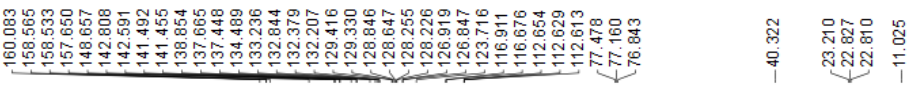

7.864
7.844
7.431
7.412
7.324
7.305
7.287
7.260
7.241
7.223
7.205
7.190
7.171
7.148
7.128
7.109
6.875
6.555
4.782
4.743
2.945
2.357
1.633
N
O
I
Ph
3ma
400 MHz, CDCl3
1.02
1.03
2.13
3.06
1.07
1.00
1.05
2.23
2.18
3.06
3.44
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)

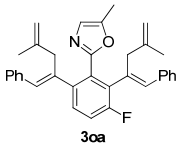

160.418
148.822
147.282
142.497
138.514
137.940
137.292
133.565
133.053
131.101
128.953
128.586
128.313
127.066
123.495
112.805
99.441
77.478
77.160
76.842
39.965
23.232
11.078
I
Ph
3ma
100 MHz, CDCl3
f1 (ppm)


7.347
7.335
7.328
7.316
7.313
7.310
7.298
7.294
7.279
7.275
7.260
7.237
7.221
7.216
7.202
7.199
7.197
6.861
6.858
6.560
4.757
2.943
2.327
1.632
Me
Ph
3na
400 MHz, CDCl3
4.37
4.25
1.00
1.01
2.16
1.99
6.40
3.07
f1 (ppm)


159.919
148.499
145.269
142.898
139.833
138.768
137.865
132.464
129.459
129.063
128.607
128.229
127.036
126.879
126.741
123.431
112.468
77.479
77.160
76.842
40.005
23.225
20.502
11.015
N
O
Me
Ph
3na
100 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)

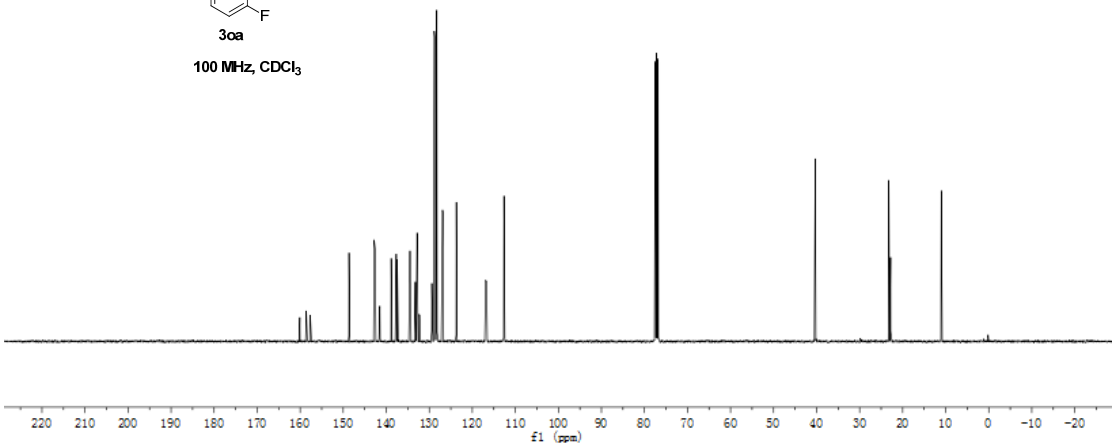

7.402
7.397
7.389
7.380
7.367
7.360
7.343
7.310
7.303
7.290
7.279
7.270
7.260
7.229
7.207
7.185
6.881
6.699
6.609
4.824
4.792
4.703
4.682
3.057
3.002
2.336
1.682
1.642
N
O
Ph
Ph
F
3oa
400 MHz, CDCl3
5.15
5.74
0.97
1.00
0.99
1.00
2.04
2.00
2.09
2.10
2.83
5.88
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)

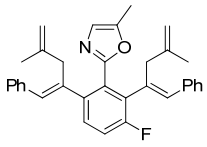




3oa

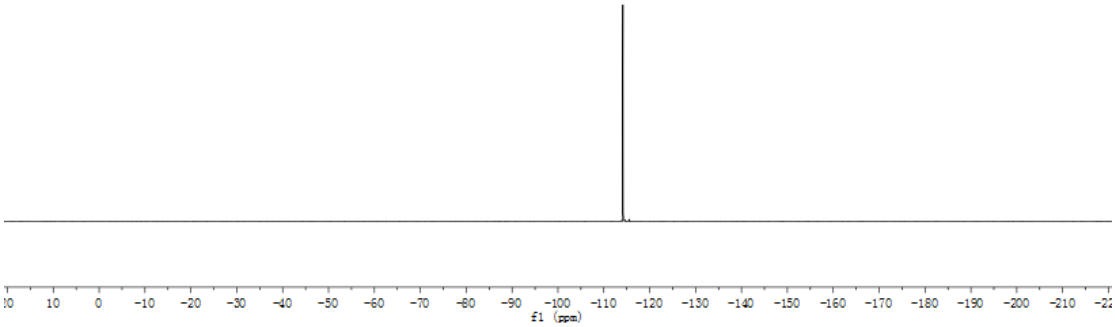
100 MHz, $CDCl_3$

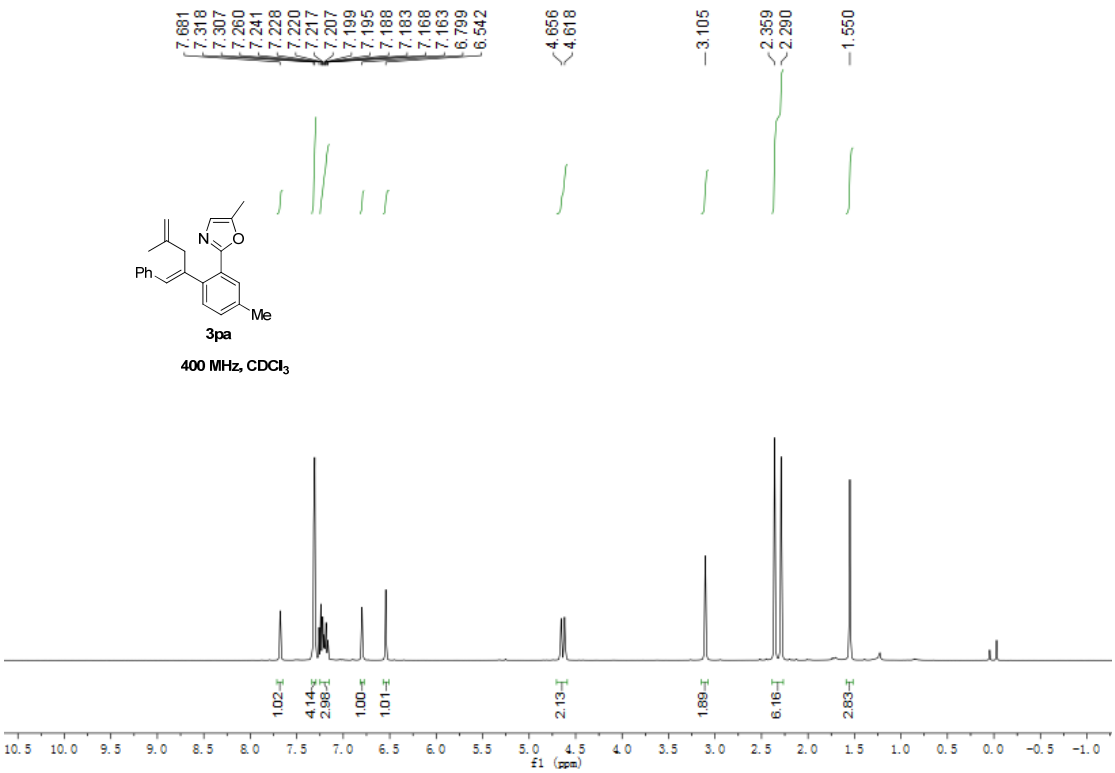




3oa

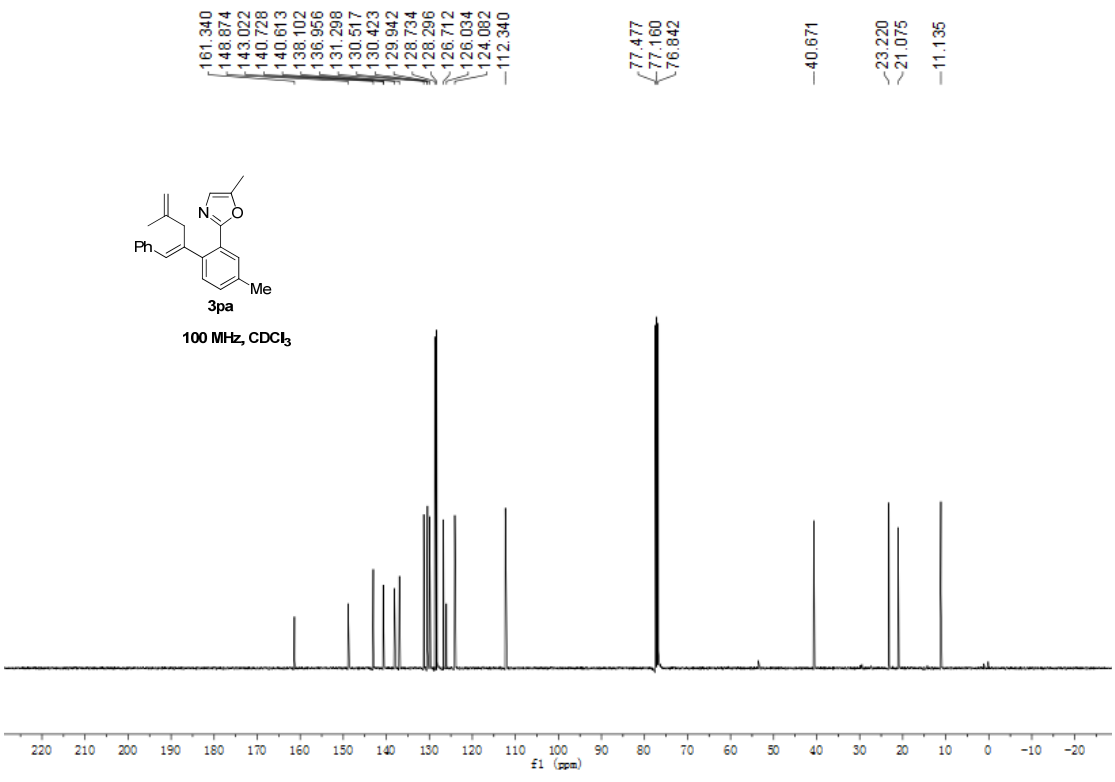
376 MHz, $CDCl_3$





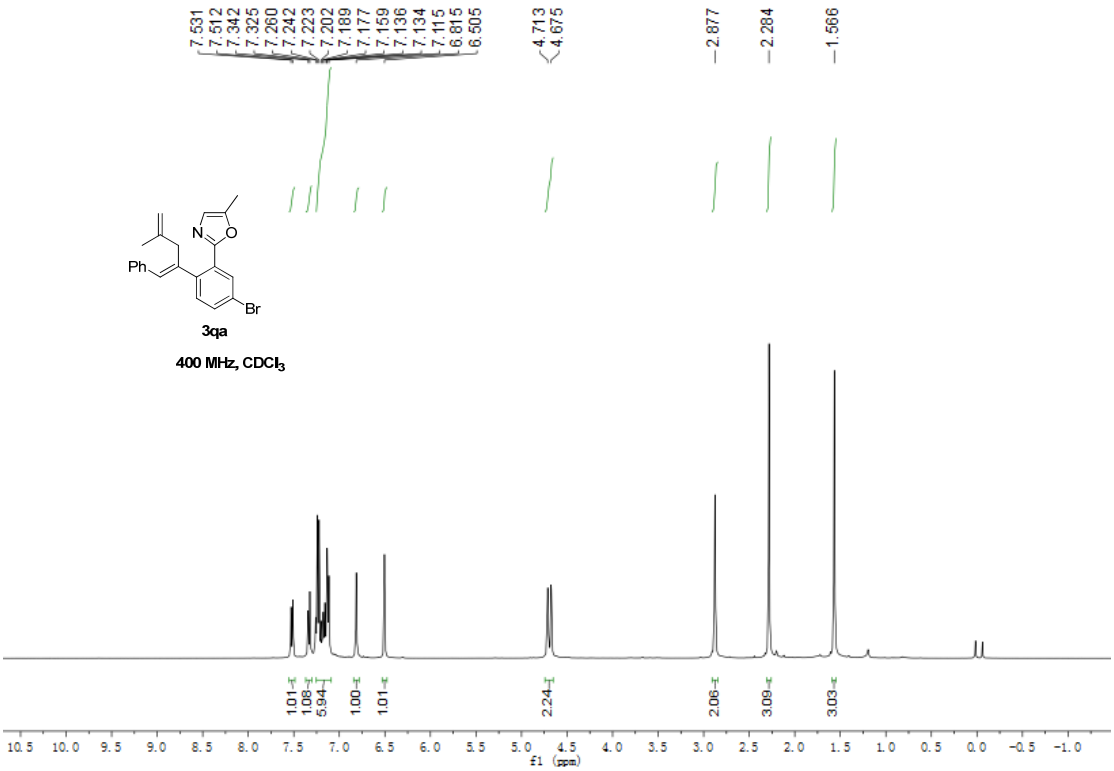
3pa

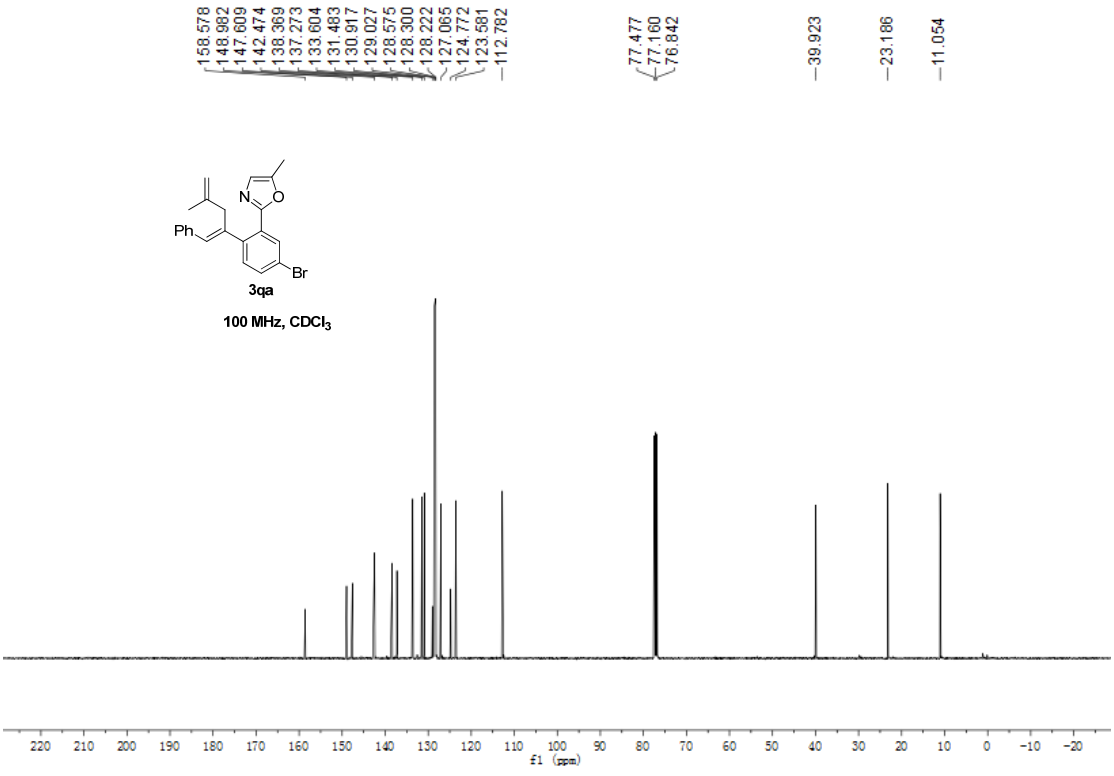
400 MHz, $CDCl_3$

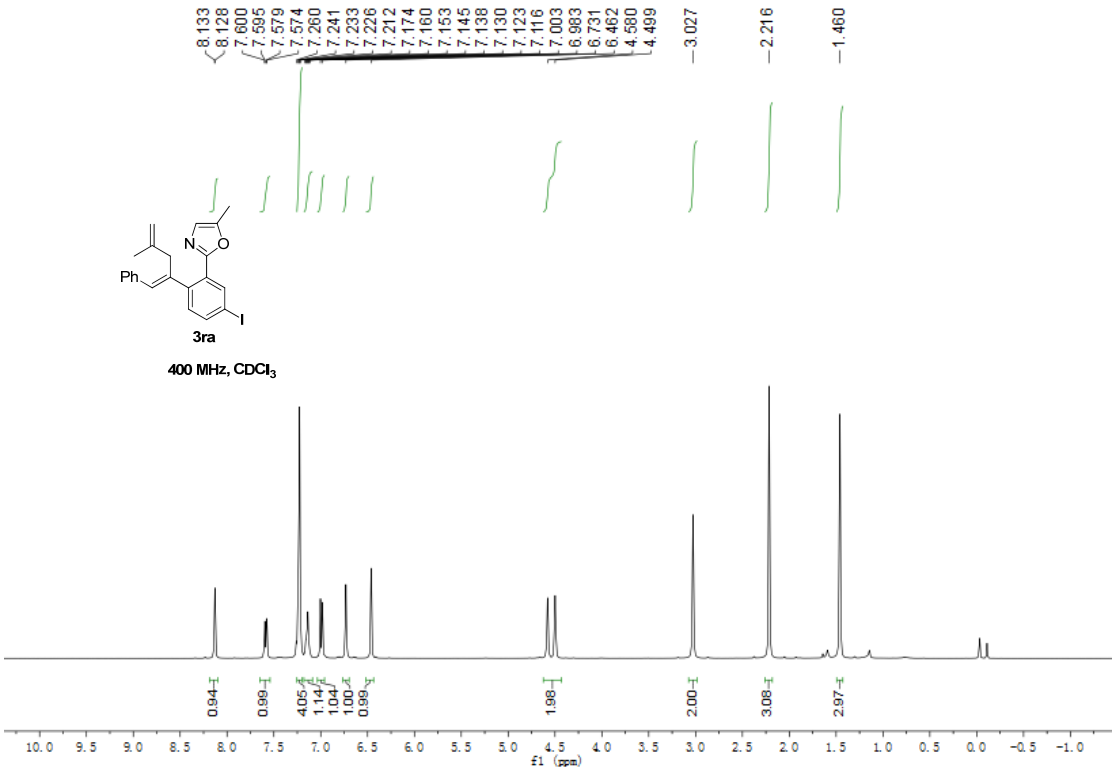


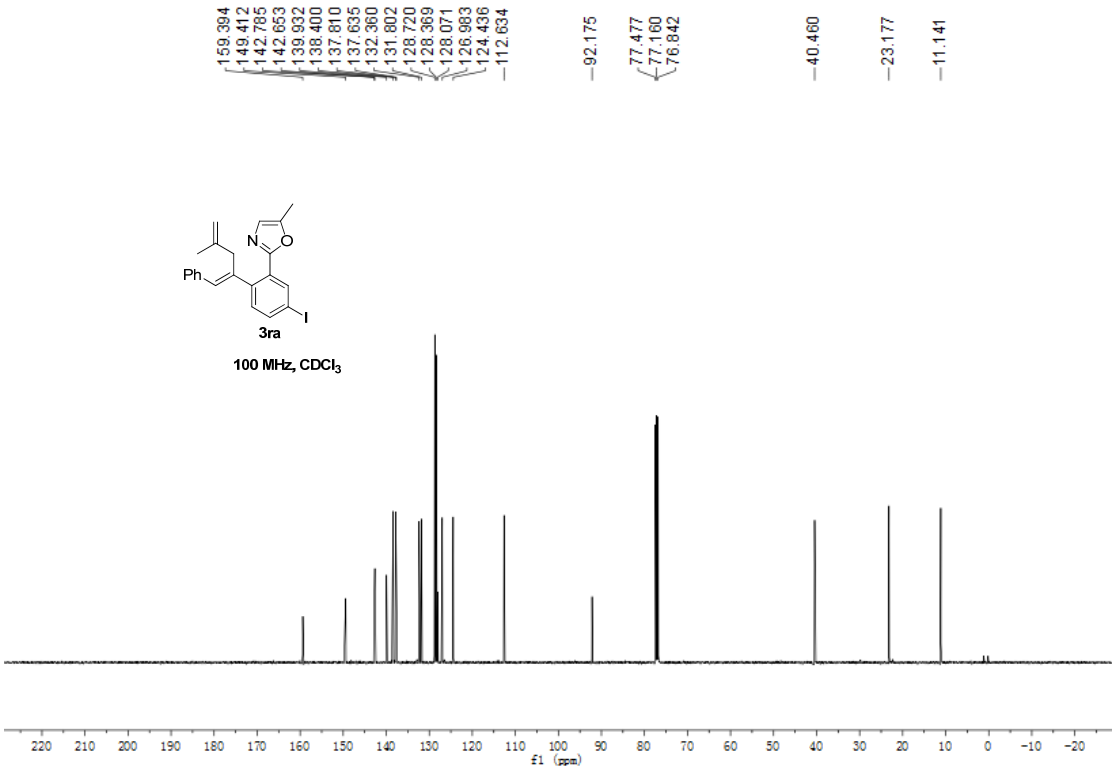
3pa

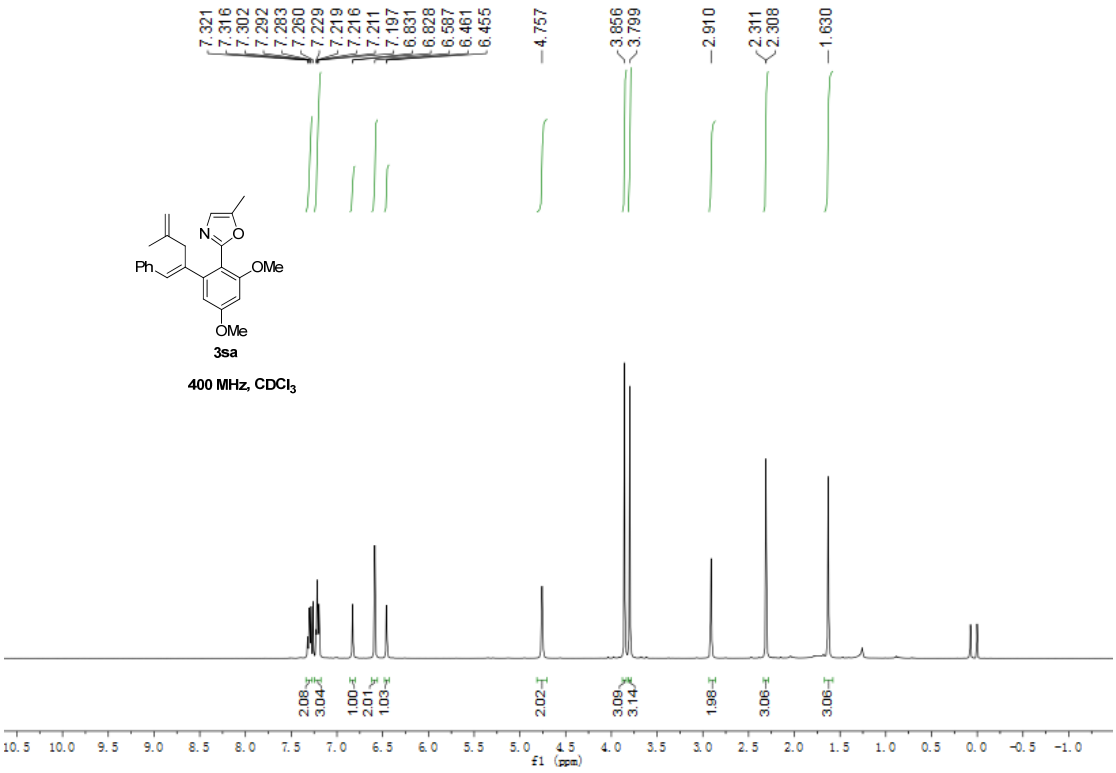
100 MHz, $CDCl_3$


7.531
7.512
7.342
7.325
7.260
7.242
7.223
7.202
7.189
7.177
7.159
7.136
7.134
7.115
6.815
6.505
4.713
4.675
2.877
2.284
1.566
Ph
N
O
Br
3qa
400 MHz, CDCl3
1.01
1.08
5.94
1.00
1.01
2.24
2.06
3.09
3.03
f1 (ppm)


158.578
148.982
147.609
142.474
138.369
137.273
133.604
131.483
130.917
129.027
128.575
128.300
128.222
127.065
124.772
123.581
112.782
77.477
77.160
76.842
39.923
23.186
11.054
Ph
N
O
Br
3qa
100 MHz, CDCl3
f1 (ppm)

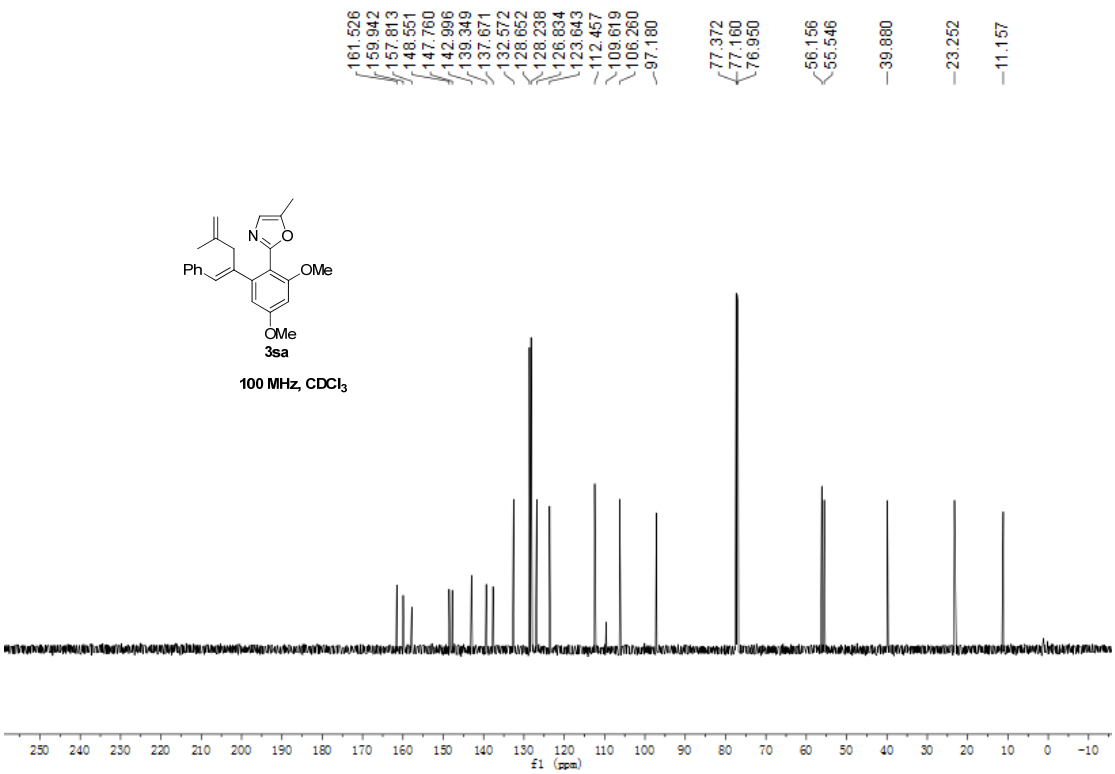

8.133
8.128
7.600
7.595
7.579
7.574
7.260
7.241
7.233
7.226
7.212
7.174
7.160
7.153
7.145
7.138
7.130
7.123
7.116
7.003
6.983
6.731
6.462
4.580
4.499
3.027
2.216
1.460
N
O
Ph
I
3ra
400 MHz, CDCl3
0.94
0.99
4.05
1.14
1.04
1.00
0.99
1.98
2.00
3.08
2.97
f1 (ppm)


159.394
149.412
142.785
142.653
139.932
138.400
137.810
137.635
132.360
131.802
128.720
128.369
128.071
126.983
124.436
112.634
92.175
77.477
77.160
76.842
40.460
23.177
11.141
N
O
Ph
I
3ra
100 MHz, CDCl3
f1 (ppm)



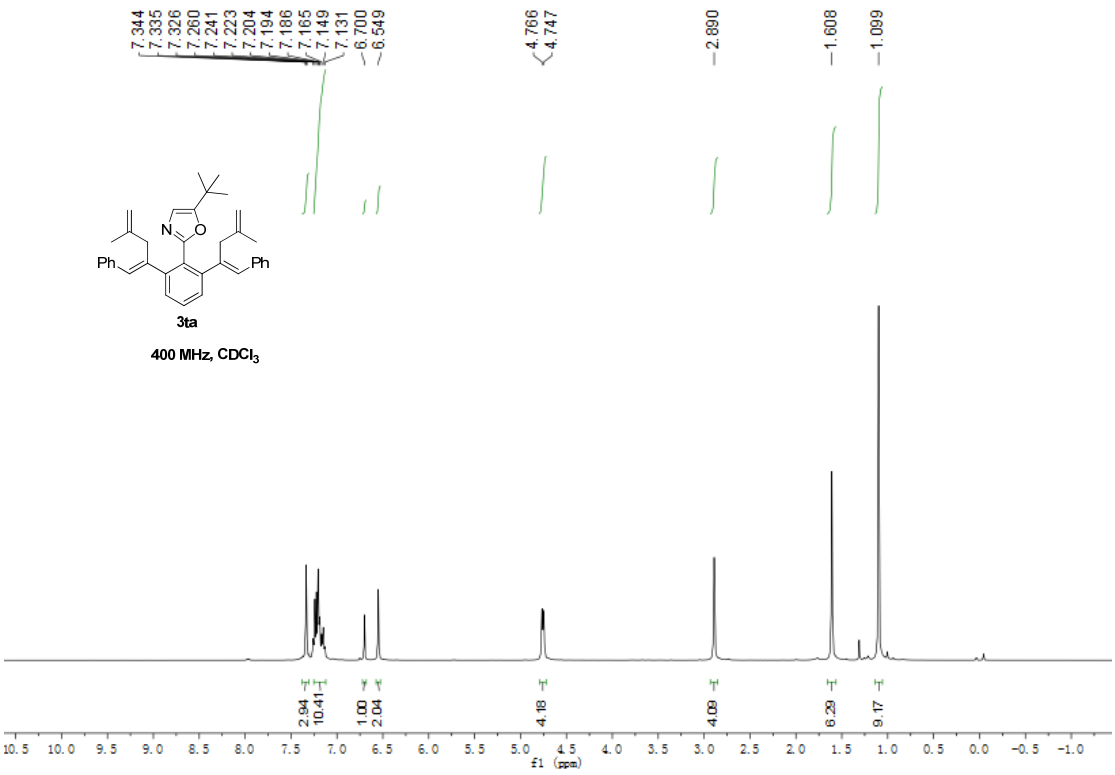
3sa

400 MHz, $CDCl_3$



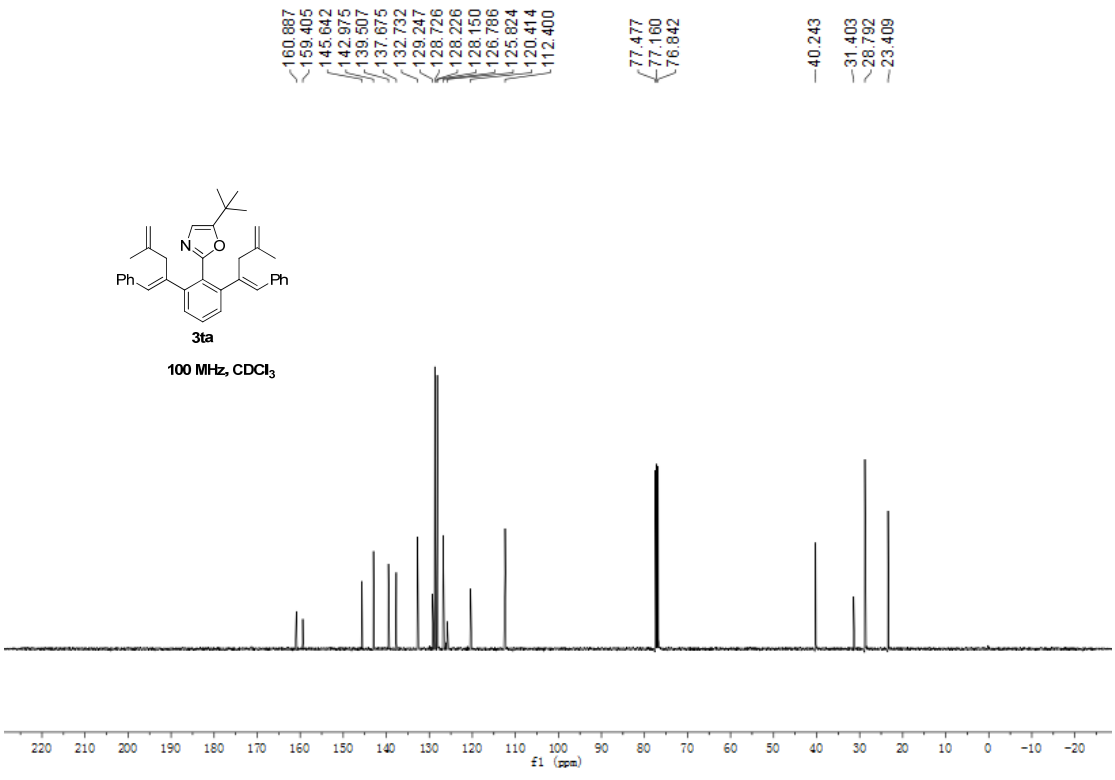
3sa

100 MHz, $CDCl_3$



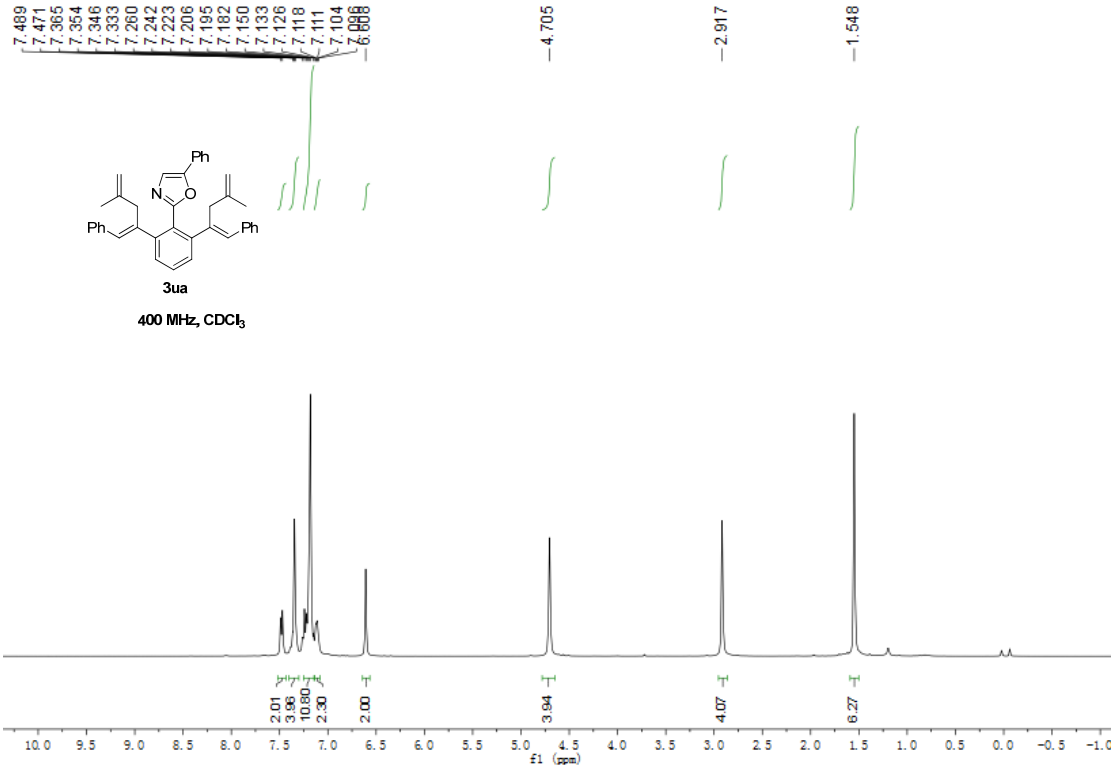
3ta

400 MHz, $CDCl_3$



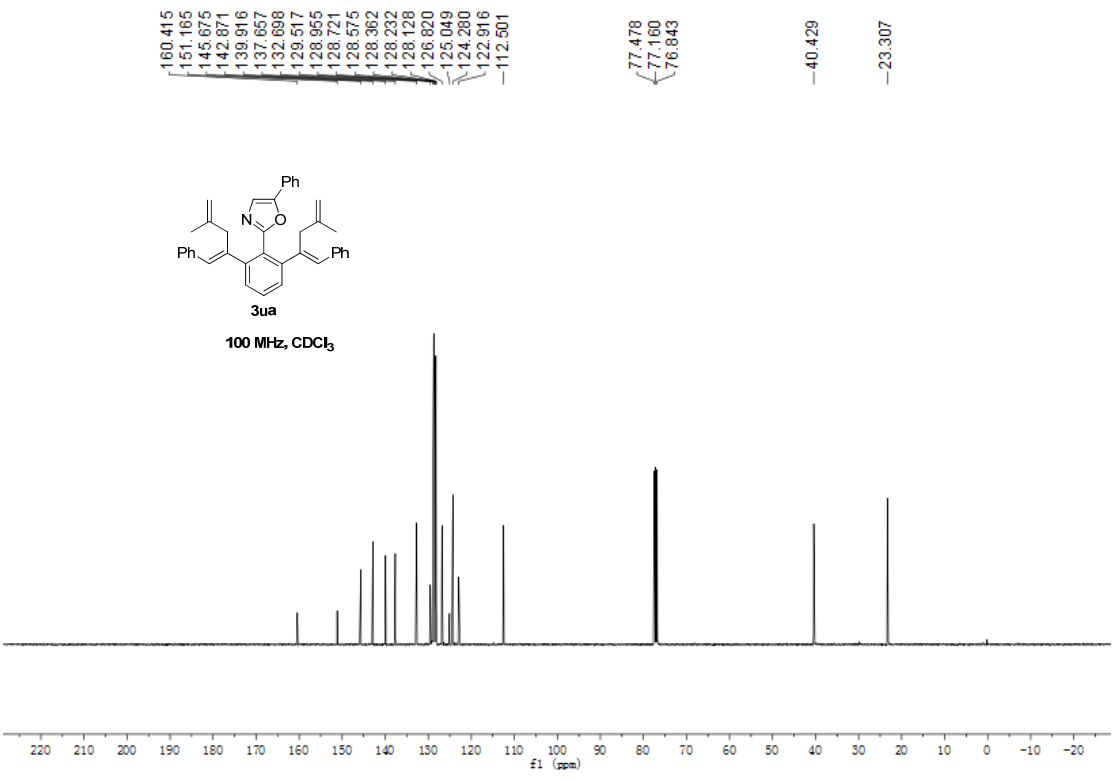
3ta

100 MHz, $CDCl_3$



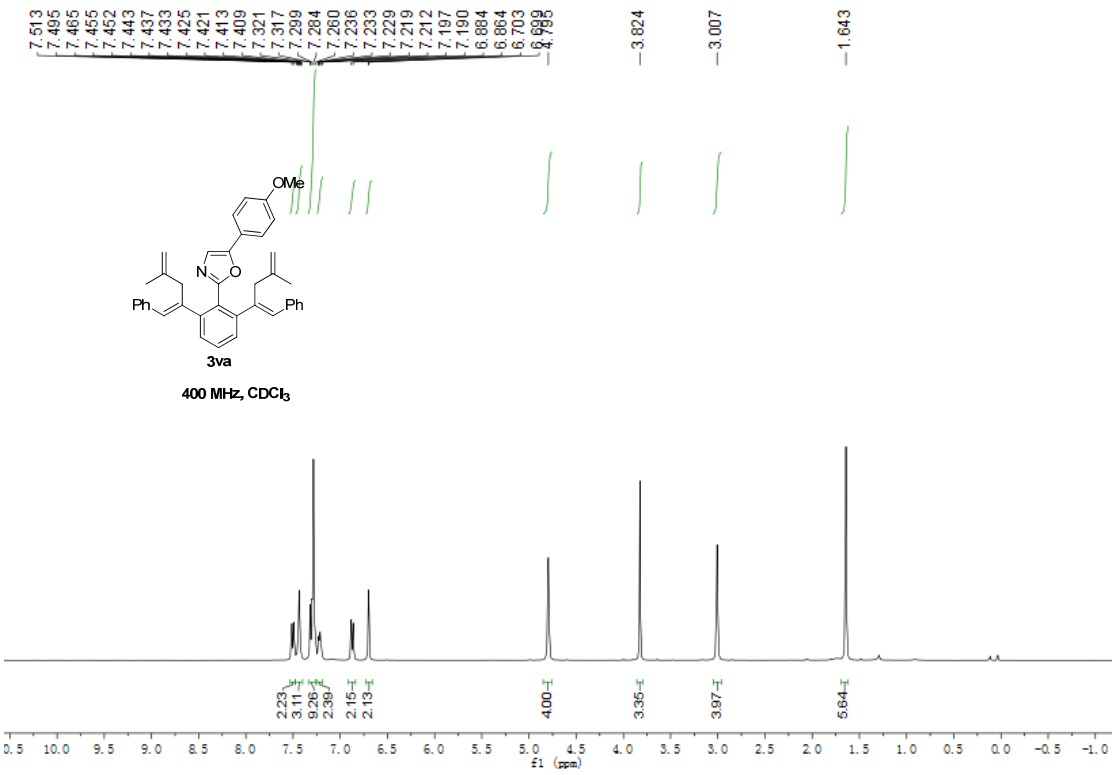
3ua

400 MHz, $CDCl_3$



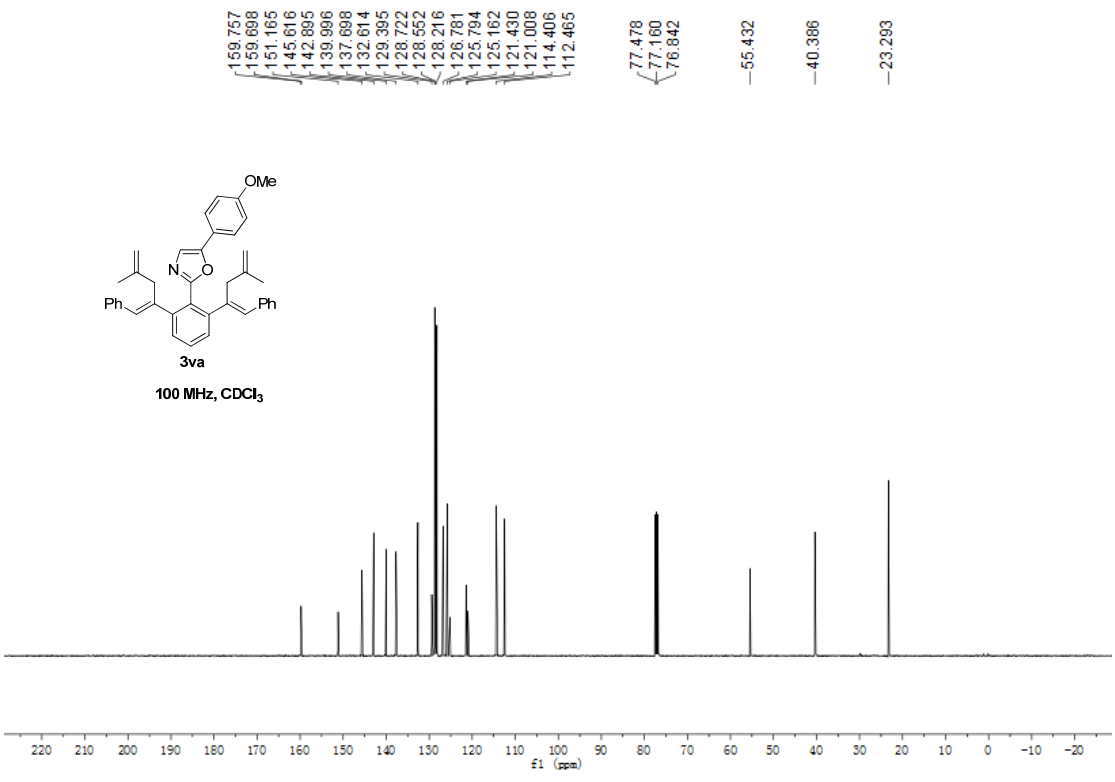
3ua

100 MHz, $CDCl_3$



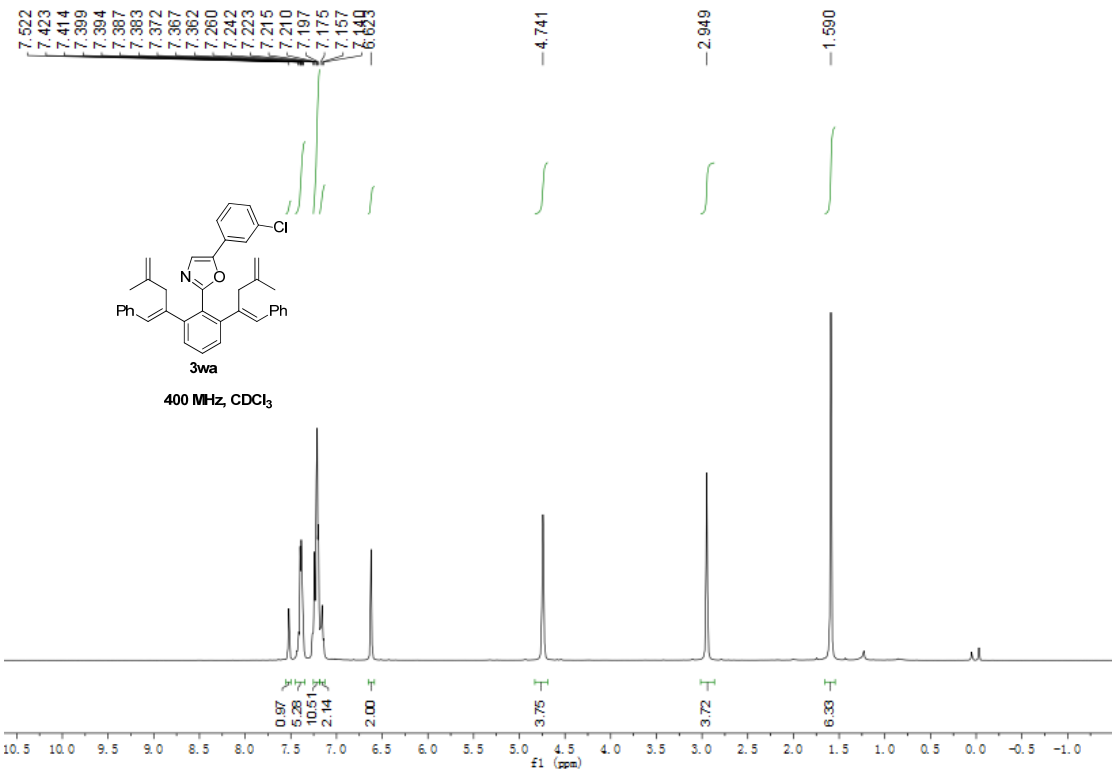
3va

400 MHz, $CDCl_3$



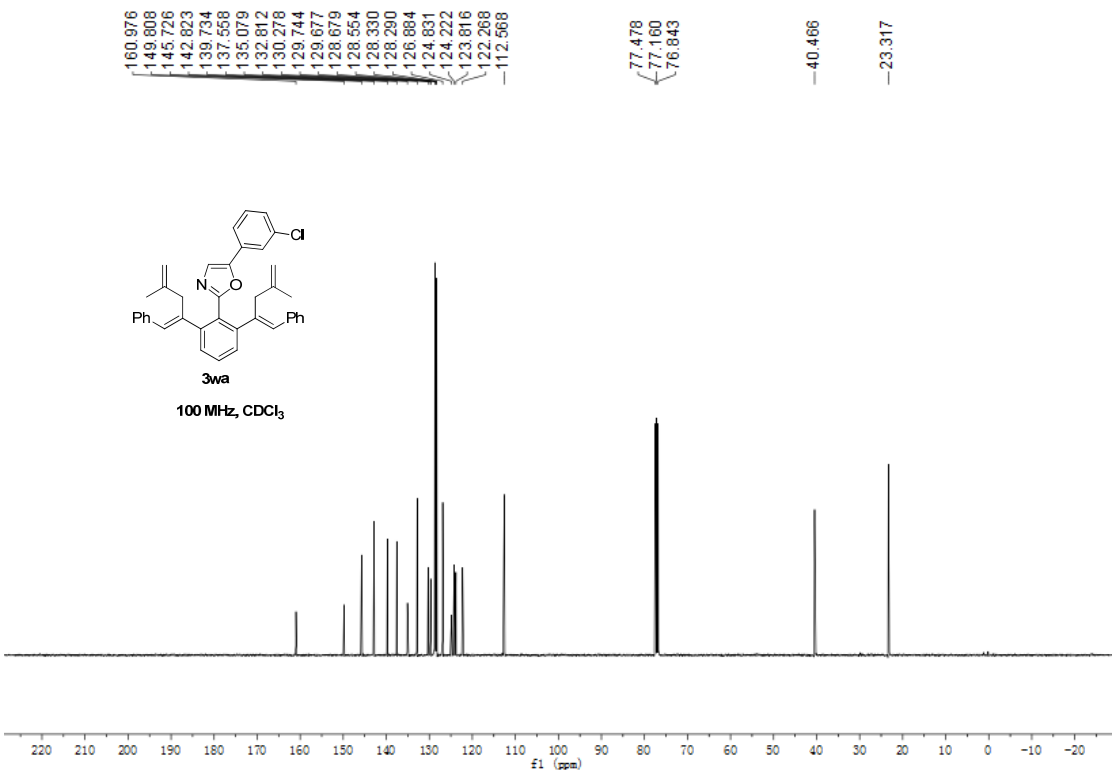
3va

100 MHz, $CDCl_3$



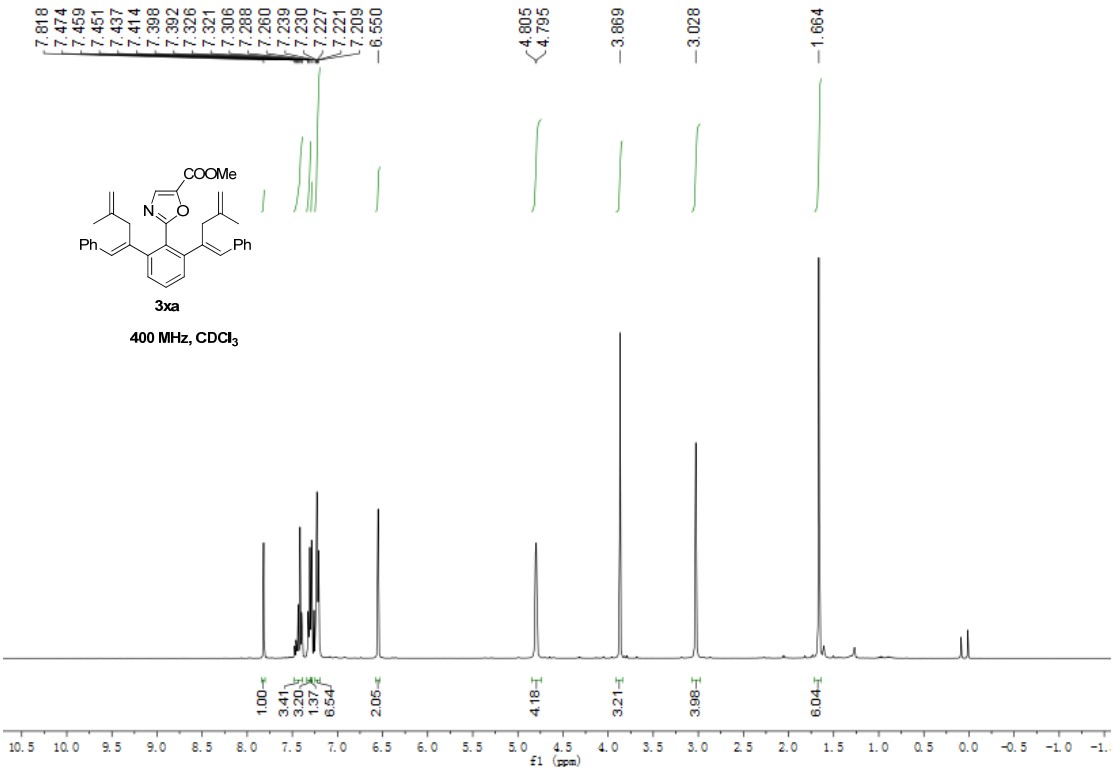
3wa

400 MHz, $CDCl_3$



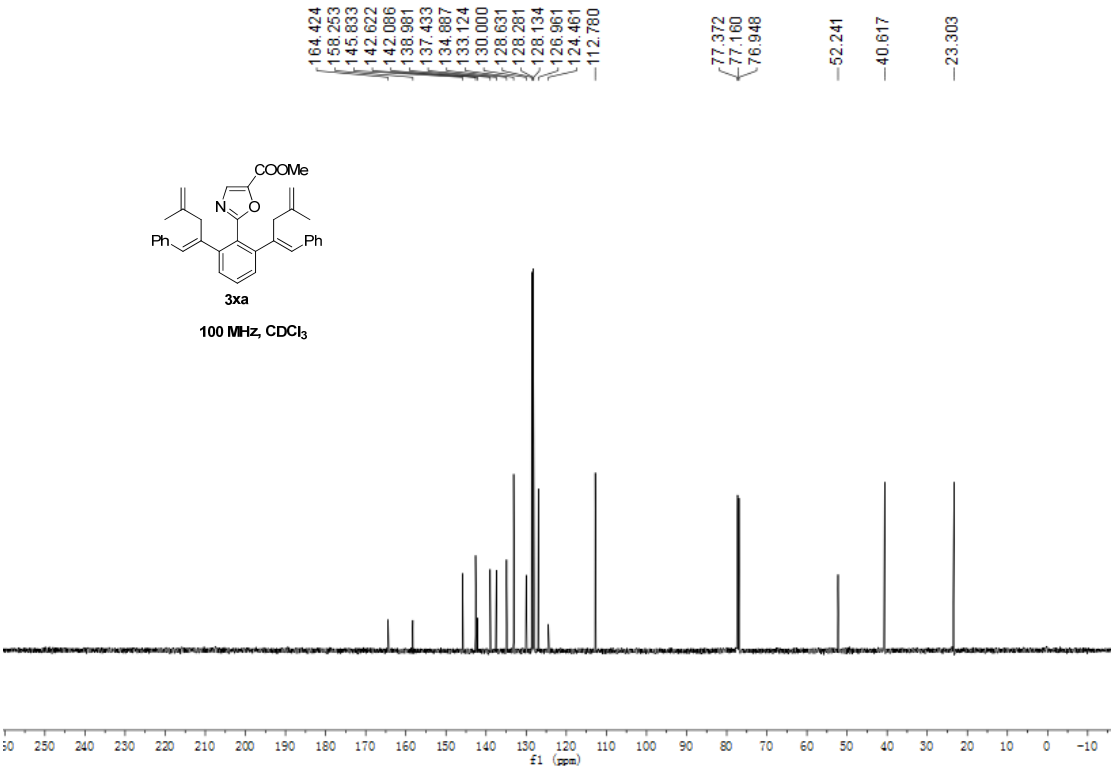
3wa

100 MHz, $CDCl_3$



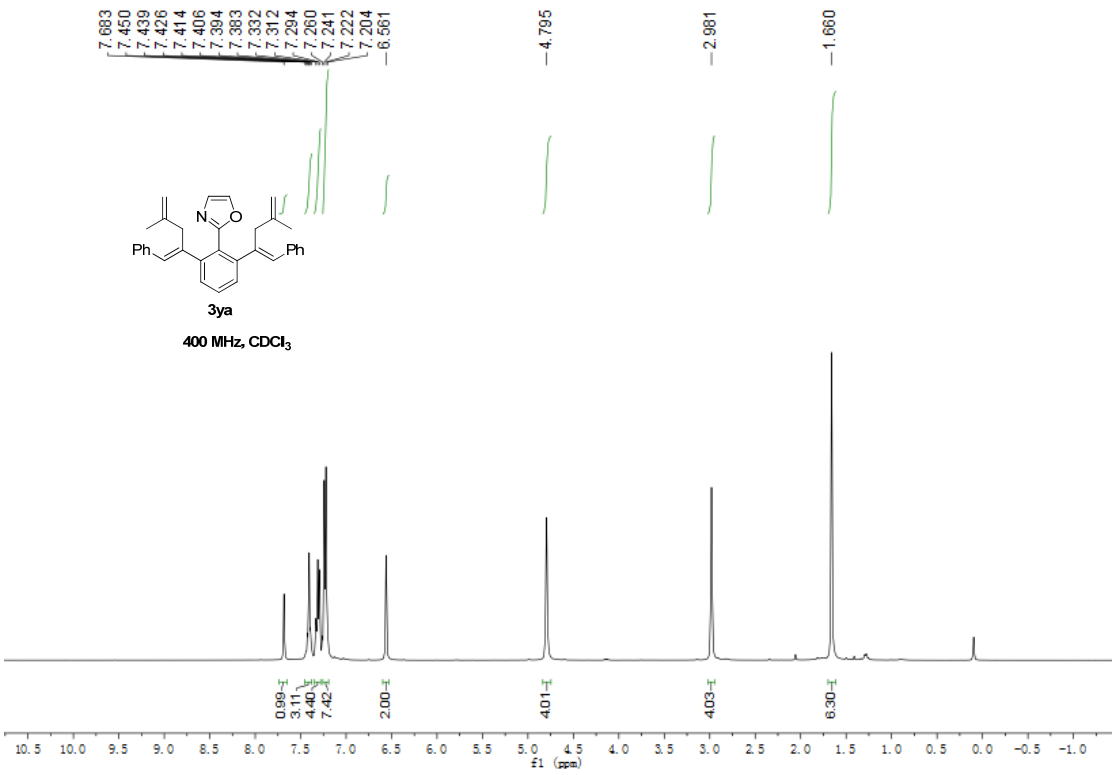
3xa

400 MHz, $CDCl_3$



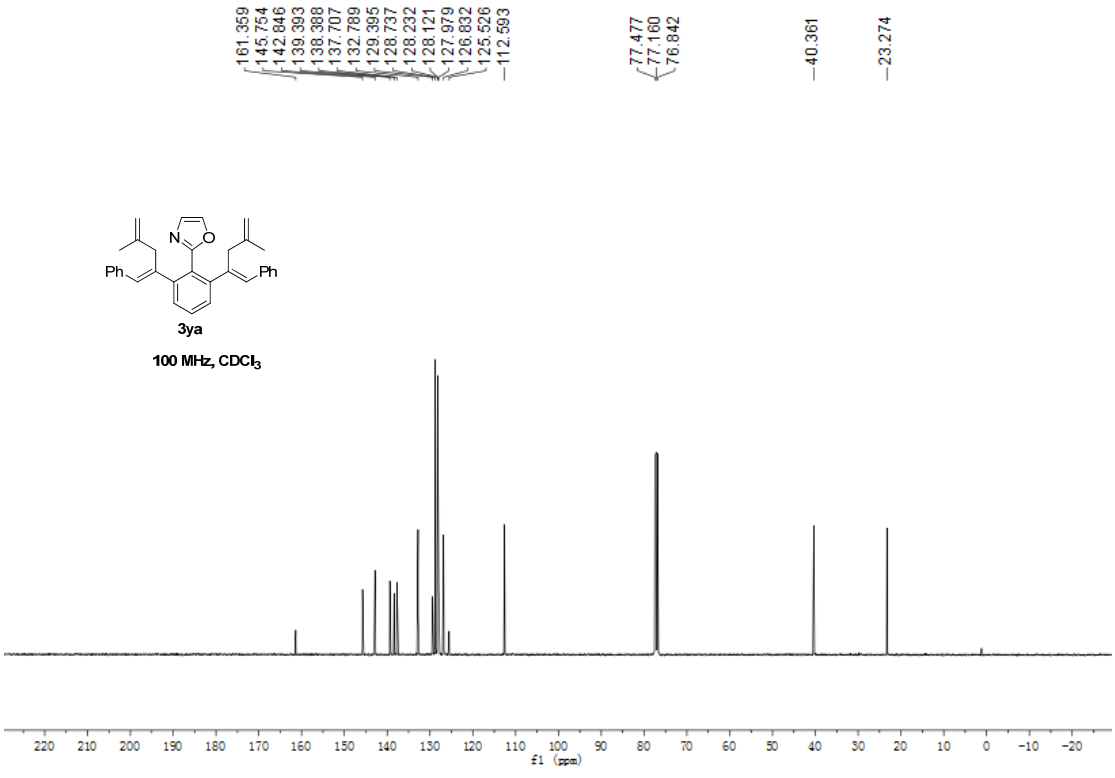
3xa

100 MHz, $CDCl_3$



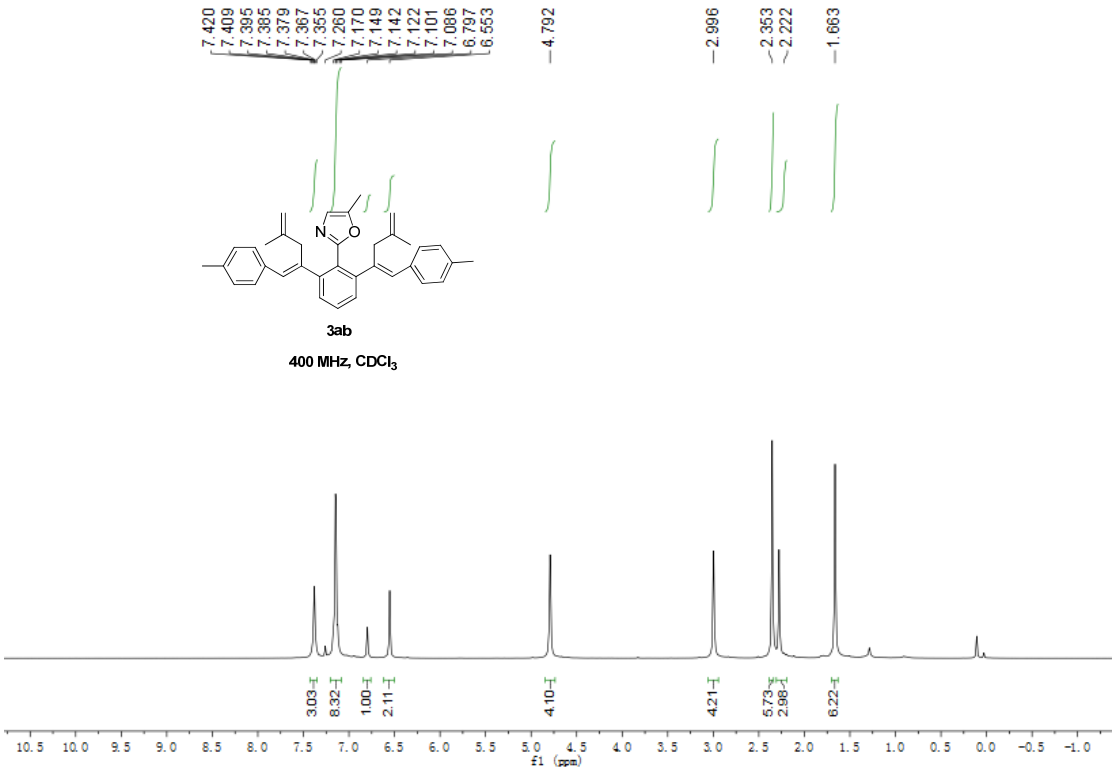
3ya

400 MHz, $CDCl_3$



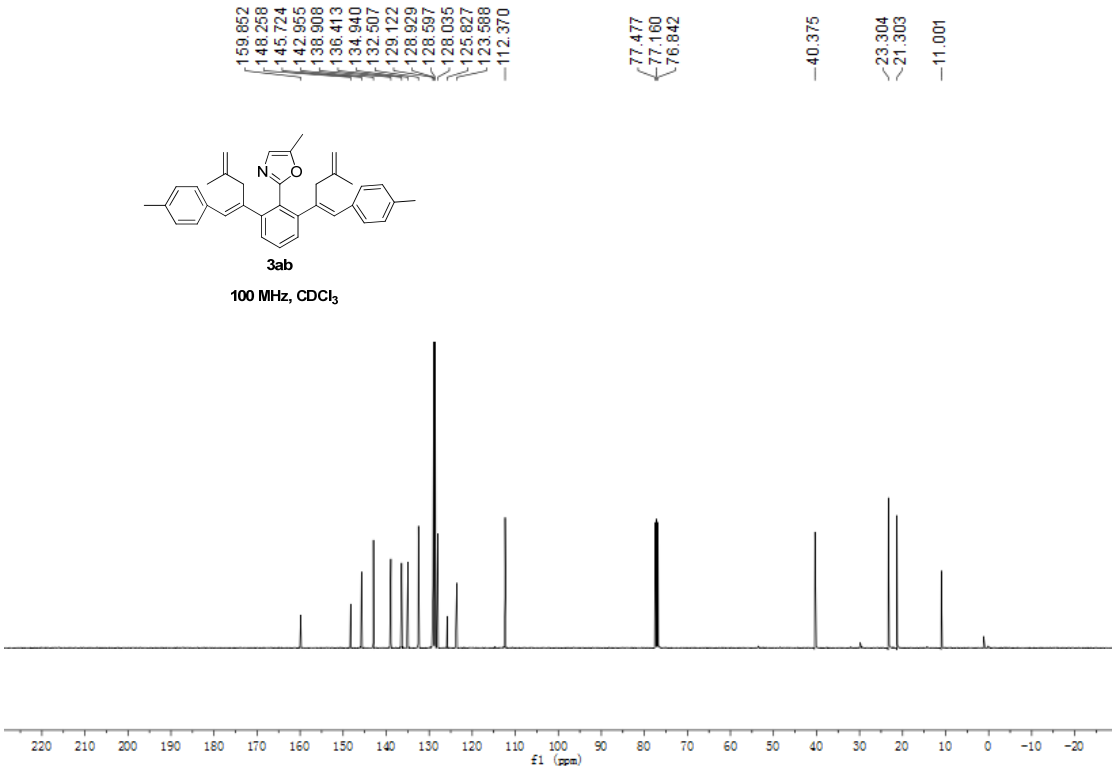
3ya

100 MHz, $CDCl_3$



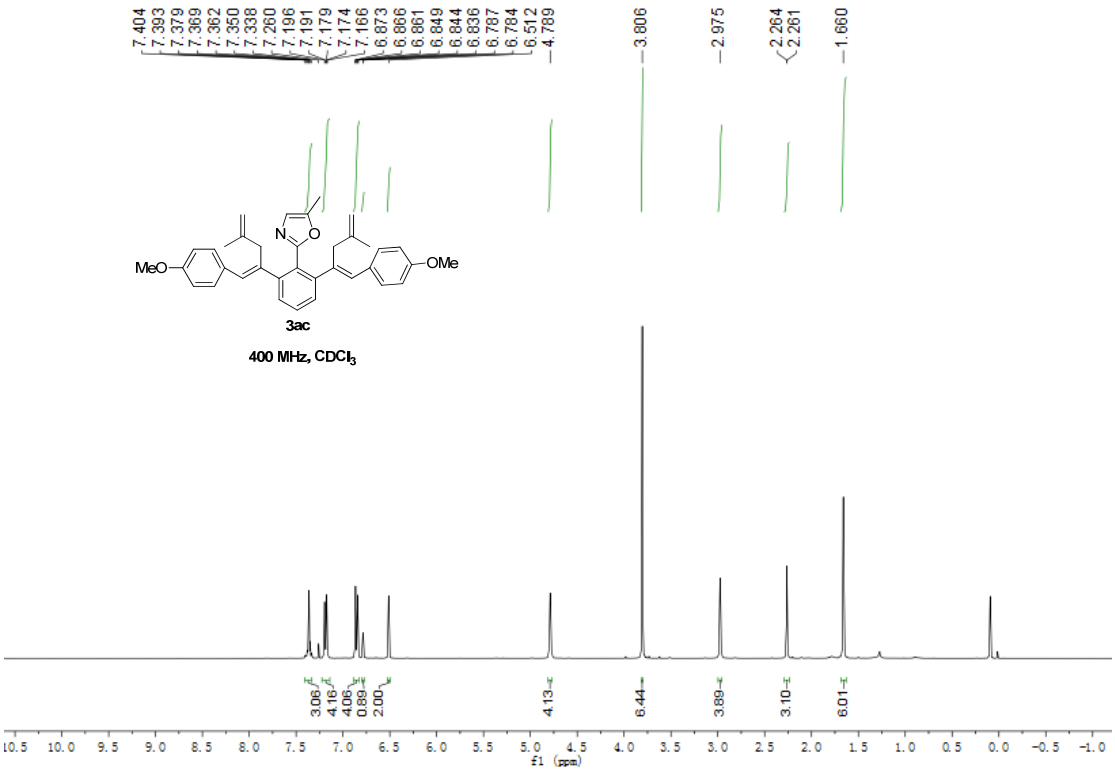
3ab

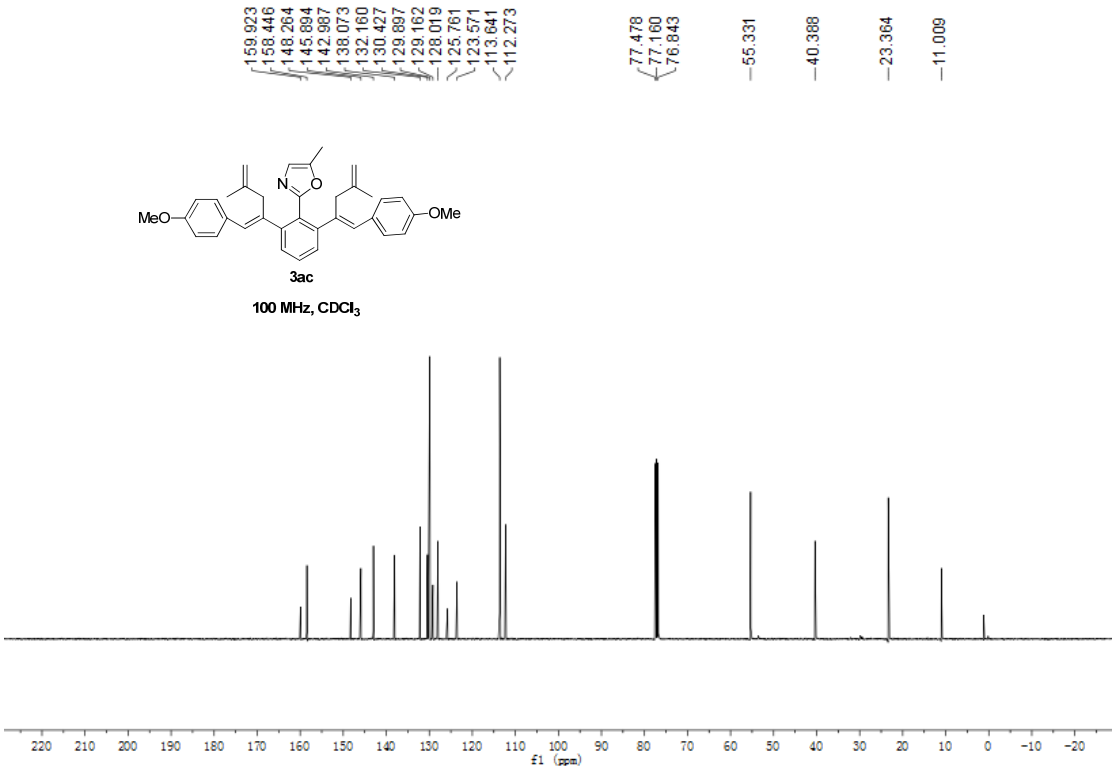
400 MHz, $CDCl_3$

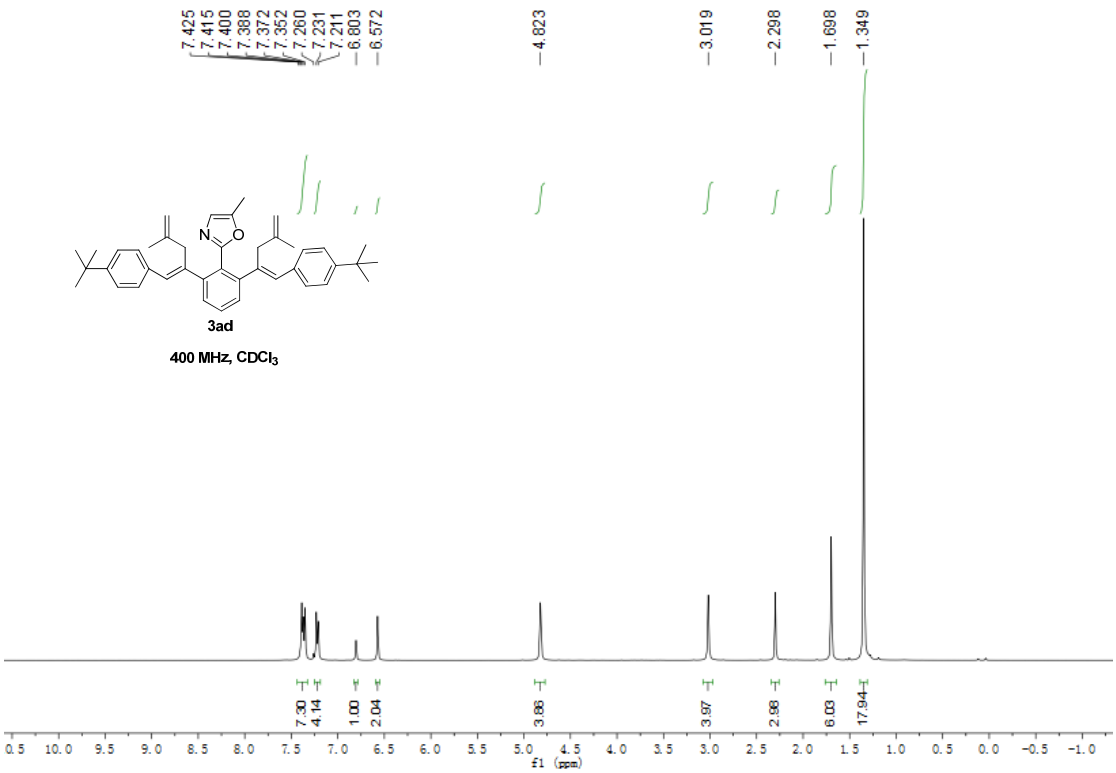


3ab

100 MHz, $CDCl_3$

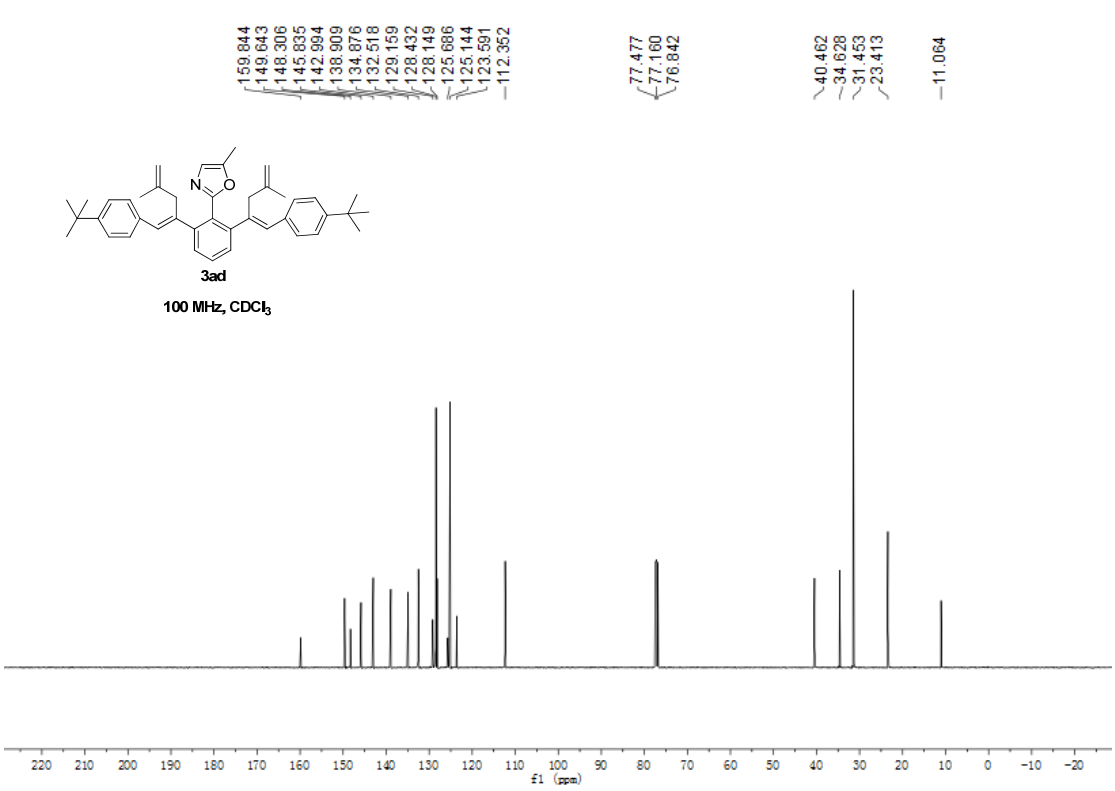

7.404
7.393
7.379
7.369
7.362
7.350
7.338
7.260
7.196
7.191
7.179
7.174
7.166
6.873
6.866
6.861
6.849
6.844
6.836
6.787
6.784
6.512
4.789
3.806
2.975
2.264
2.261
1.660
MeO
OMe
3ac
400 MHz, CDCl3
3.06
4.16
4.06
0.89
2.00
4.13
6.44
3.89
3.10
6.01
f1 (ppm)


159.923
158.446
148.264
145.894
142.987
138.073
132.160
130.427
129.897
129.162
128.019
125.761
123.571
113.641
112.273
77.478
77.160
76.843
55.331
40.388
23.364
11.009
MeO
OMe
3ac
100 MHz, CDCl3
f1 (ppm)



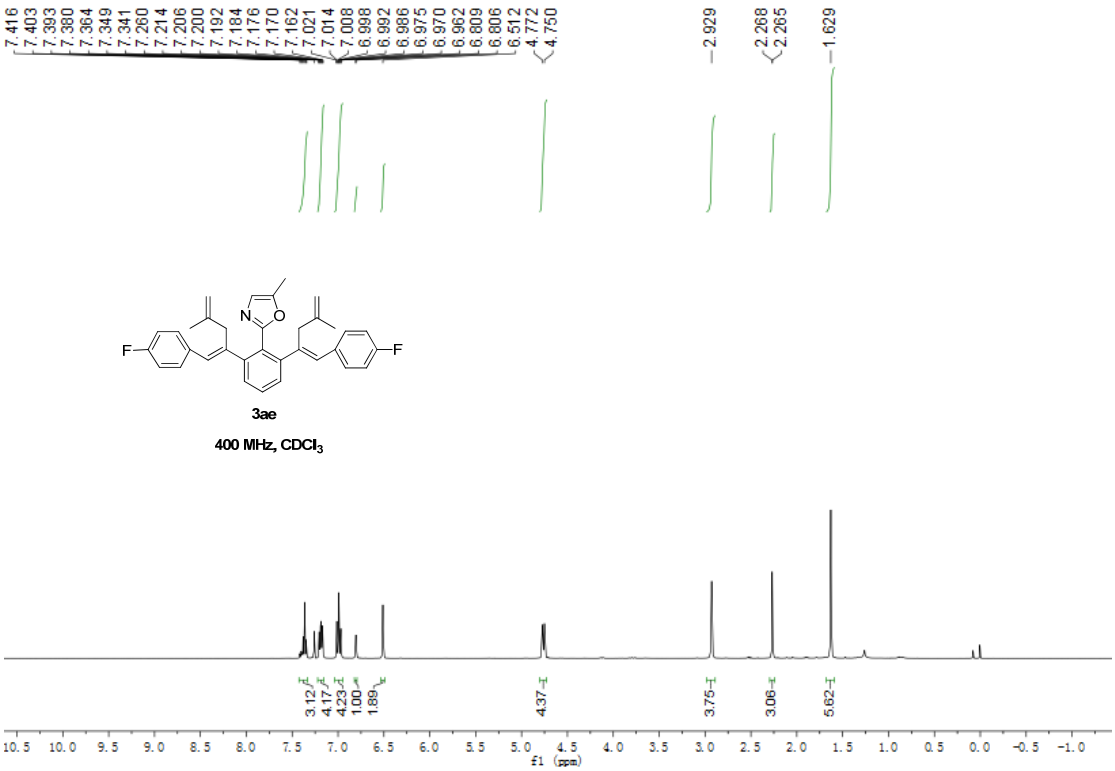
3ad

400 MHz, $CDCl_3$



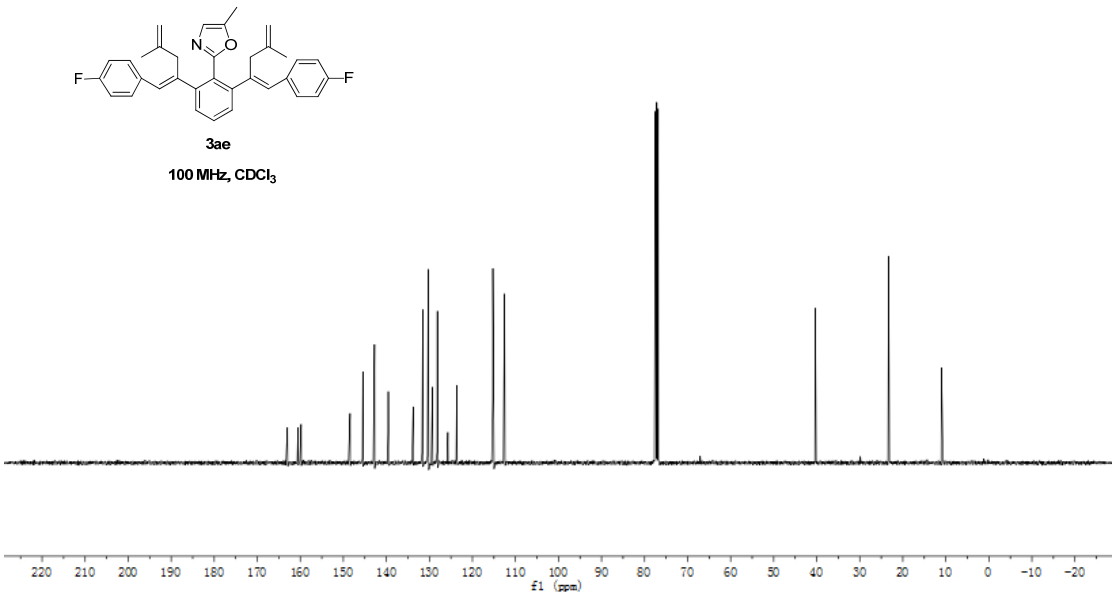
3ad

100 MHz, $CDCl_3$



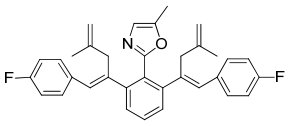
3ae

400 MHz, $CDCl_3$



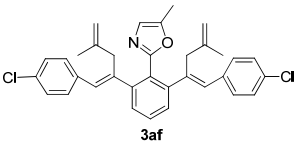
3ae

100 MHz, $CDCl_3$



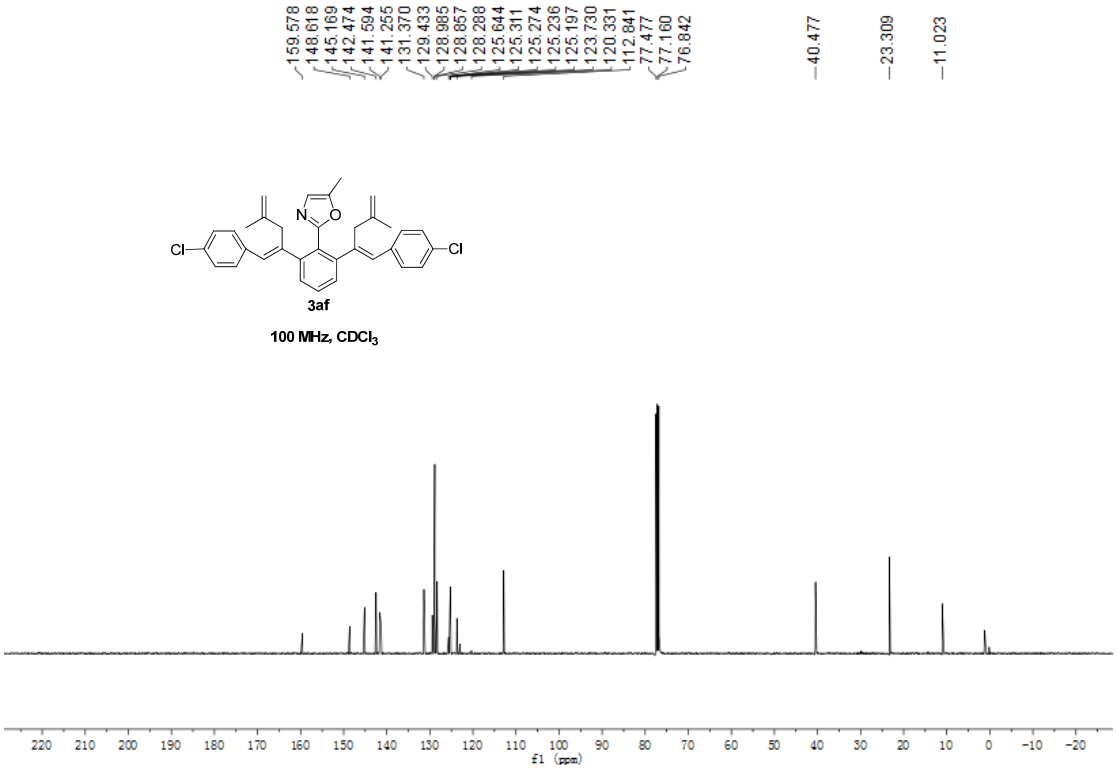
3ae

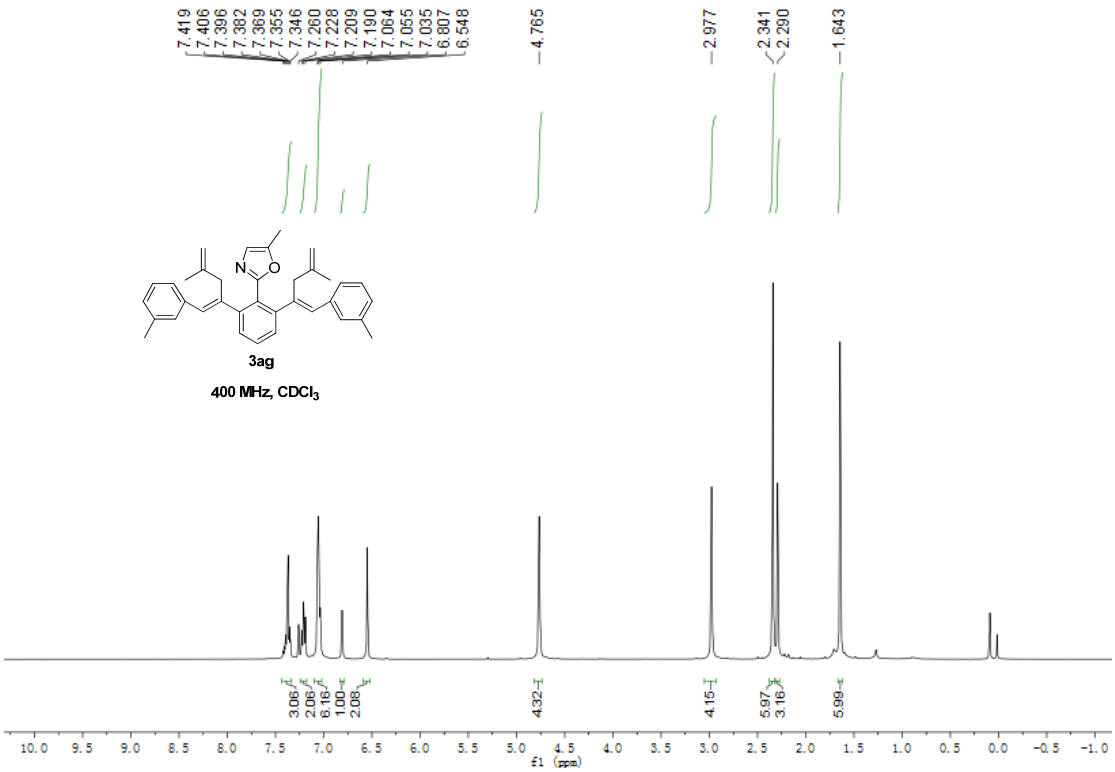
376 MHz, $CDCl_3$

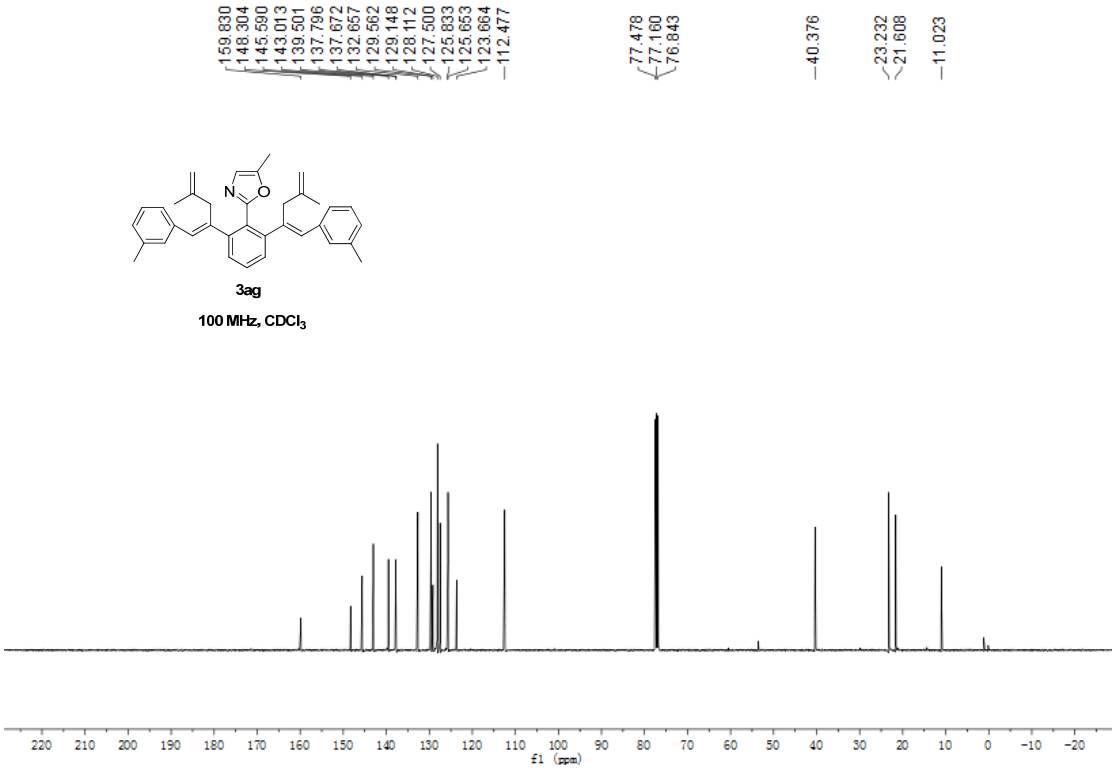


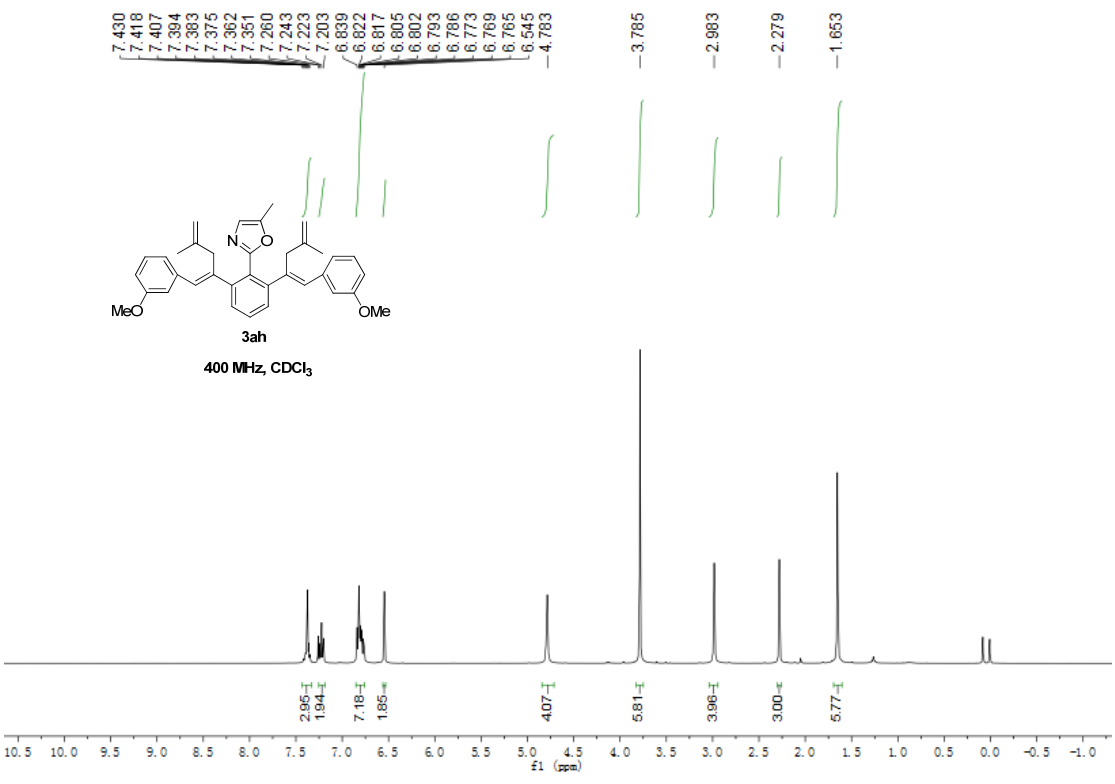
3af

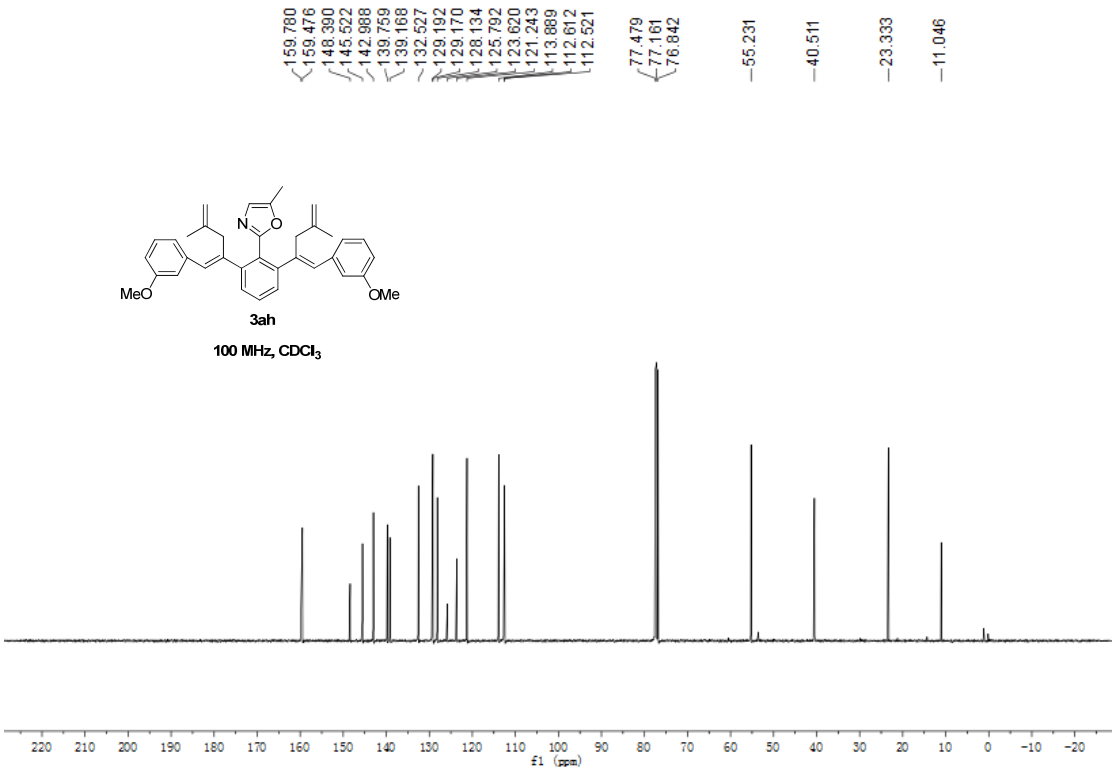
400 MHz, $CDCl_3$


159.578
148.618
145.169
142.474
141.594
141.255
131.370
129.433
128.985
128.857
128.288
125.644
125.311
125.274
125.236
125.197
123.730
120.331
112.641
77.477
77.160
76.842
40.477
23.309
11.023
Cl
Cl
N
O
3af
100 MHz, CDCl3
f1 (ppm)


7.419
7.406
7.396
7.382
7.369
7.355
7.346
7.260
7.228
7.209
7.190
7.064
7.055
7.035
6.807
6.548
4.765
2.977
2.341
2.290
1.643
N
O
3ag
400 MHz, CDCl3
3.06
2.06
6.16
1.00
2.08
4.32
4.15
5.97
3.16
5.99
f1 (ppm)


159.830
148.304
145.590
143.013
139.501
137.796
137.672
132.657
129.562
129.148
128.112
127.500
125.833
125.653
123.664
112.477
77.478
77.160
76.843
40.376
23.232
21.608
11.023
N
O
3ag
100 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)


7.430
7.418
7.407
7.394
7.383
7.375
7.362
7.351
7.260
7.243
7.223
7.203
6.839
6.822
6.817
6.805
6.802
6.793
6.786
6.773
6.769
6.765
6.545
4.783
3.785
2.983
2.279
1.653
N
O
MeO
OMe
3ah
400 MHz, CDCl3
2.95
1.94
7.18
1.85
4.07
5.81
3.96
3.00
5.77
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)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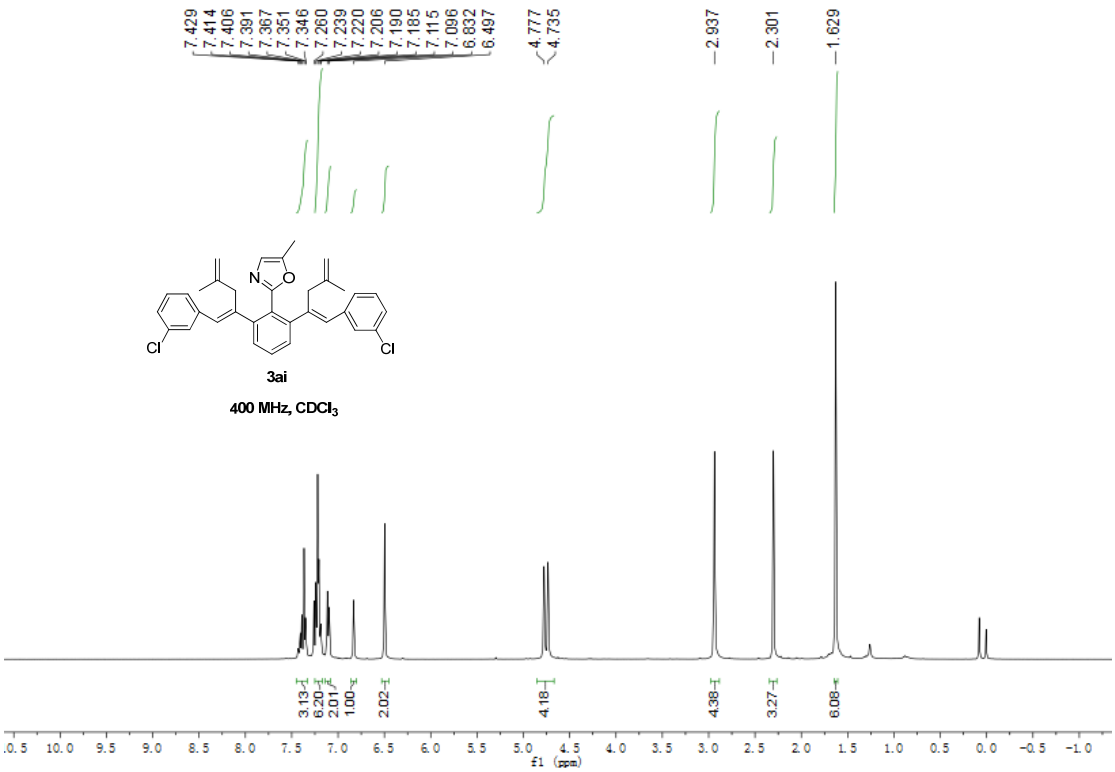
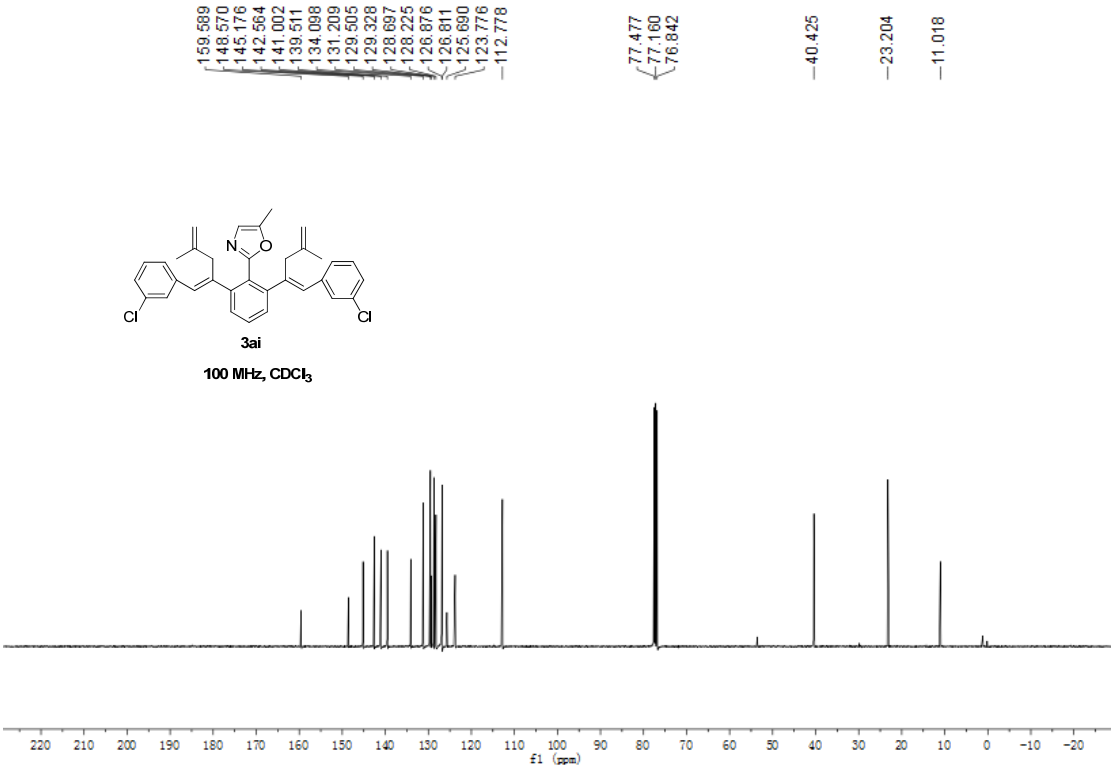
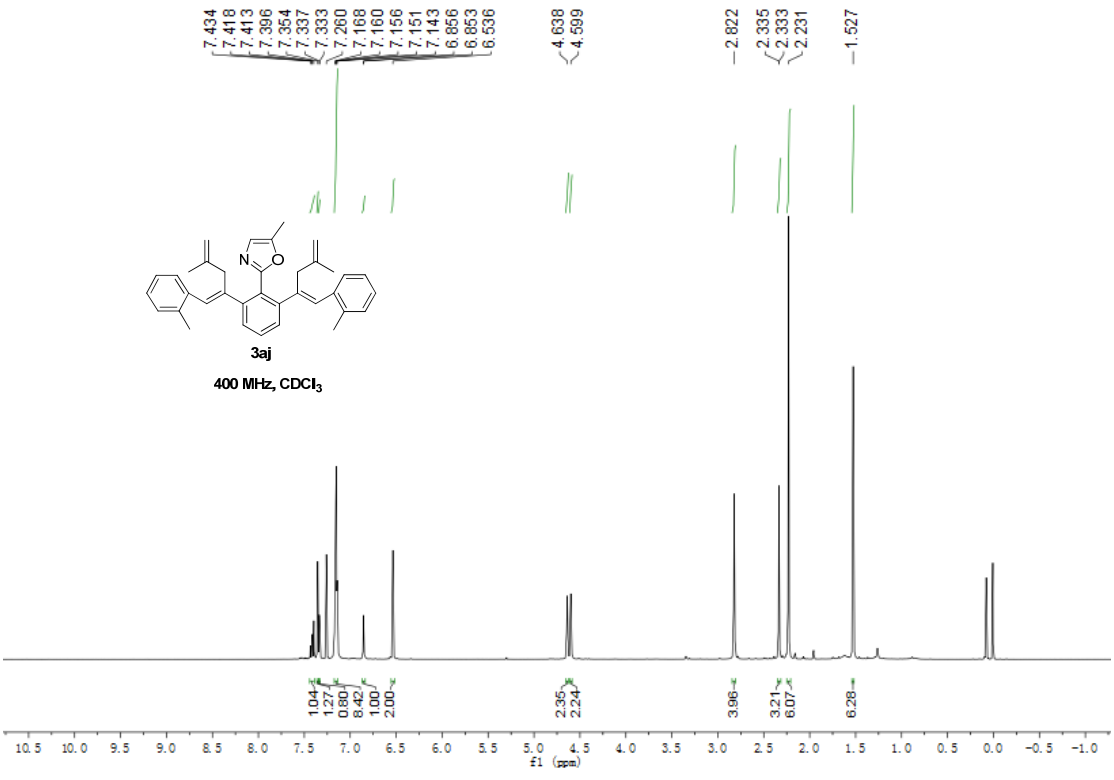
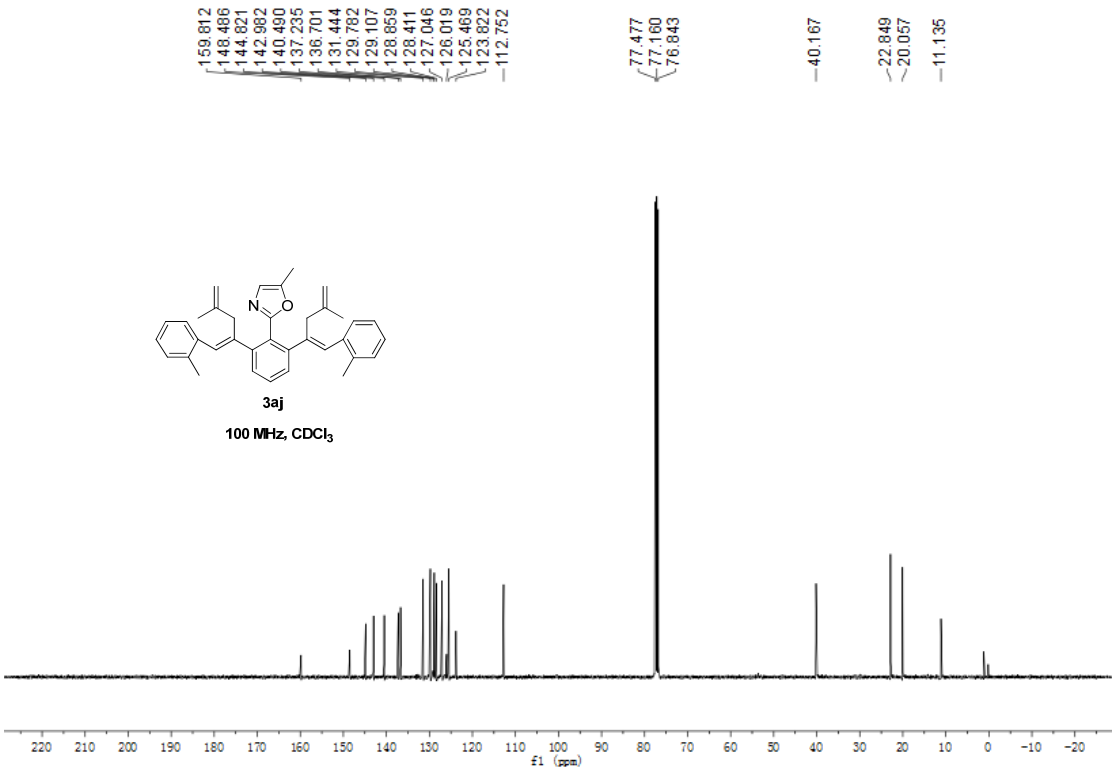
159.476
148.390
145.522
142.988
139.759
139.168
132.527
129.192
129.170
128.134
125.792
123.620
121.243
113.889
112.612
112.521
77.479
77.161
76.842
55.231
40.511
23.333
11.046
MeO
OMe
N
O
3ah
100 MHz, CDCl3
f1 (ppm)


7.429
7.414
7.406
7.391
7.367
7.351
7.346
7.260
7.239
7.220
7.206
7.190
7.185
7.115
7.096
6.832
6.497
4.777
4.735
2.937
2.301
1.629
Cl
Cl
N
O
3ai
400 MHz, CDCl3
3.13
6.20
2.01
1.00
2.02
4.18
4.38
3.27
6.08
f1 (ppm)

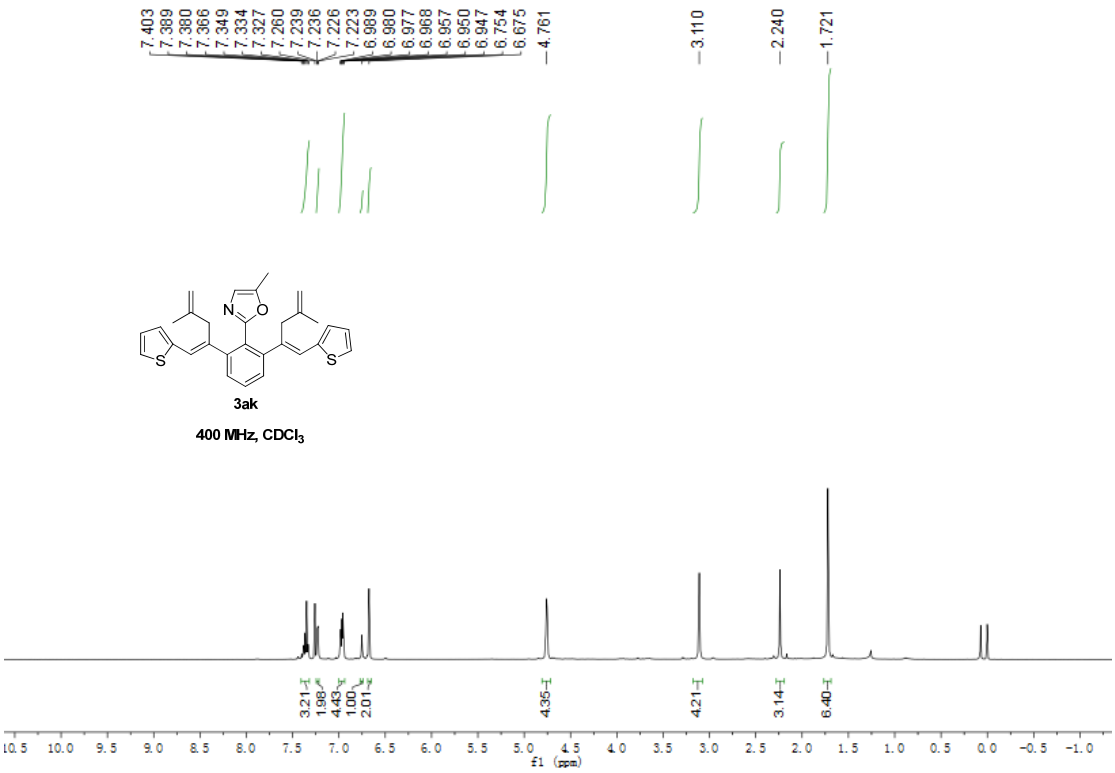

159.589
148.570
145.176
142.564
141.002
139.511
134.098
131.209
129.505
129.328
128.697
128.225
126.876
126.811
125.690
123.776
112.778
77.477
77.160
76.842
40.425
23.204
11.018
N
O
Cl
Cl
3ai
100 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)


7.434
7.418
7.413
7.396
7.354
7.337
7.333
7.260
7.168
7.160
7.156
7.151
7.143
6.856
6.853
6.536
4.638
4.599
2.822
2.335
2.333
2.231
1.527
N
O
3aj
400 MHz, CDCl3
1.04
1.27
0.80
8.42
1.00
2.00
2.35
2.24
3.96
3.21
6.07
6.28
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)



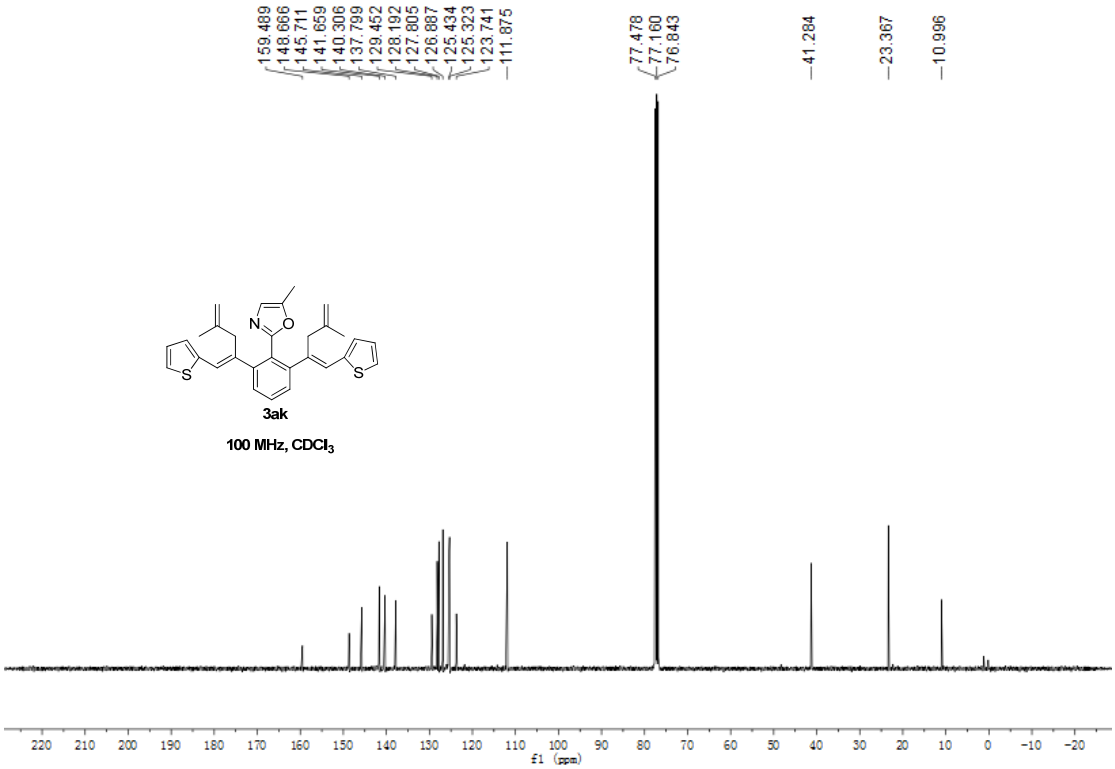
3aj

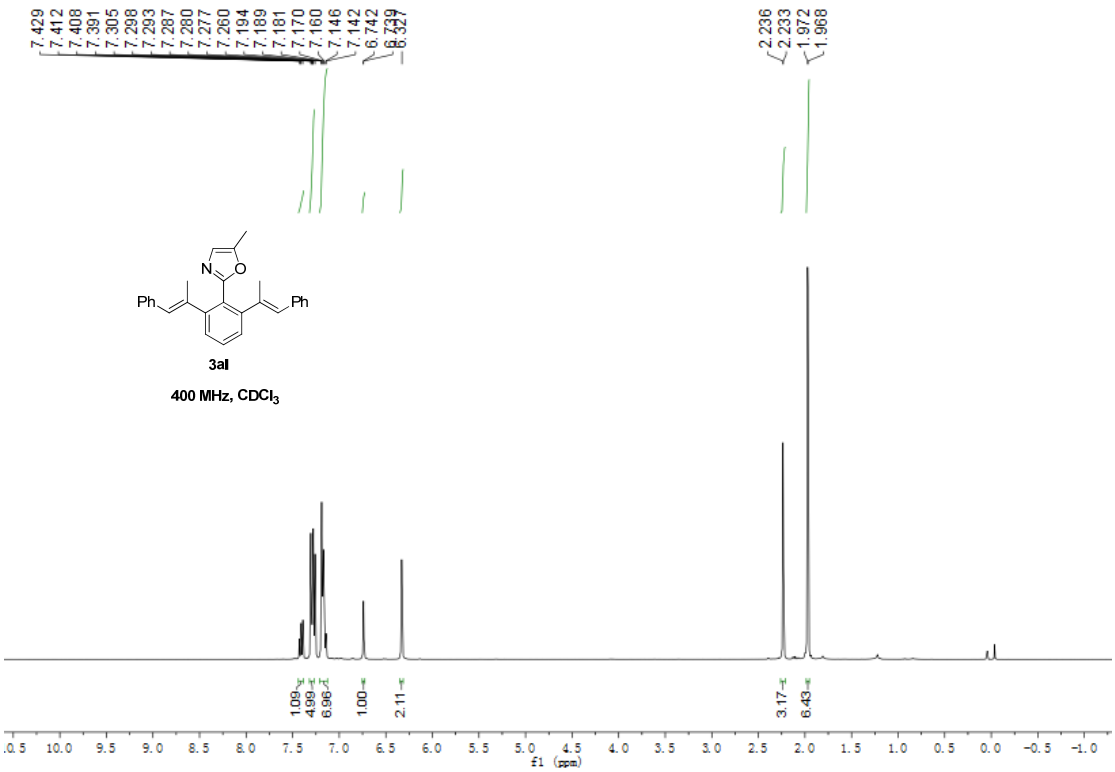
100 MHz, $CDCl_3$

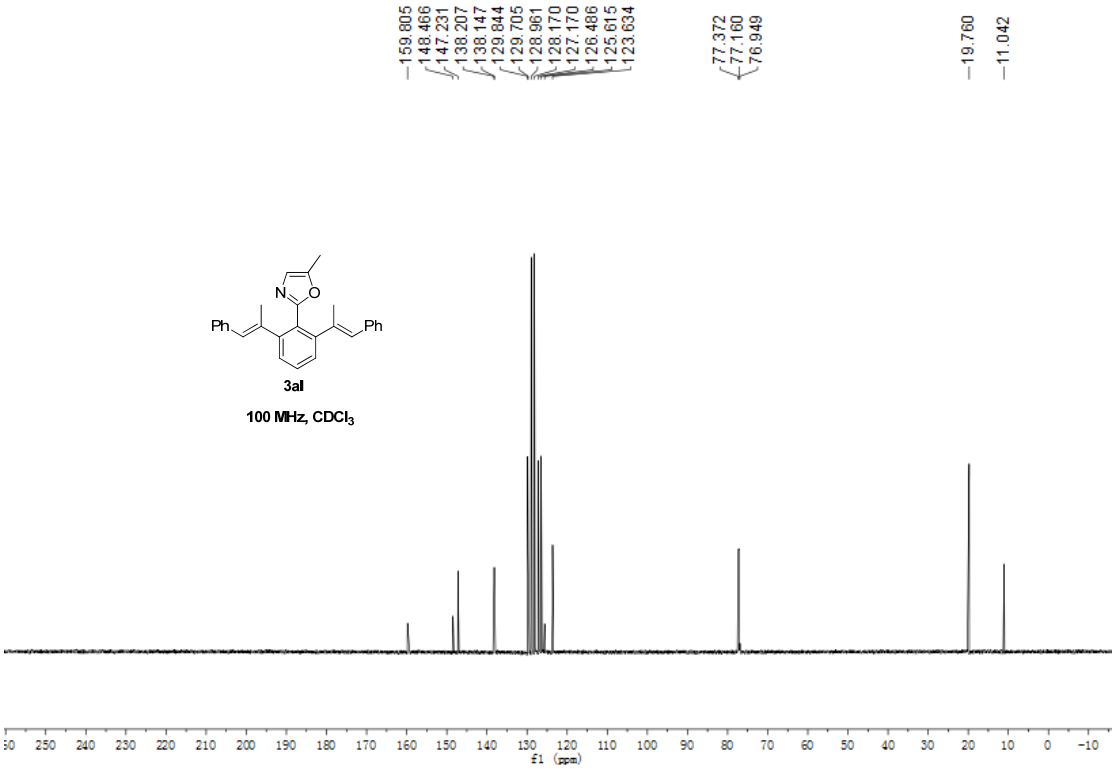


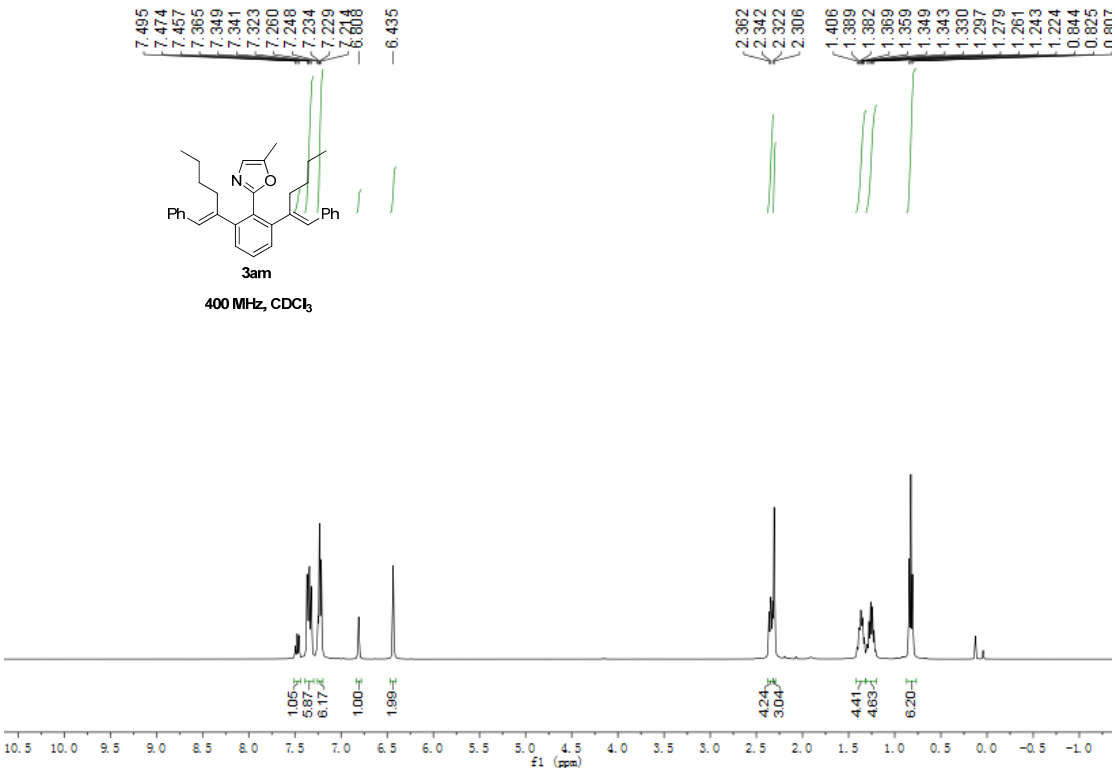
3ak

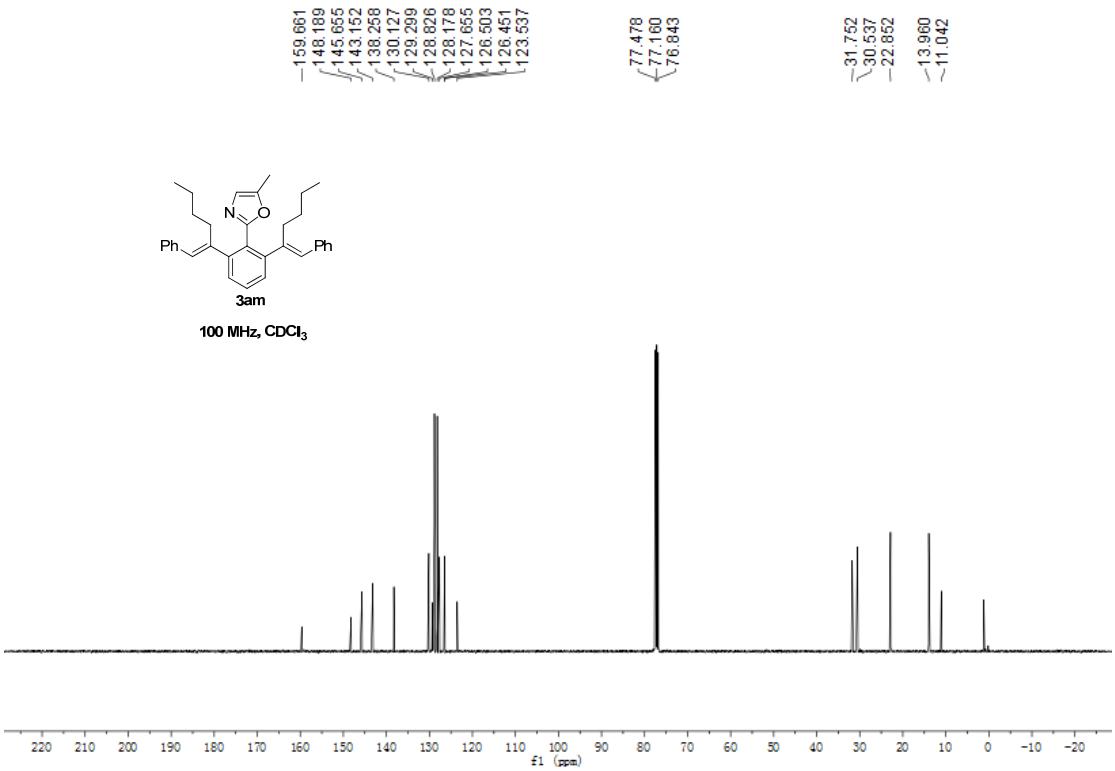
400 MHz, $CDCl_3$

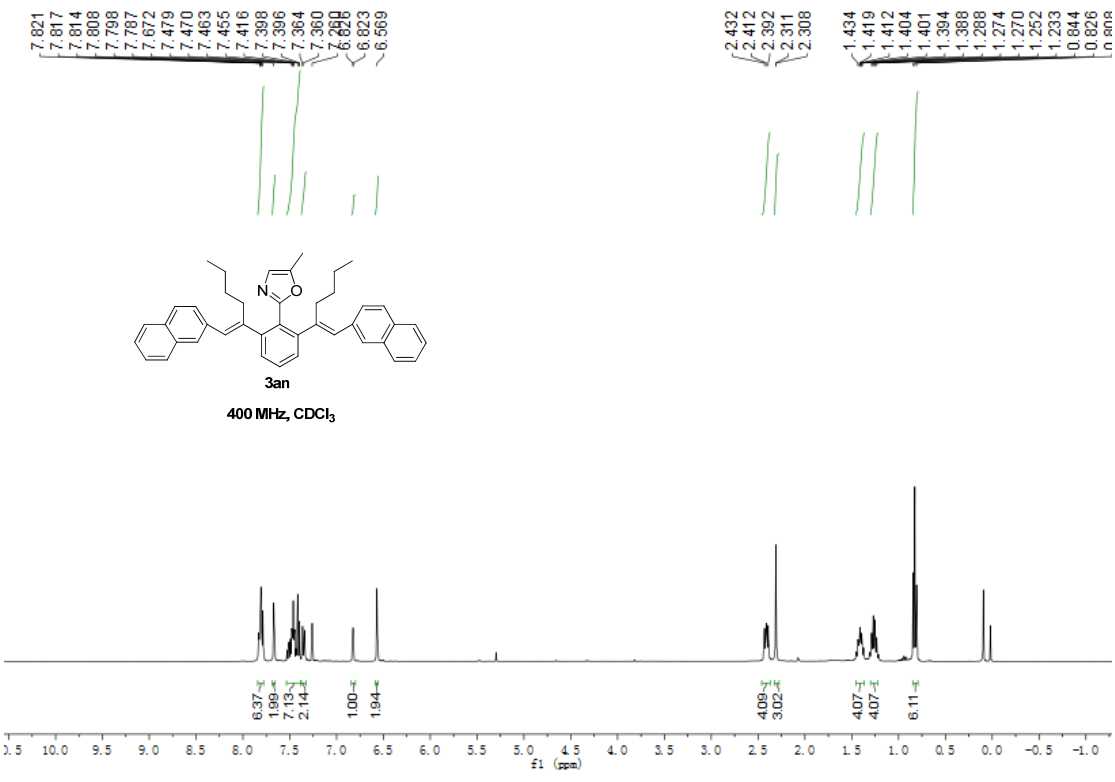

159.489
148.666
145.711
141.659
140.306
137.799
129.452
128.192
127.805
126.887
125.434
125.323
123.741
111.875
77.478
77.160
76.843
41.284
23.367
10.996
3ak
100 MHz, CDCl3
f1 (ppm)

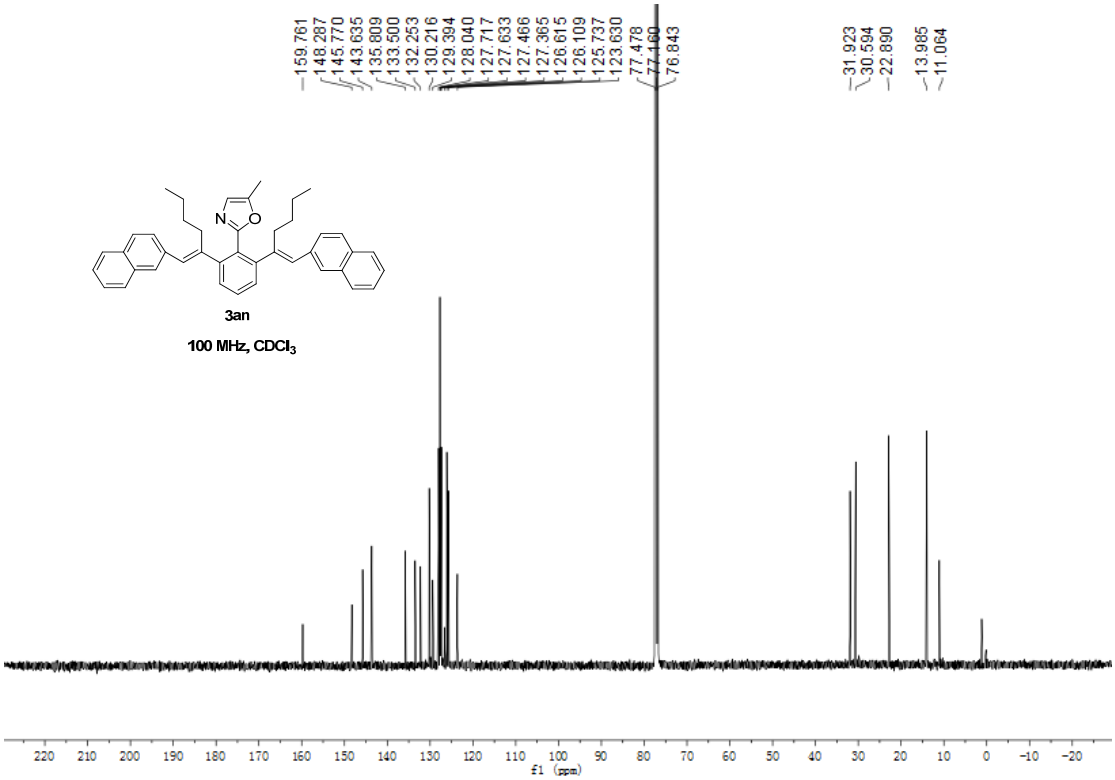

7.429
7.412
7.408
7.391
7.305
7.298
7.293
7.287
7.280
7.277
7.260
7.194
7.189
7.181
7.170
7.160
7.146
7.142
6.742
6.739
6.327
2.236
2.233
1.972
1.968
Ph
Ph
3al
400 MHz, CDCl3
1.09
4.99
6.96
1.00
2.11
3.17
6.43
f1 (ppm)


159.805
148.466
147.231
138.207
138.147
129.844
129.705
128.961
128.170
127.170
126.486
125.615
123.634
77.372
77.160
76.949
19.760
11.042
Ph
Ph
3al
100 MHz, CDCl3
f1 (ppm)


7.495
7.474
7.457
7.365
7.349
7.341
7.323
7.260
7.248
7.234
7.229
7.214
6.808
6.435
2.362
2.342
2.322
2.306
1.406
1.389
1.382
1.369
1.359
1.349
1.343
1.330
1.297
1.279
1.261
1.243
1.224
0.844
0.825
Ph
Ph
3am
400 MHz, CDCl3
1.05
5.87
6.17
1.00
1.99
4.24
3.04
4.41
4.63
6.20
f1 (ppm)


159.661
148.189
145.655
143.152
138.258
130.127
129.299
128.826
128.178
127.655
126.503
126.451
123.537
77.478
77.160
76.843
31.752
30.537
22.852
13.960
11.042
N
O
Ph
Ph
3am
100 MHz, CDCl3
f1 (ppm)


7.821
7.817
7.814
7.808
7.798
7.787
7.672
7.479
7.470
7.463
7.455
7.416
7.398
7.396
7.364
7.360
7.260
6.826
6.823
6.569
2.432
2.412
2.392
2.311
2.308
1.434
1.419
1.412
1.404
1.401
1.394
1.388
1.288
1.274
1.270
1.252
1.233
0.844
0.826
N
O
3an
400 MHz, CDCl3
6.37
1.99
7.13
2.14
1.00
1.94
4.09
3.02
4.07
4.07
6.11
f1 (ppm)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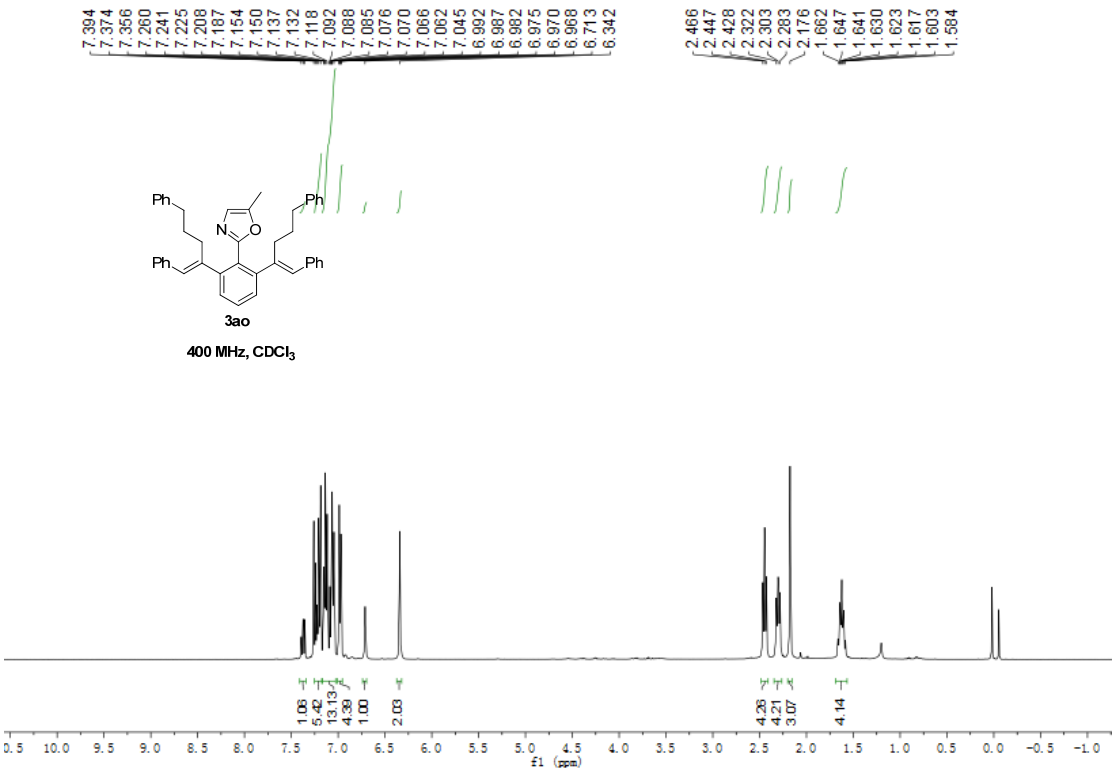
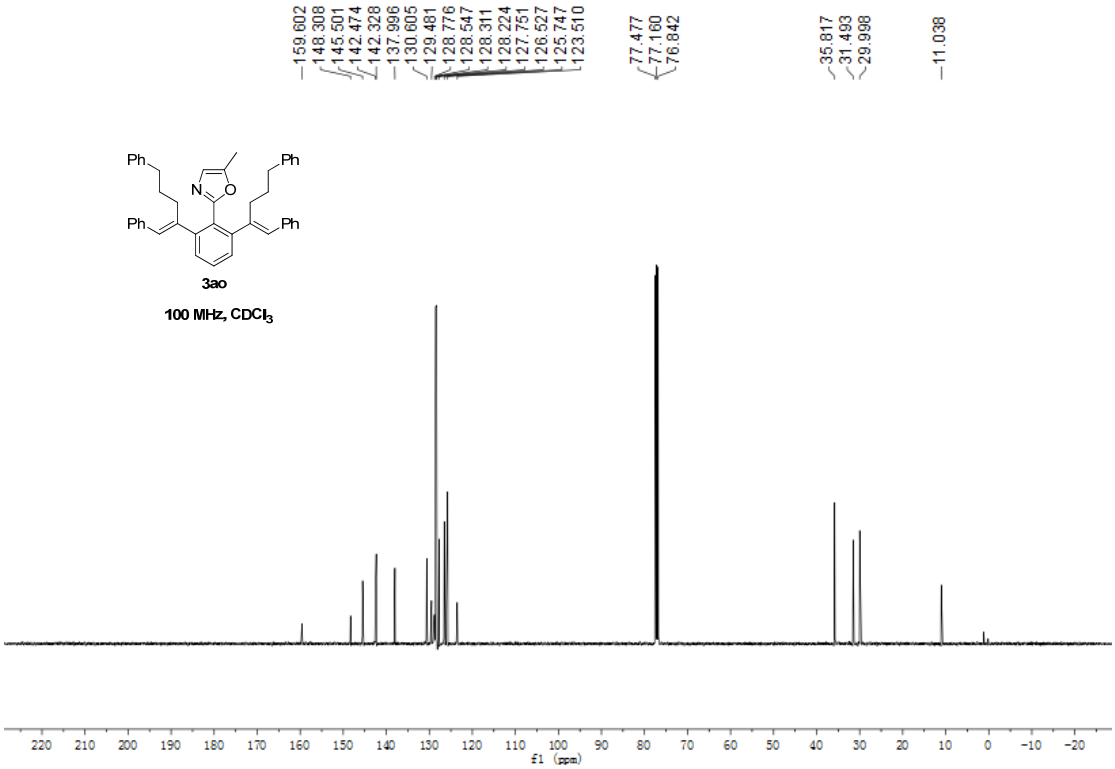
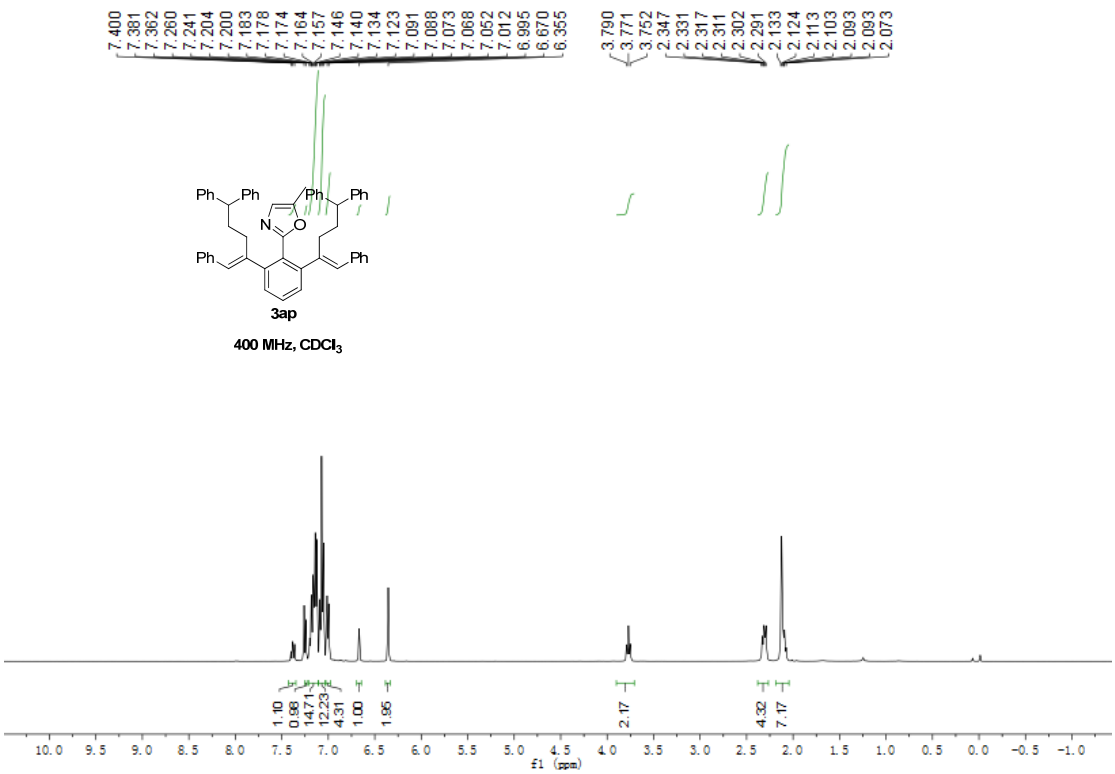
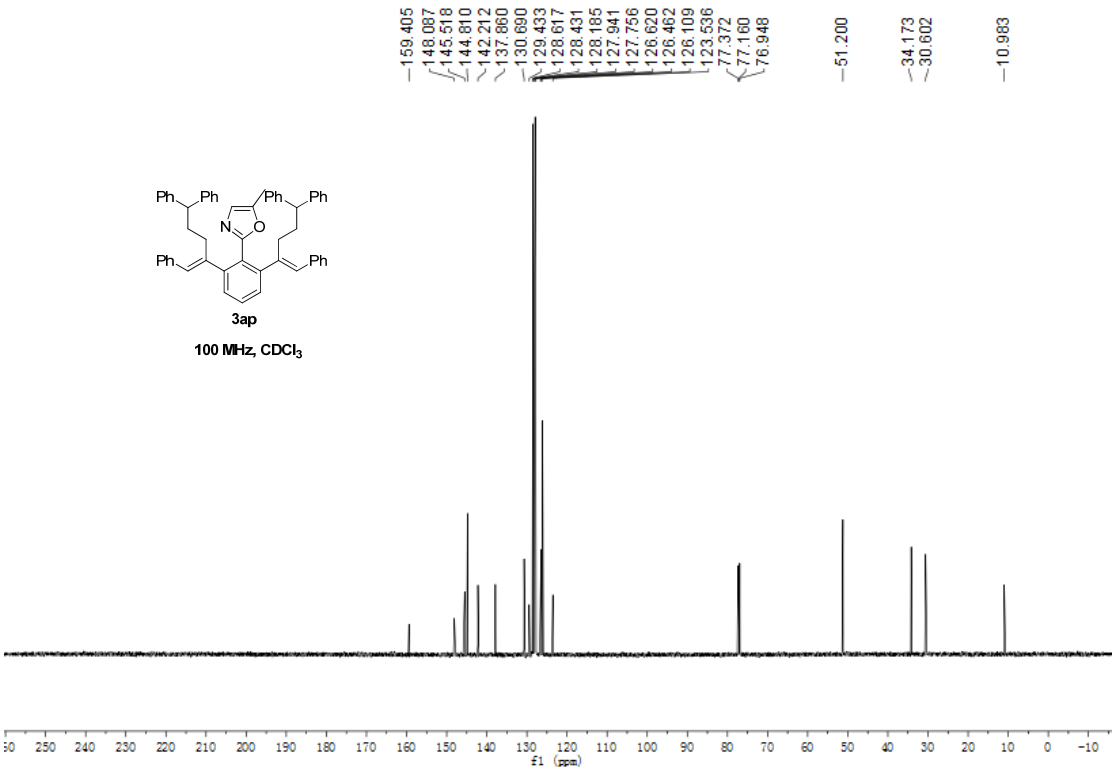
148.287
145.770
143.635
135.809
133.500
132.253
130.216
129.394
128.040
127.717
127.633
127.466
127.365
126.615
126.109
125.737
123.630
77.478
77.160
76.843
31.923
30.594
22.890
13.985
11.064
N
O
3an
100 MHz, CDCl3
f1 (ppm)


7.394
7.374
7.356
7.260
7.241
7.225
7.208
7.187
7.154
7.150
7.137
7.132
7.118
7.092
7.088
7.085
7.076
7.070
7.066
7.062
7.045
6.992
6.987
6.982
6.975
6.970
6.968
6.713
6.342
2.466
2.447
2.428
2.322
2.303
2.283
2.176
1.662
1.647
1.641
1.630
1.623
1.617
1.603
1.584
Ph
Ph
Ph
Ph
N
O
3ao
400 MHz, CDCl3
1.08
5.42
13.13
4.39
1.00
2.03
4.26
4.21
3.07
4.14
f1 (ppm)

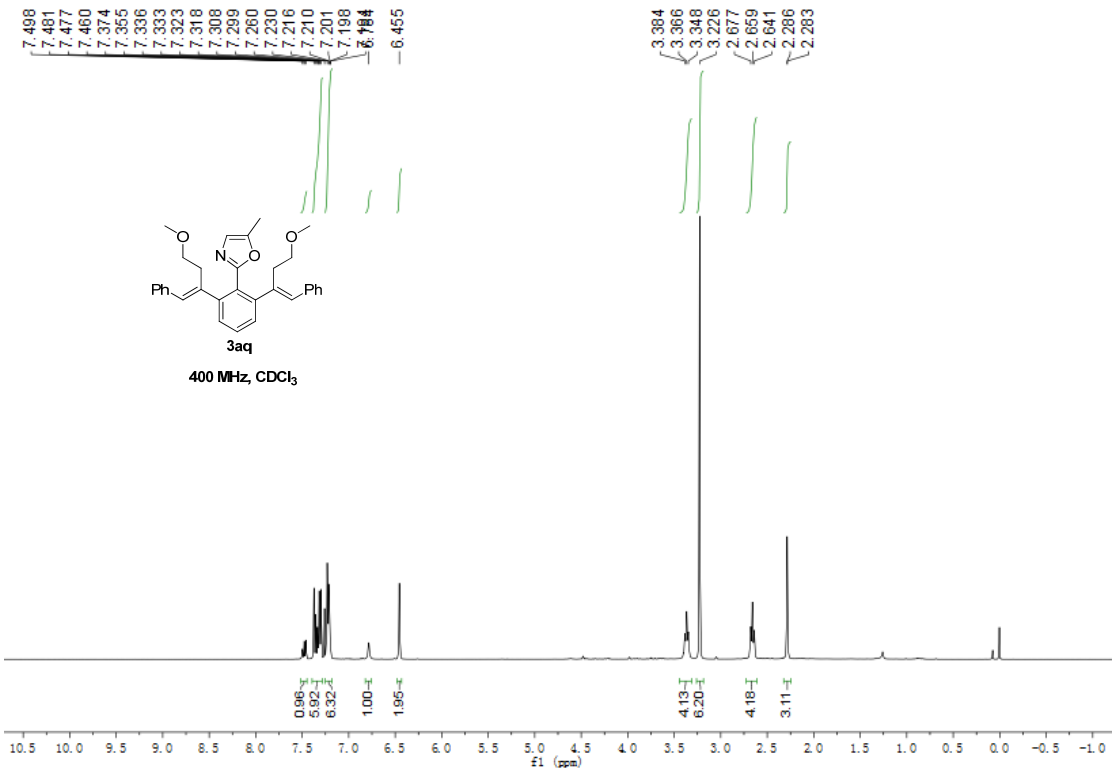

159.602
148.308
145.501
142.474
142.328
137.996
130.605
129.481
128.776
128.547
128.311
128.224
127.751
126.527
125.747
123.510
77.477
77.160
76.842
35.817
31.493
29.998
11.038
Ph
Ph
Ph
Ph
N
O
3ao
100 MHz, CDCl3
f1 (ppm)


7.400
7.381
7.362
7.260
7.241
7.204
7.200
7.183
7.178
7.174
7.164
7.157
7.146
7.140
7.134
7.123
7.091
7.088
7.073
7.068
7.052
7.012
6.995
6.670
6.355
3.790
3.771
3.752
2.347
2.331
2.317
2.311
2.302
2.291
2.133
2.124
2.113
2.103
2.093
2.093
2.073
Ph
Ph
Ph
Ph
Ph
Ph
N
O
3ap
400 MHz, CDCl3
1.10
0.98
14.71
12.23
4.31
1.00
1.95
2.17
4.32
7.17
f1 (ppm)



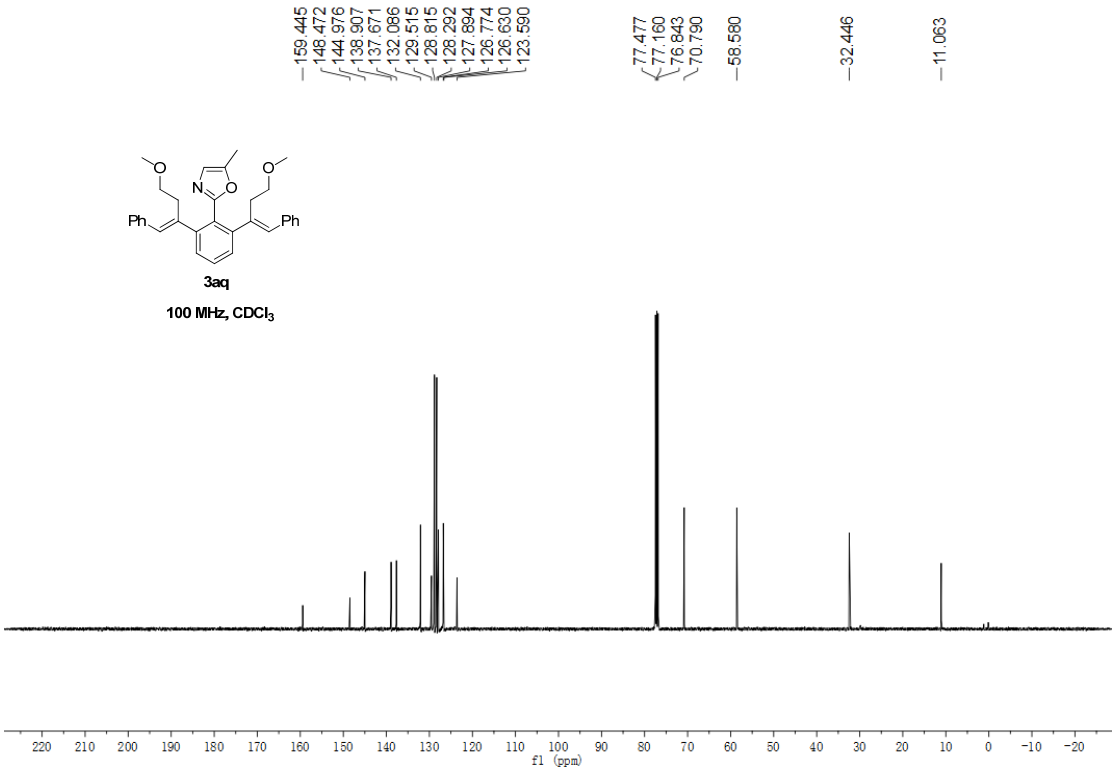
3ap

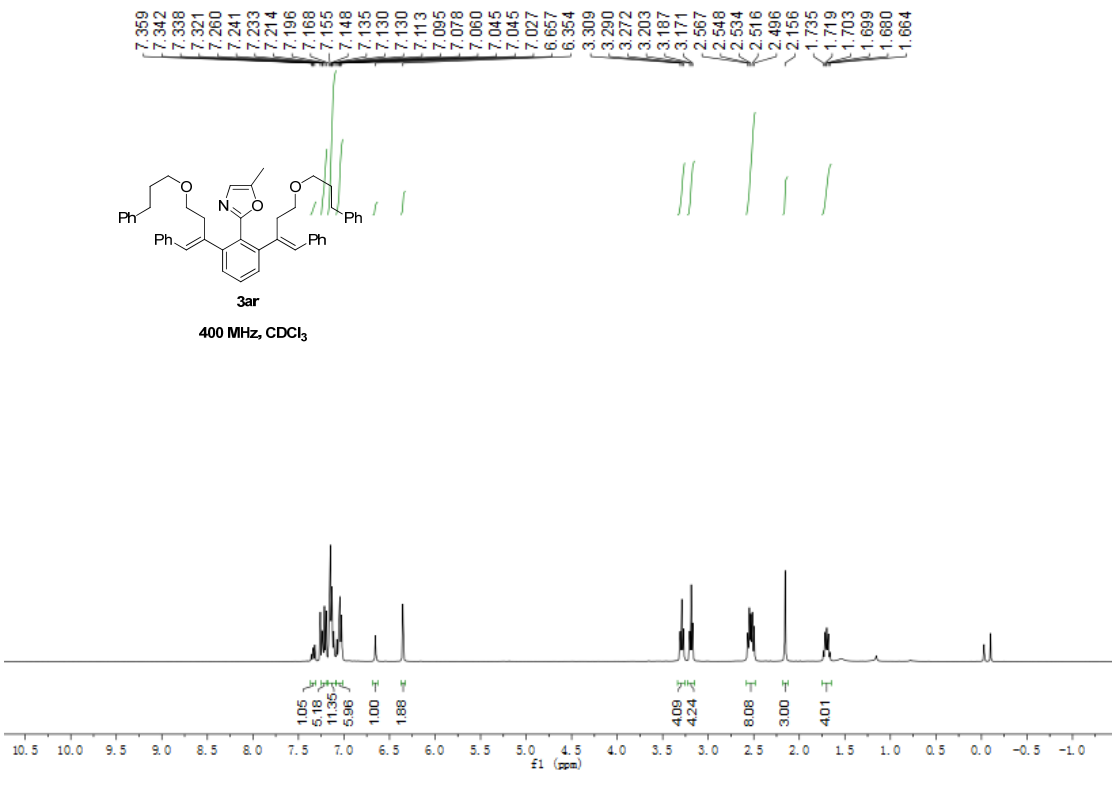
100 MHz, $CDCl_3$

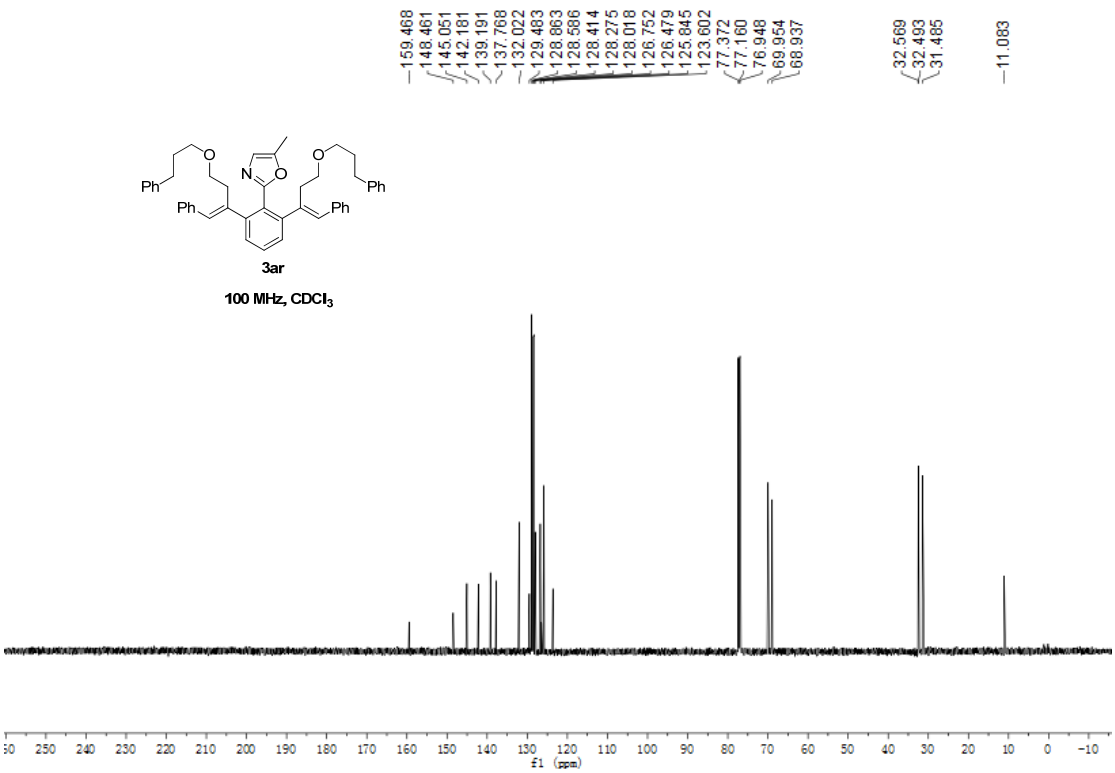


3aq

400 MHz, $CDCl_3$

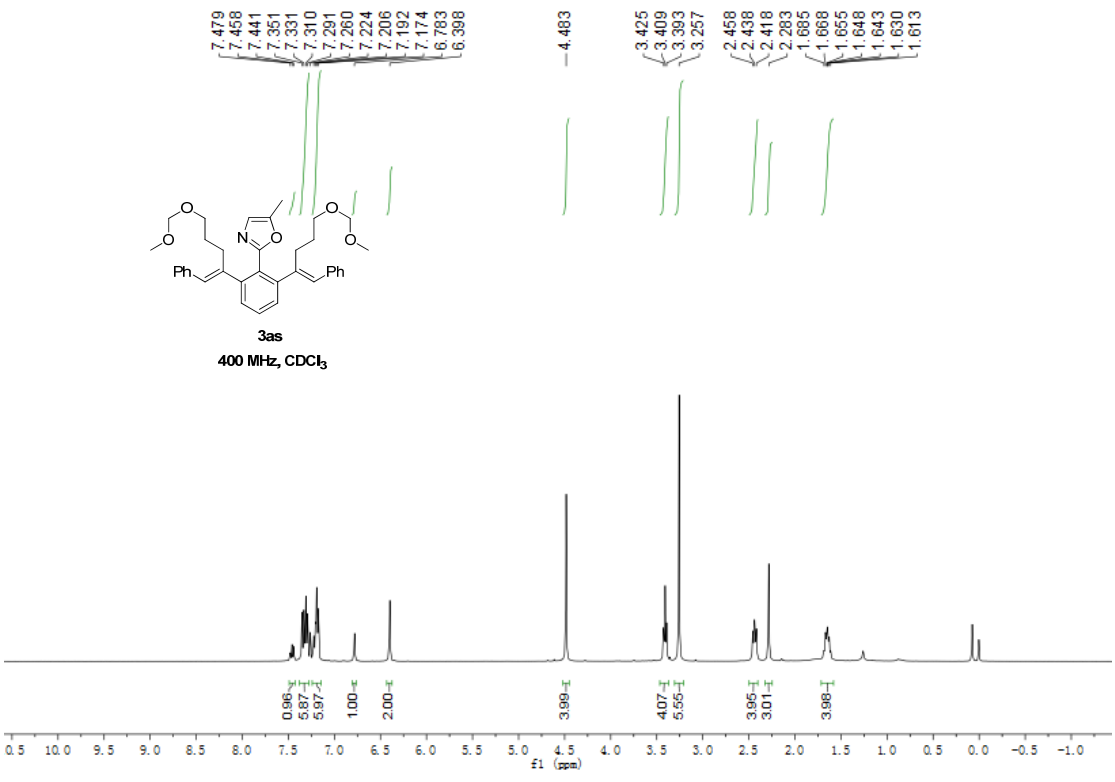

159.445
148.472
144.976
138.907
137.671
132.086
129.515
128.815
128.292
127.894
126.774
126.630
123.590
77.477
77.160
76.843
70.790
58.580
32.446
11.063
O
N
O
O
Ph
Ph
3aq
100 MHz, CDCl3
f1 (ppm)


7.359
7.342
7.338
7.321
7.260
7.241
7.233
7.214
7.196
7.168
7.155
7.148
7.135
7.130
7.130
7.113
7.095
7.078
7.060
7.045
7.045
7.027
6.657
6.354
3.309
3.290
3.272
3.203
3.187
3.171
2.567
2.548
2.534
2.516
2.496
2.156
1.735
1.719
1.703
1.699
1.680
1.664
O
N
O
O
Ph
Ph
Ph
Ph
3ar
400 MHz, CDCl3
1.05
5.18
11.35
5.96
1.00
1.88
4.09
4.24
8.08
3.00
4.01
f1 (ppm)



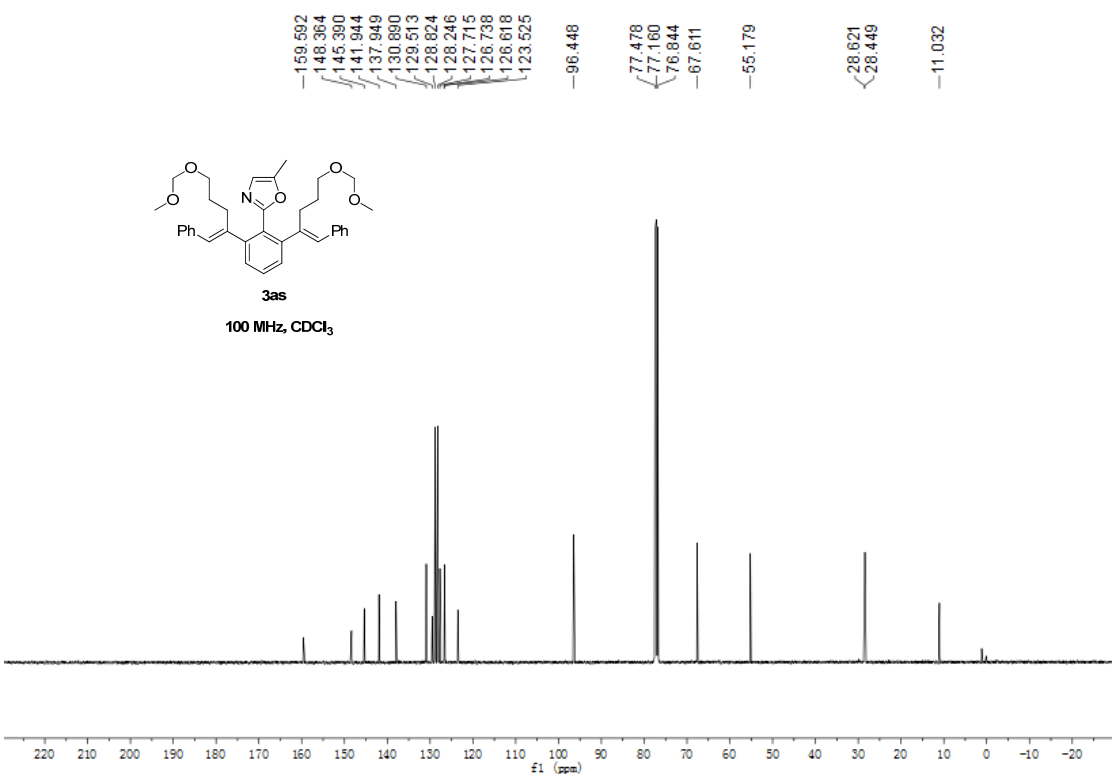
3ar

100 MHz, $CDCl_3$



3as

400 MHz, $CDCl_3$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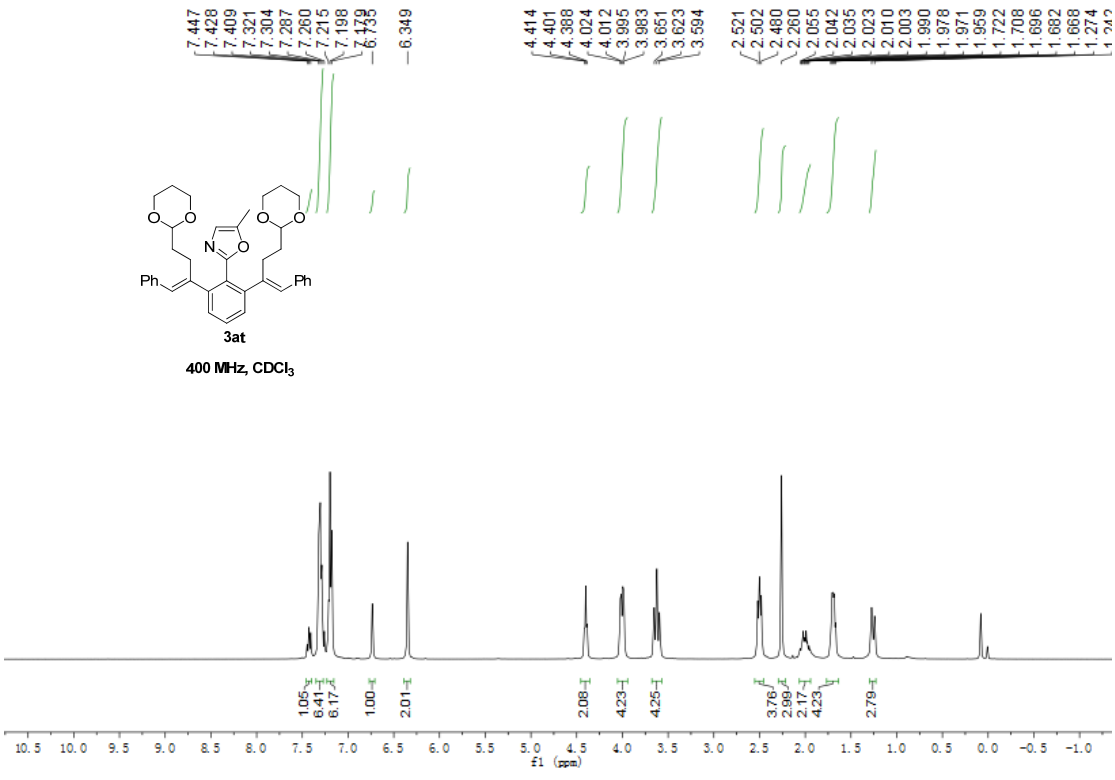
145.390
141.944
137.949
130.890
129.513
128.824
128.246
127.715
126.738
126.618
123.525
96.448
77.478
77.160
76.844
67.611
55.179
28.621
28.449
11.032
Ph
Ph
3as
100 MHz, CDCl3
f1 (ppm)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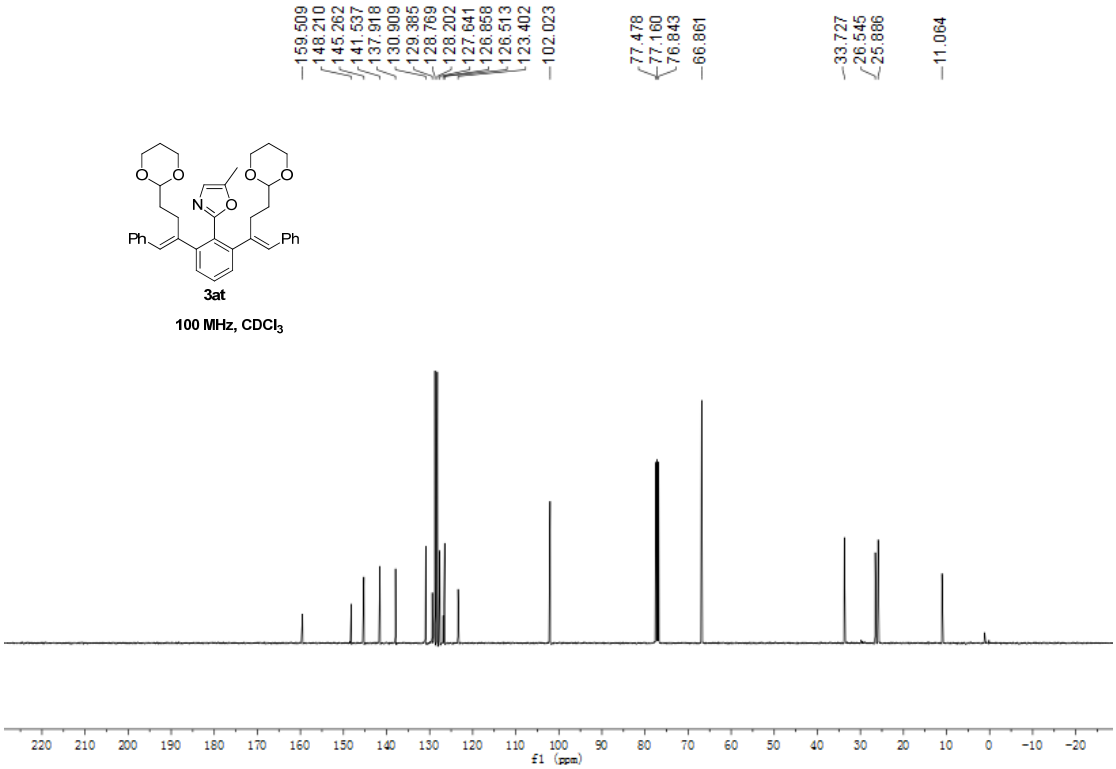
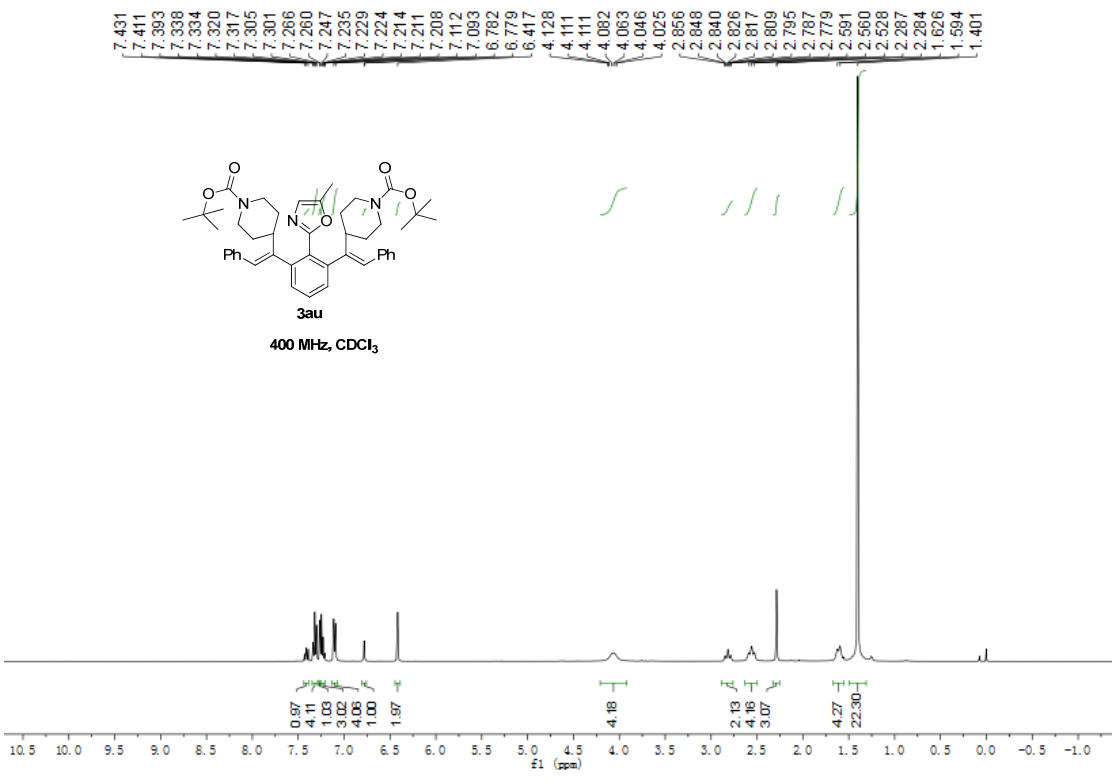
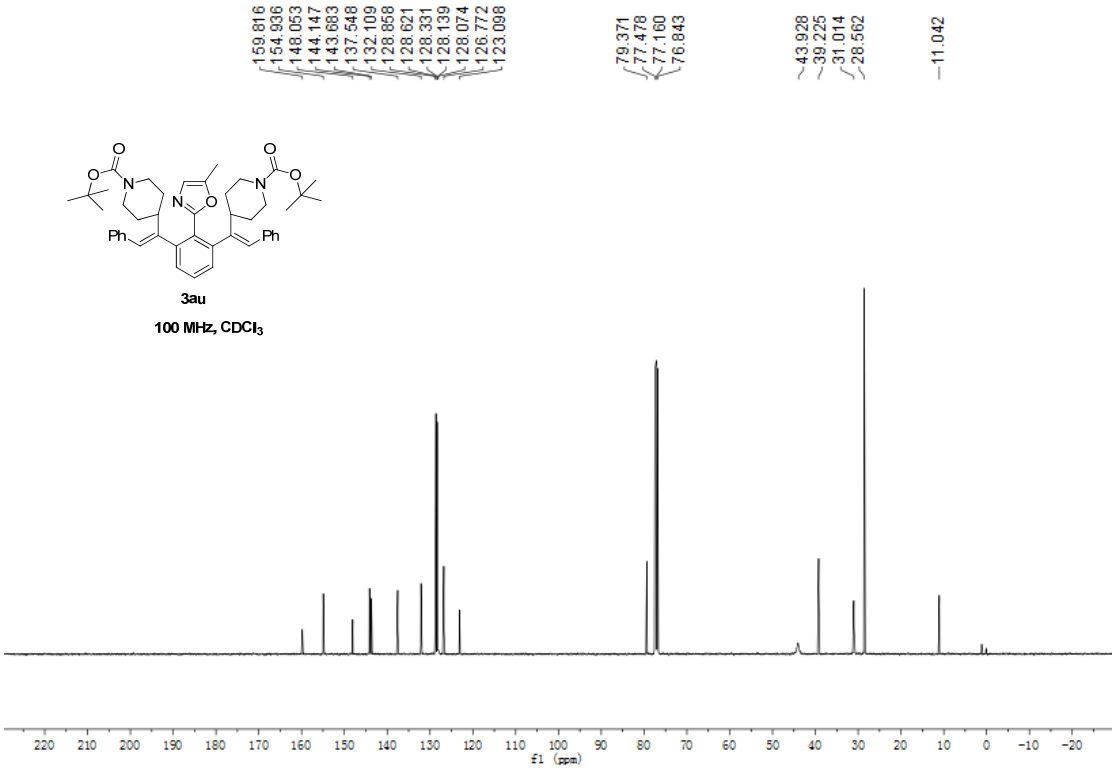
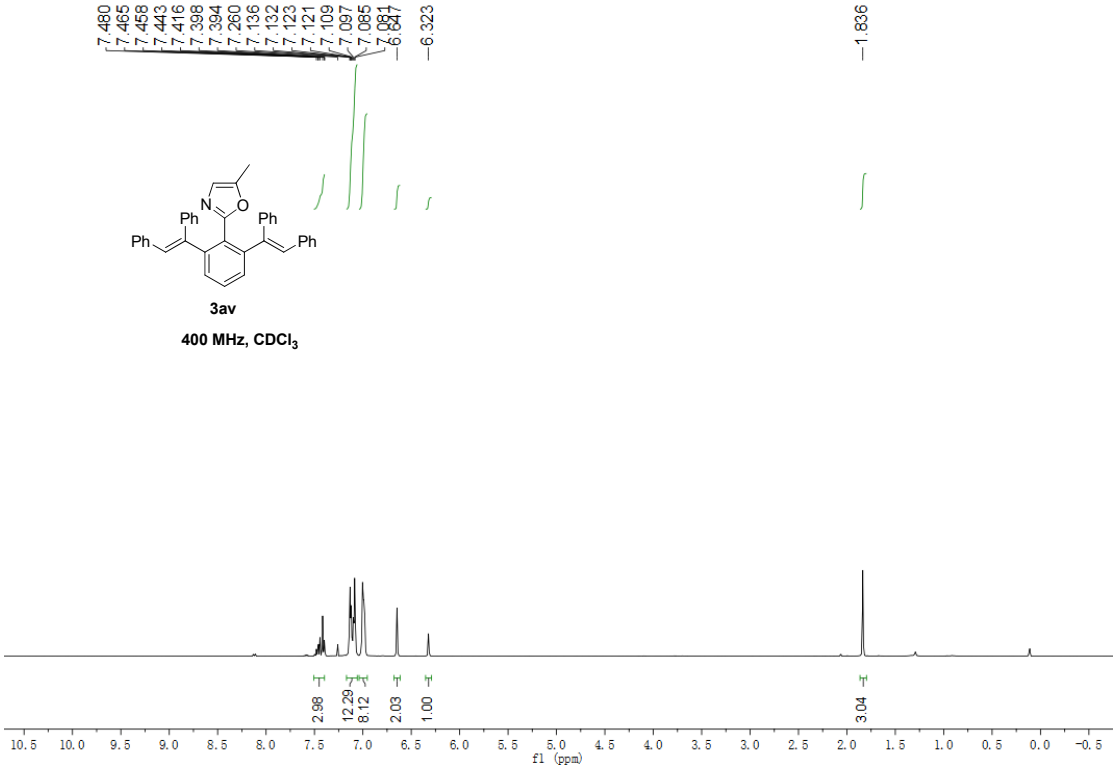
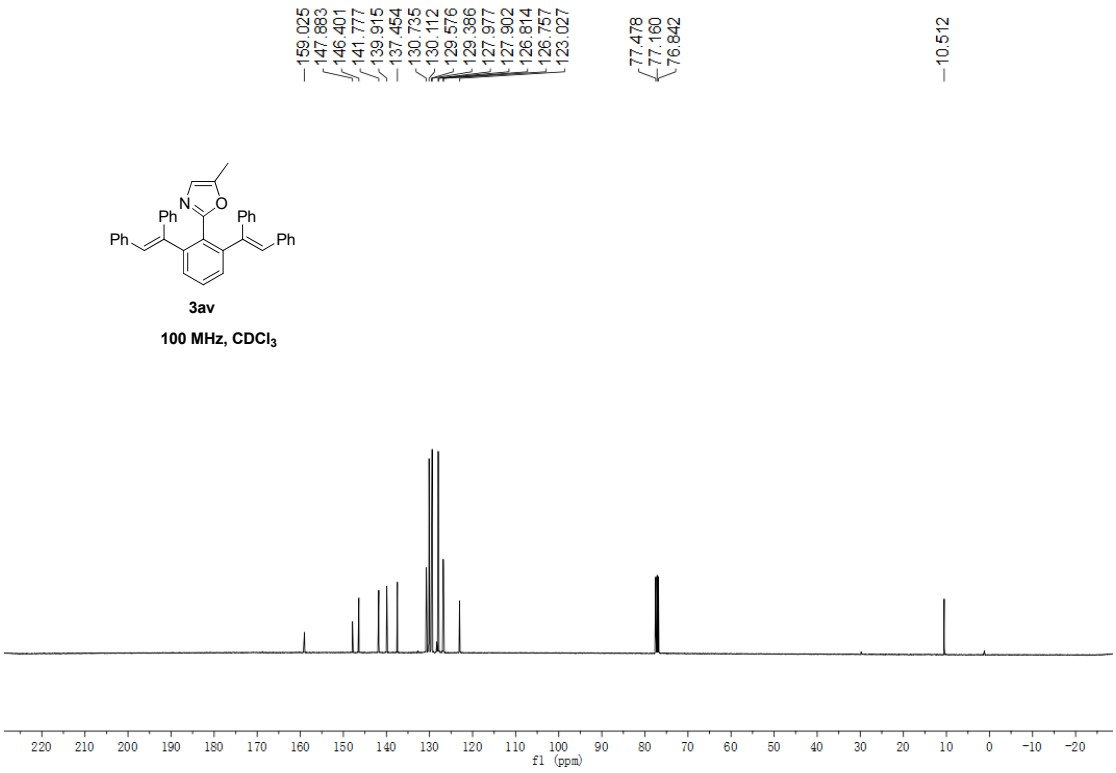
7.428
7.409
7.321
7.304
7.287
7.260
7.215
7.198
7.179
6.735
6.349
4.414
4.401
4.388
4.024
4.012
3.995
3.983
3.651
3.623
3.594
2.521
2.502
2.480
2.260
2.055
2.042
2.035
2.023
2.010
2.003
1.990
1.978
1.971
1.959
1.722
1.708
1.696
1.682
1.668
1.274
Ph
Ph
3at
400 MHz, CDCl3
1.05
6.41
6.17
1.00
2.01
2.08
4.23
4.25
3.76
2.99
2.17
4.23
2.79
f1 (ppm)


159.509
148.210
145.262
141.537
137.918
130.909
129.385
128.769
128.202
127.641
126.858
126.513
123.402
102.023
77.478
77.160
76.843
66.861
33.727
26.545
25.886
11.064
3at
100 MHz, CDCl3
f1 (ppm)


7.431
7.411
7.393
7.338
7.334
7.320
7.317
7.305
7.301
7.266
7.260
7.247
7.235
7.229
7.224
7.214
7.211
7.208
7.112
7.093
6.782
6.779
6.417
4.128
4.111
4.111
4.082
4.063
4.046
4.025
2.856
2.848
2.840
2.826
2.817
2.809
2.795
2.787
2.779
2.591
2.560
2.528
2.287
2.284
1.626
1.594
1.401
3au
400 MHz, CDCl3
0.97
4.11
1.03
3.02
4.06
1.00
1.97
4.18
2.13
4.16
3.07
4.27
22.30
f1 (ppm)

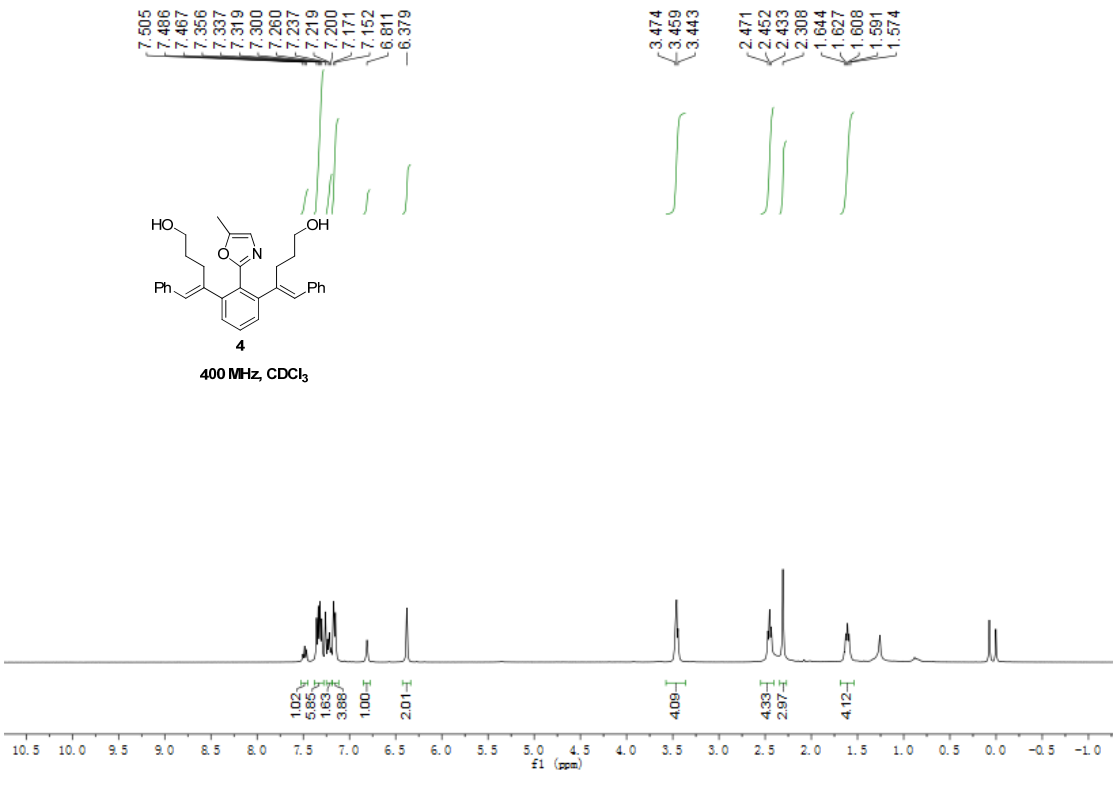

159.816
154.936
148.053
144.147
143.683
137.548
132.109
128.858
128.621
128.331
128.139
128.074
126.772
123.098
79.371
77.478
77.160
76.843
43.928
39.225
31.014
28.562
11.042
3au
100 MHz, CDCl3
f1 (ppm)


7.480
7.465
7.458
7.443
7.416
7.398
7.394
7.260
7.136
7.132
7.123
7.121
7.109
7.097
7.085
7.081
6.847
6.323
1.836
3av
400 MHz, CDCl3
2.98
12.29
8.12
2.03
1.00
3.04
f1 (ppm)



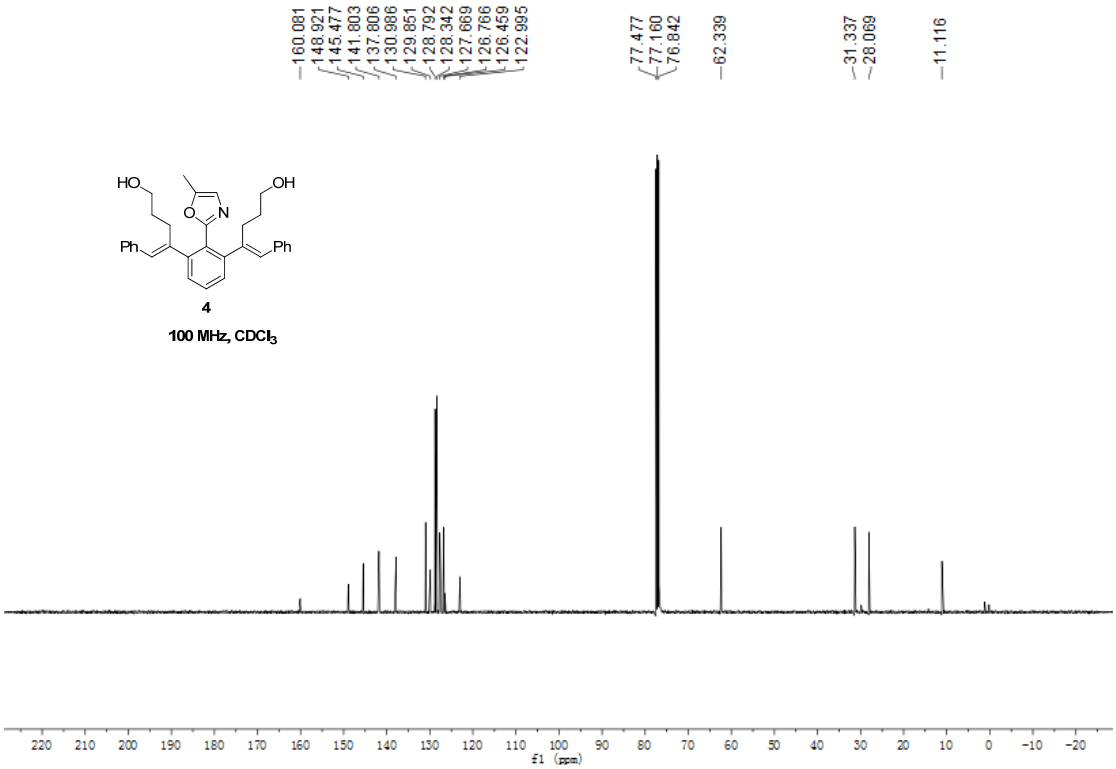
3av

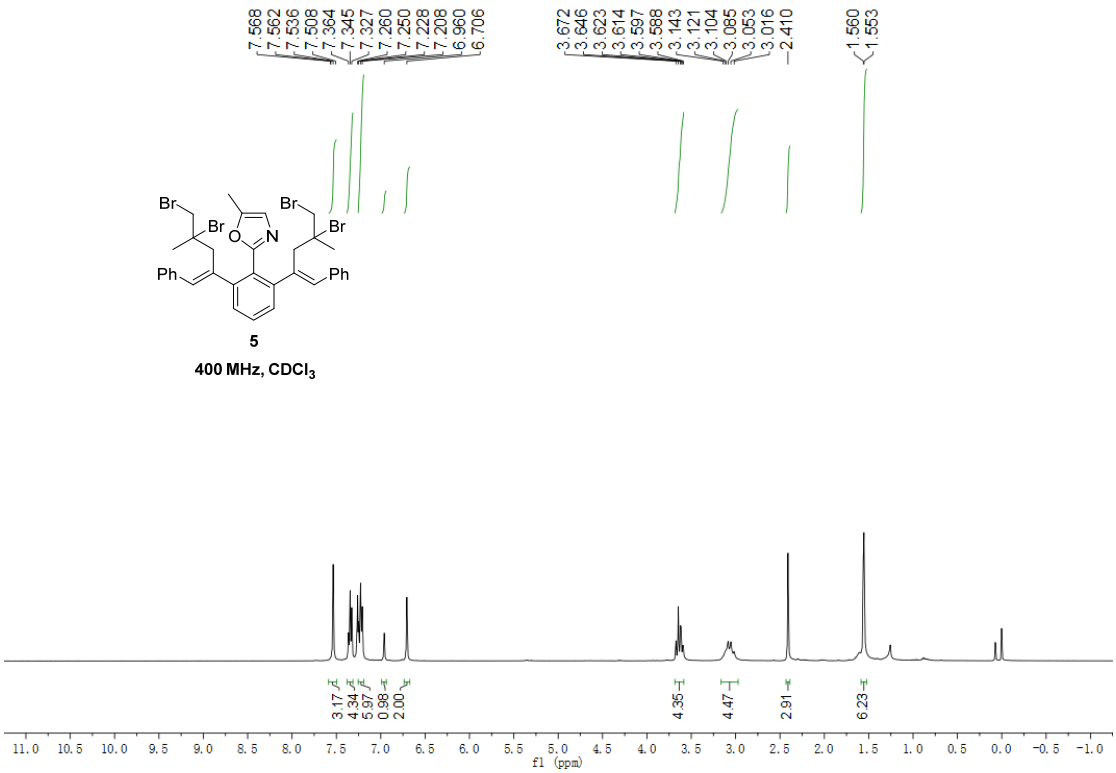
100 MHz, $CDCl_3$

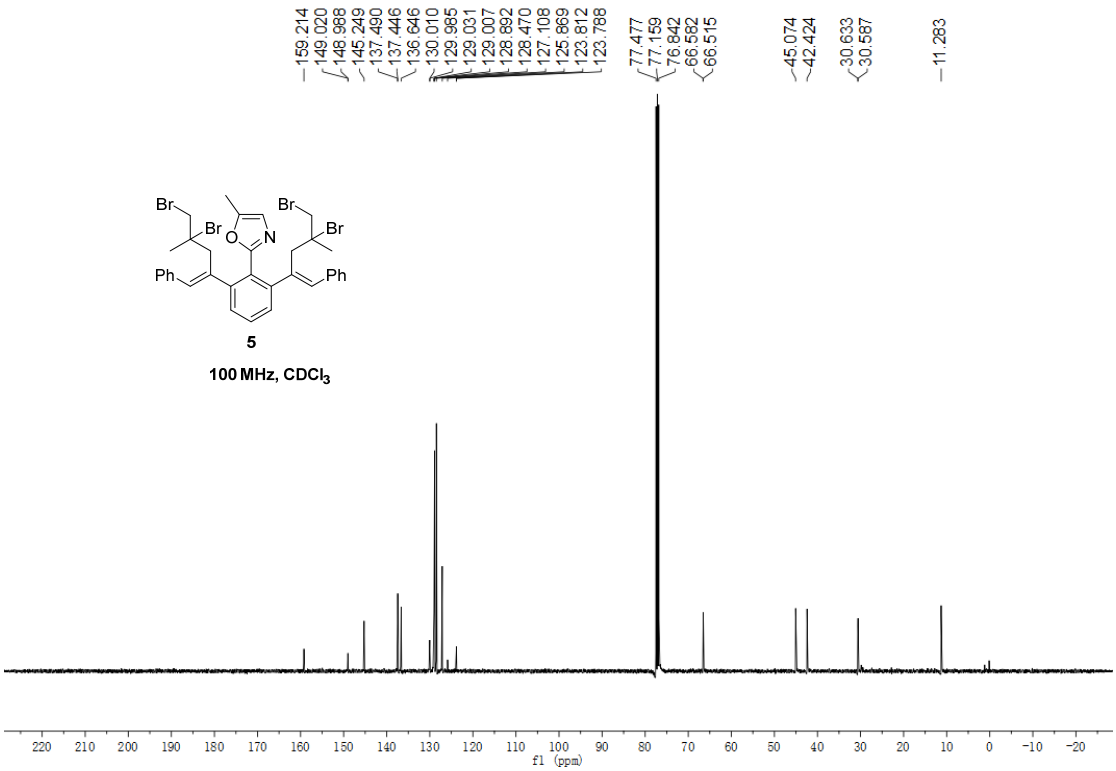


4

400 MHz, $CDCl_3$

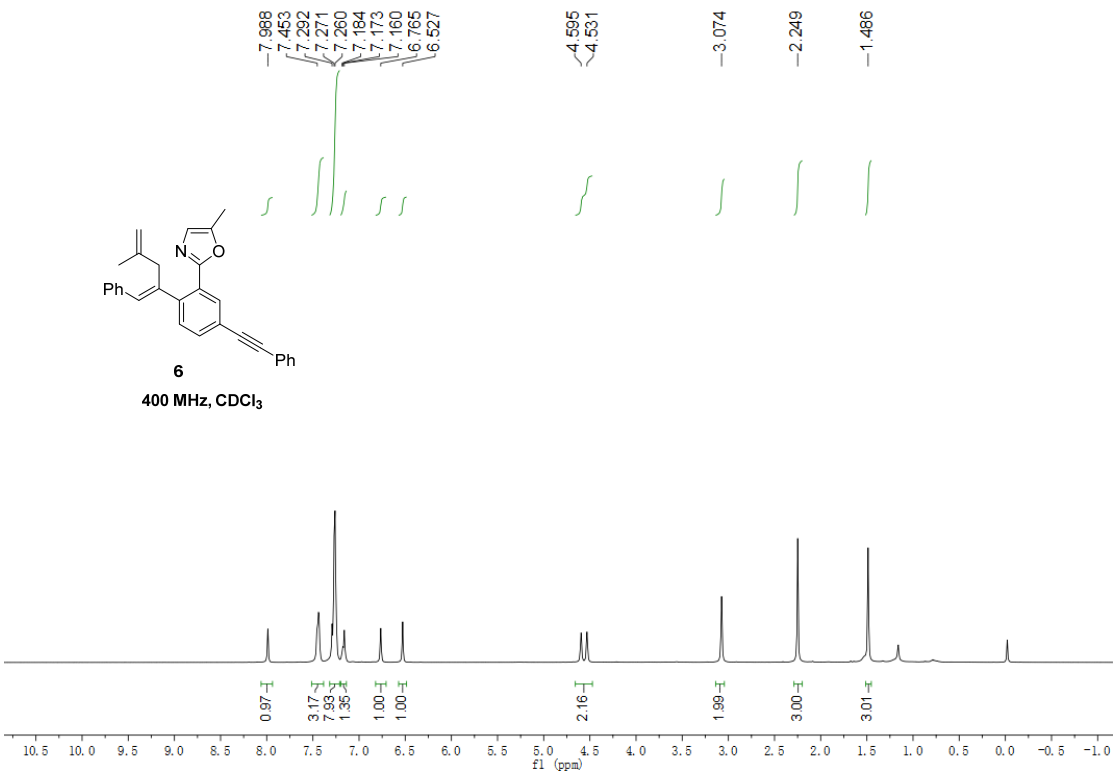

160.081
148.921
145.477
141.803
137.806
130.986
129.851
128.792
128.342
127.669
126.766
126.459
122.995
77.477
77.160
76.842
62.339
31.337
28.069
11.116
HO
OH
Ph
Ph
O
N
4
100 MHz, CDCl3
f1 (ppm)


7.568
7.562
7.536
7.508
7.364
7.345
7.327
7.260
7.250
7.228
7.208
6.960
6.706
3.672
3.646
3.623
3.614
3.597
3.588
3.143
3.121
3.104
3.085
3.053
3.016
2.410
1.560
1.553
Br
Br
Br
Br
O
N
Ph
Ph
5
400 MHz, CDCl3
3.17
4.34
5.97
0.98
2.00
4.35
4.47
2.91
6.23
f1 (ppm)



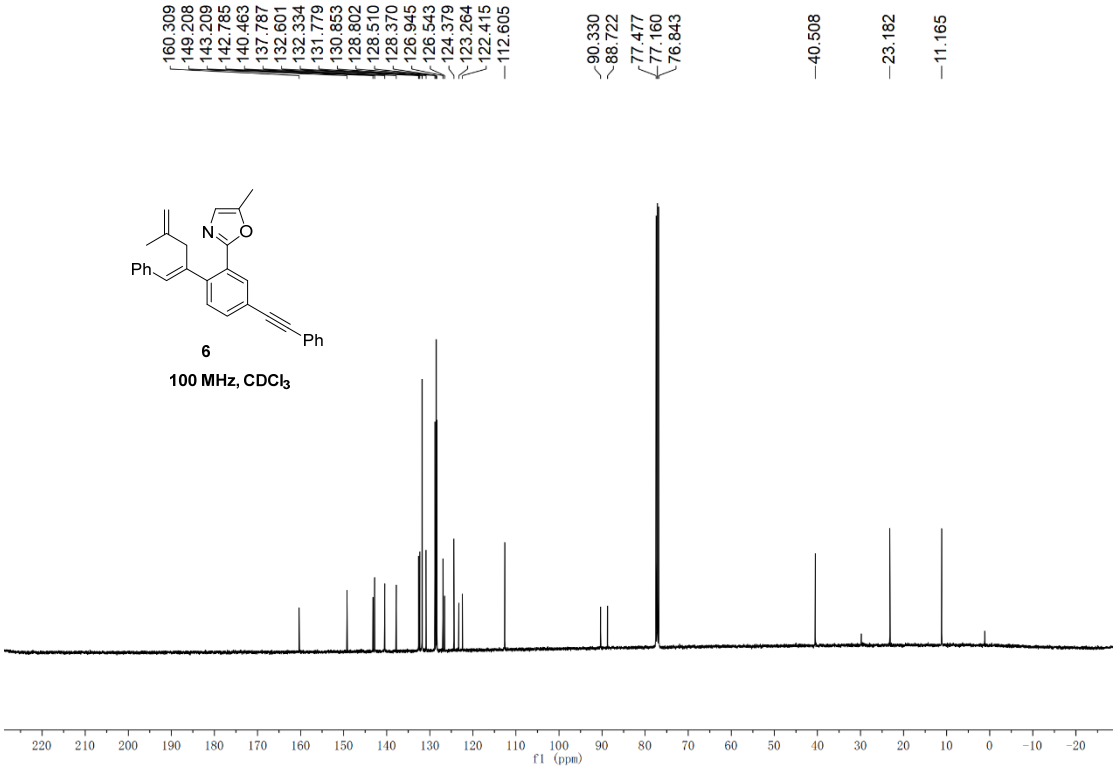
5

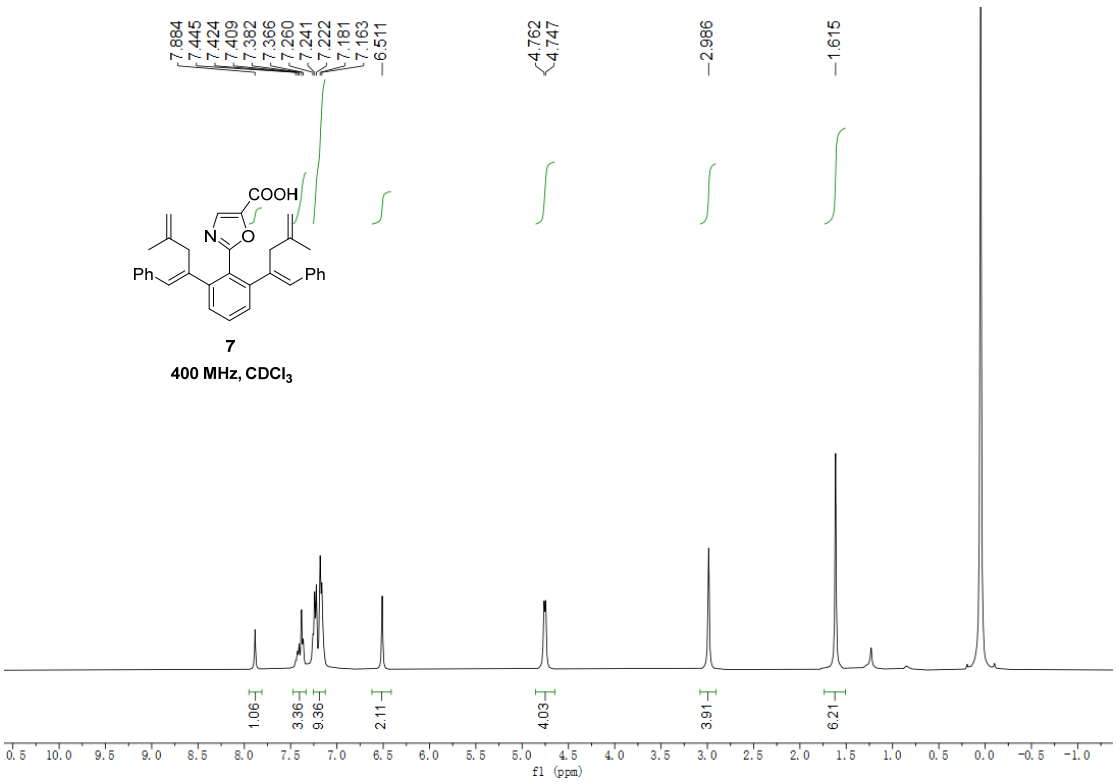
100 MHz, $CDCl_3$

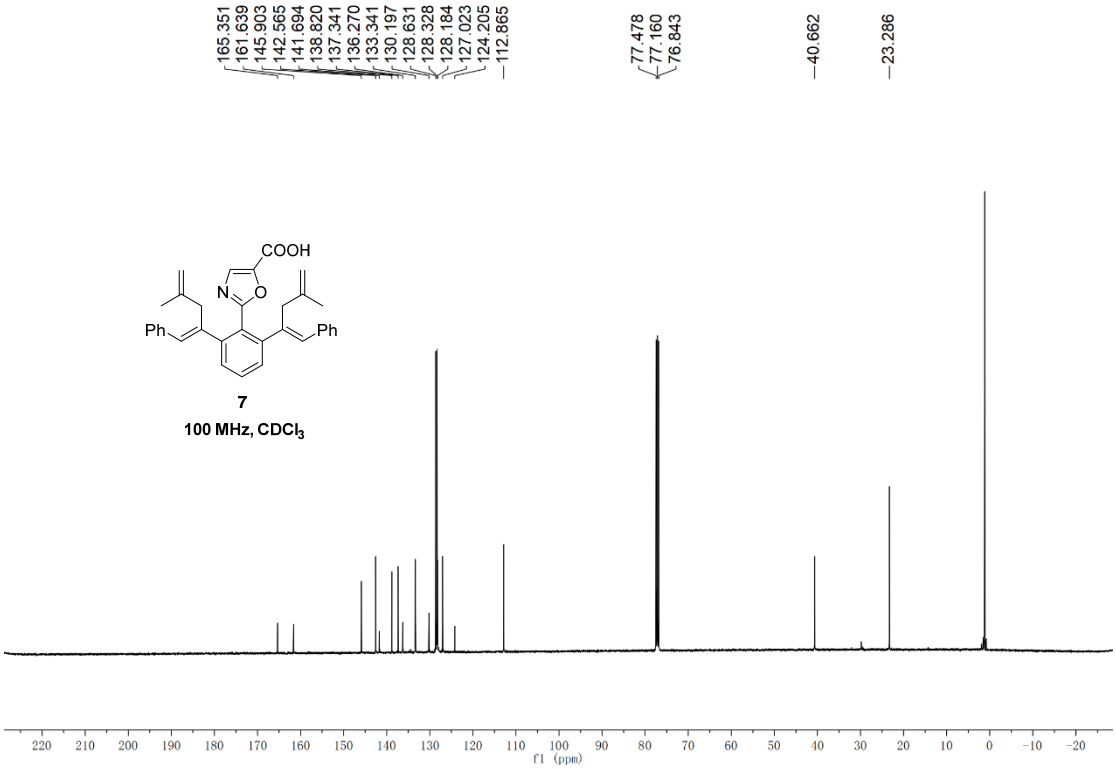


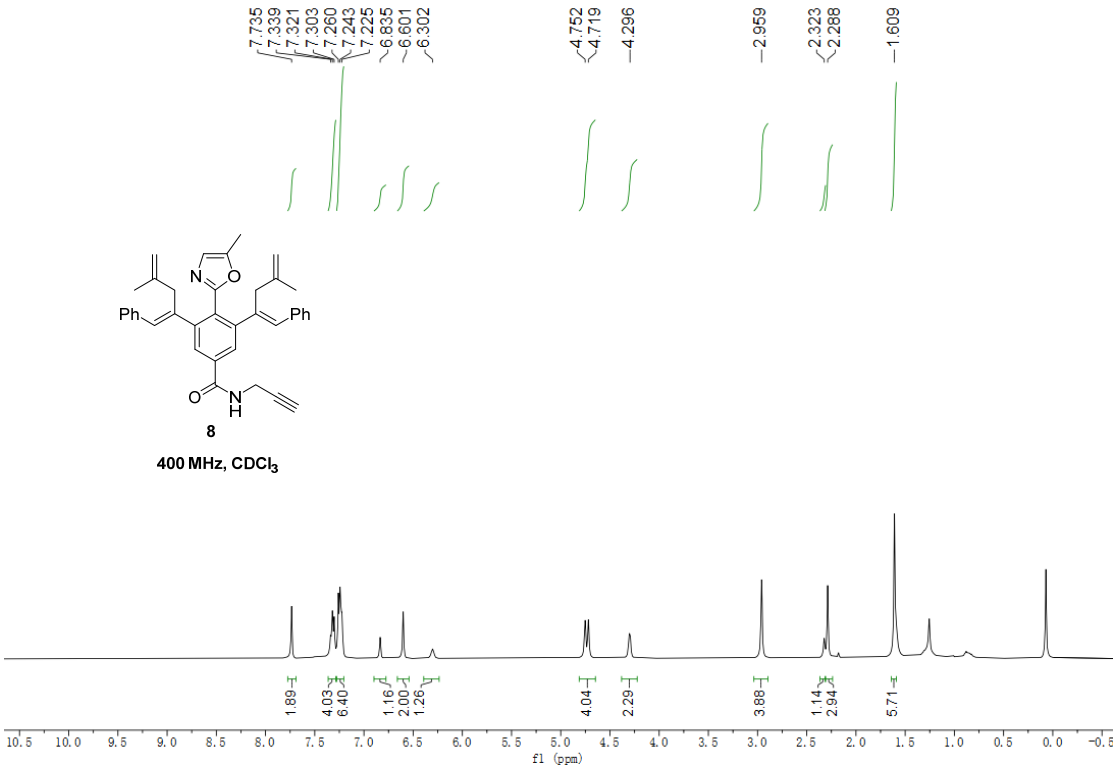
6

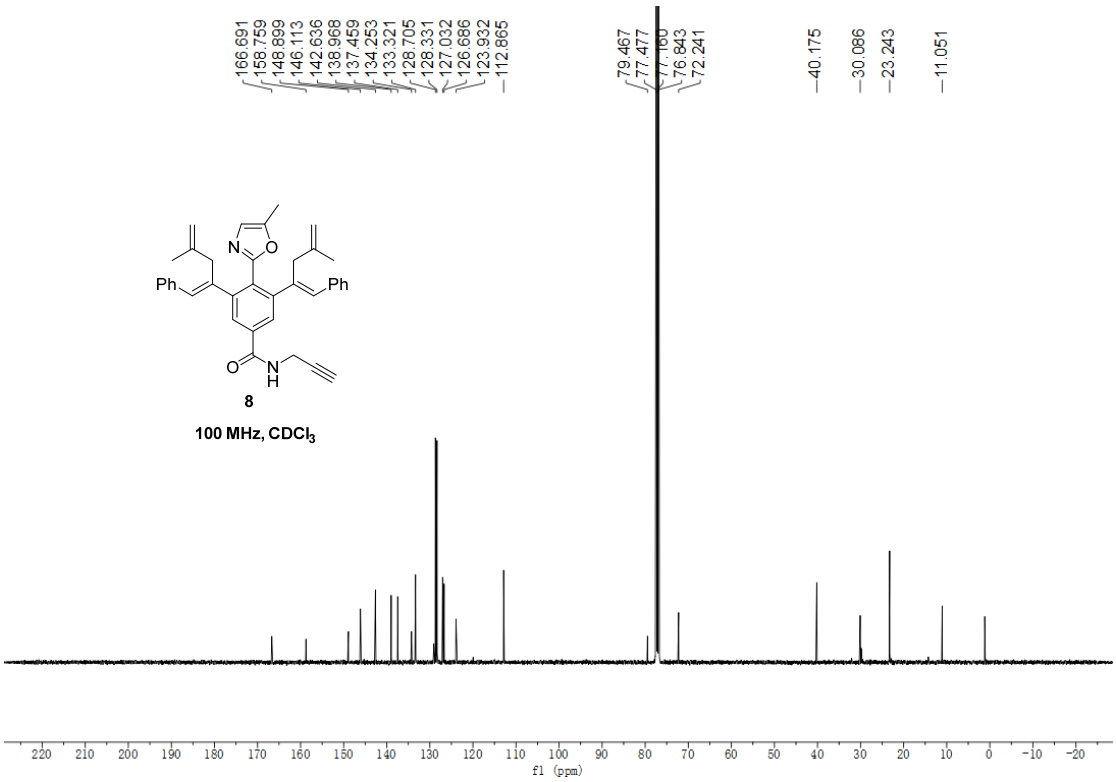
400 MHz, $CDCl_3$


160.309
149.208
143.209
142.785
140.463
137.787
132.601
132.334
131.779
130.853
128.802
128.510
128.370
126.945
126.543
124.379
123.264
122.415
112.605
90.330
88.722
77.477
77.160
76.843
40.508
23.182
11.165
N
O
Ph
Ph
6
100 MHz, CDCl3
f1 (ppm)


7.884
7.445
7.424
7.409
7.382
7.366
7.260
7.241
7.222
7.181
7.163
6.511
4.762
4.747
2.986
1.615
COOH
N
O
Ph
Ph
7
400 MHz, CDCl3
1.06
3.36
9.36
2.11
4.03
3.91
6.21
f1 (ppm)


165.351
161.639
145.903
142.565
141.694
138.820
137.341
136.270
133.341
130.197
128.631
128.328
128.184
127.023
124.205
112.865
77.478
77.160
76.843
40.662
23.286
COOH
N
O
Ph
Ph
7
100 MHz, CDCl3
f1 (ppm)


7.735
7.339
7.321
7.303
7.260
7.243
7.225
6.835
6.601
6.302
4.752
4.719
4.296
2.959
2.323
2.288
1.609
N
O
Ph
Ph
O
N
H
8
400 MHz, CDCl3
1.89
4.03
6.40
1.16
2.00
1.26
4.04
2.29
3.88
1.14
2.94
5.71
f1 (ppm)



8

100 MHz, $CDCl_3$