Supporting Information

Substrate- and reagent-dependent selective annulation of amidines and 2-tert-amino benzaldehydes

Yi Zhang,[a,b] Renchao Ma,[b] Yongmin Ma [b]*and Weiwei Fang [a]*

[a]International Innovation Center for Forest Chemicals and Materials, College of Chemical Engineering, Nanjing Forestry University, Nanjing, 210037, P. R. China

[b]Institute of Advanced Studies and School of Pharmaceutical Sciences, Taizhou University, Jiaojiang, Zhejiang, 318000, P. R. China

Email:yongmin.ma@tzc.edu.cn;wwfang2020@njfu.edu.cn

Table of Contents

1. General…….....S3
2. General procedure for the synthesis of **4-7**……..... ..... S3
3. Optimization of the reaction conditions.....S4-S6
4. HRMS spectra of the intermediates…..... ....…...S7
5. Characterization data for compounds **4-7**….....S8-S13
6. NMR spectra of compounds **4-7**…….....S14-S50

General methods. Various aryl 2-(piperidin-1-yl)benzaldehyde, 2-(diethylamino)benzaldehyde, N-phenylbenzimidamide substrates (**2**) and N-alkylamidines substrates (**3**)were prepared according to the previously reported literatures.[1] Their analysis data were identical with the reported data. Other starting materials, reagents and solvents were purchased commercial sources and used as received. ^{1}H and ^{13}C NMR spectra were recorded at 400 and 101 MHz, respectively. All chemical shifts are given as δ value (ppm) with reference to tetramethylsilane (TMS) as an internal standard. The peak patterns are indicated as follows: s, singlet; d, doublet; t, triplet; m, multiplet; q, quartet; qd, quartet of doublets. The coupling constants, *J*, are reported in Hertz (Hz). High-resolution mass spectra (HRMS) were performed with a Q-TOF-Premier mass spectrometer. HPLC analyses were carried out on an Agilent 1260 Infinity II instrument. Melting points were determined using aX-4 digital micro melting point apparatus. All reactions were monitored by thin-layer chromatography (TLC) using silica gel plates (silica gel 60 F254).

General procedure for the synthesis of **4-7**

General Procedure for the synthesis of quinazoline 4a. A sealed tube was charged with **2h** (0.6 mmol, 1.0 equiv.), **1k** (0.6 mmol, 1.0 equiv.), $CoCl_2$ (0.06 mmol, 10 mol%) and toluene (2 mL). The reaction was carried out at 120 ^{o}C for 48 hours till almost completed conversion of the substrates by TLC analysis. After being cooled to room temperature, the mixture was concentrated under reduced pressure, and the residue was purified by flash column chromatography (column chromatography eluent, petroleum ether/EtOAc) to afford **4a**.

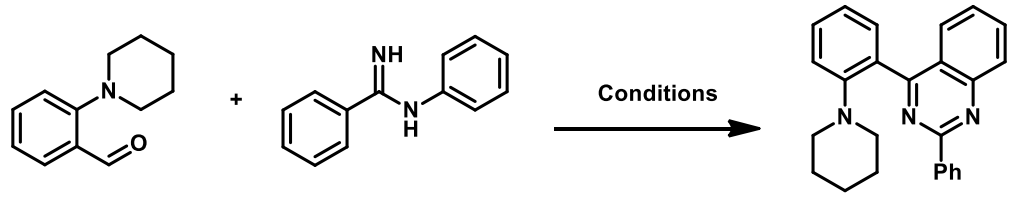
General Procedure for the synthesis of quinazoline 5. A sealed tube was charged with **2** (0.6 mmol, 1.0 equiv.), **1** (0.6 mmol, 1.0 equiv.), $FeSO4 \cdot 7H_2O$ (0.12 mmol, 20 mol%) and toluene (2 mL). The reaction was carried out at 120 ^{o}C for 48 hours till almost completed conversion of the substrates by TLC analysis. After being cooled to room temperature, the mixture was concentrated under reduced pressure, and the residue was purified by flash column chromatography (column chromatography eluent, petroleum ether/EtOAc) to afford **5**.

General Procedure for the synthesis of triazine 6. A sealed tube was charged with **2** (0.6 mmol, 2.0 equiv.), **1** (0.3 mmol, 1.0 equiv.), piperidine (0.15 mmol, 50 mol%) and dichloroethane (2 mL). The reaction was carried out at 90 ^{o}C for 24 hours till almost completed conversion of the substrates by TLC analysis. After being cooled to room temperature, the mixture was concentrated under reduced pressure, and the residue was purified by flash column chromatography (column chromatography eluent, petroleum ether/EtOAc) to afford **6**.

General Procedure for the synthesis of triazine 7. A sealed tube was charged with **3** (0.6 mmol, 1.0 equiv.), **1a** (0.6 mmol), ZnI_2 (0.12 mmol, 20 mol%) and toluene (2 mL). The reaction was carried out at 120 ^{o}C for 40 hours till almost completed conversion of the substrates by TLC analysis. After being cooled to room temperature, the mixture was concentrated under reduced pressure, and the residue was purified by flash column chromatography (column chromatography eluent, petroleum ether/EtOAc) to afford **7**.

Optimization of the reaction conditions

Table S1 Optimization of reaction conditions for the synthesis of **5a**[a,b]

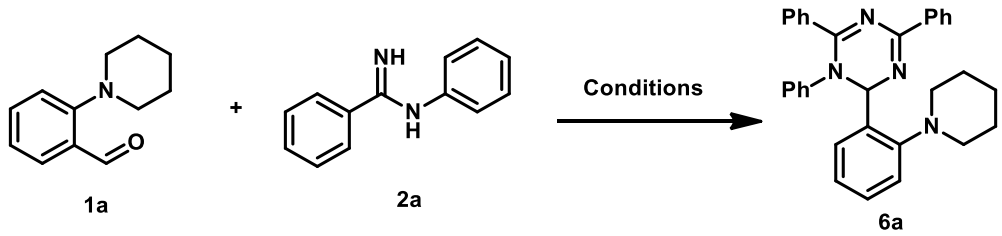


1a **2a** **5a**

Entry	Solvent	Catalyst (equiv.)	Temp. (°C)	Yield (%)
1	toluene	$CoCl_2$ (0.2)	120	45
2	toluene	$AlCl_3$ (0.2)	120	0
3	**toluene**	**$FeSO_4·7H_2O$ (0.2)**	**120**	**61**
4	toluene	$Cu(OTf)_2$ (0.2)	120	53
5	toluene	$NiCl_2$ (0.2)	120	0
6	toluene	$MgSO_4$ (0.2)	120	0
7	toluene	Ag_2CO_3 (0.2)	120	0
8	toluene	ZnI_2 (0.2)	120	0
9	toluene	$FeSO_4·7H_2O$ (0.1)	120	55
10	toluene	$FeSO_4·7H_2O$ (0.4)	120	58
11	toluene	$FeSO_4·7H_2O$ (0.2)	100	40
12	toluene	$FeSO_4·7H_2O$ (0.2)	130	61
13	PhCl	$FeSO_4·7H_2O$ (0.2)	120	Trace
14	IPA	$FeSO_4·7H_2O$ (0.2)	120	0
15	DMSO	$FeSO_4·7H_2O$ (0.2)	120	0
16	DMF	$FeSO_4·7H_2O$ (0.2)	120	0
17	1,4-Dioxane	$FeSO_4·7H_2O$ (0.2)	120	Trace
18	DCE	$FeSO_4·7H_2O$ (0.2)	120	0
19	THF	$FeSO_4·7H_2O$ (0.2)	120	0
20	NMP	$FeSO_4·7H_2O$ (0.2)	120	Trace

[a]Reaction conditions: **1a** (0.6 mmol), **2a** (0.6 mmol) and catalyst at the indicated amount in solvent (2 mL) at the indicated temperature for 48 h; [b]isolated yield.

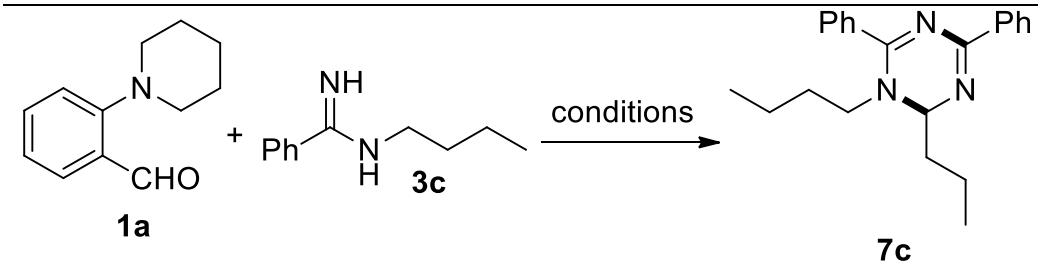
Table S2 Optimization of reaction conditions for the synthesis of **6a**[a,b]



Entry	Solvent	Additive (equiv.)	Temp. (°C)	Yield (%)
1	DCE	piperidine (0.5)	120	26
2	Toluene	piperidine (0.5)	120	0
3	EtOH	piperidine (0.5)	120	0
4	CH_3CN	piperidine (0.5)	120	0
5	DMSO	piperidine (0.5)	120	0
6	1,4-Dioxane	piperidine (0.5)	120	0
7	CCl_4	piperidine (0.5)	120	20
8	DMF	piperidine (0.5)	120	0
9	Dibutyl ether	piperidine (0.5)	120	0
10	**DCE**	**piperidine (0.5)**	**90**	**42**
12	DCE	piperidine (0.5)	130	10
13	DCE	NaOH (0.5)	120	0
14	DCE	K_2CO_3 (0.5)	120	0
15	DCE	EtONa (0.5)	120	Trace
16	DCE	KH_2PO_4 (0.5)	120	0
17	DCE	Pyrrolidine (0.5)	120	8

[a]Reaction conditions: **1a** (0.3 mmol), **2a** (0.6 mmol) and base (0.5 equiv.) at the indicated amount in solvent (2 mL) at the indicated temperature for 24 h; [b]isolated yield.

Table S3 Optimization of reaction conditions for the synthesis of **7c**[a,b]

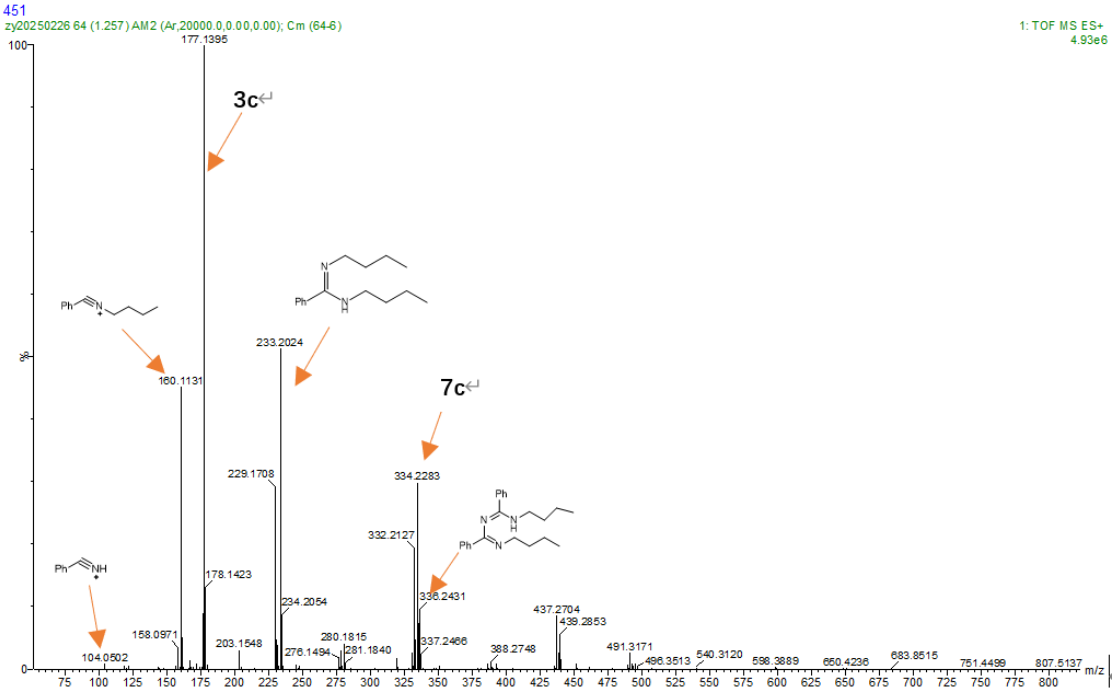


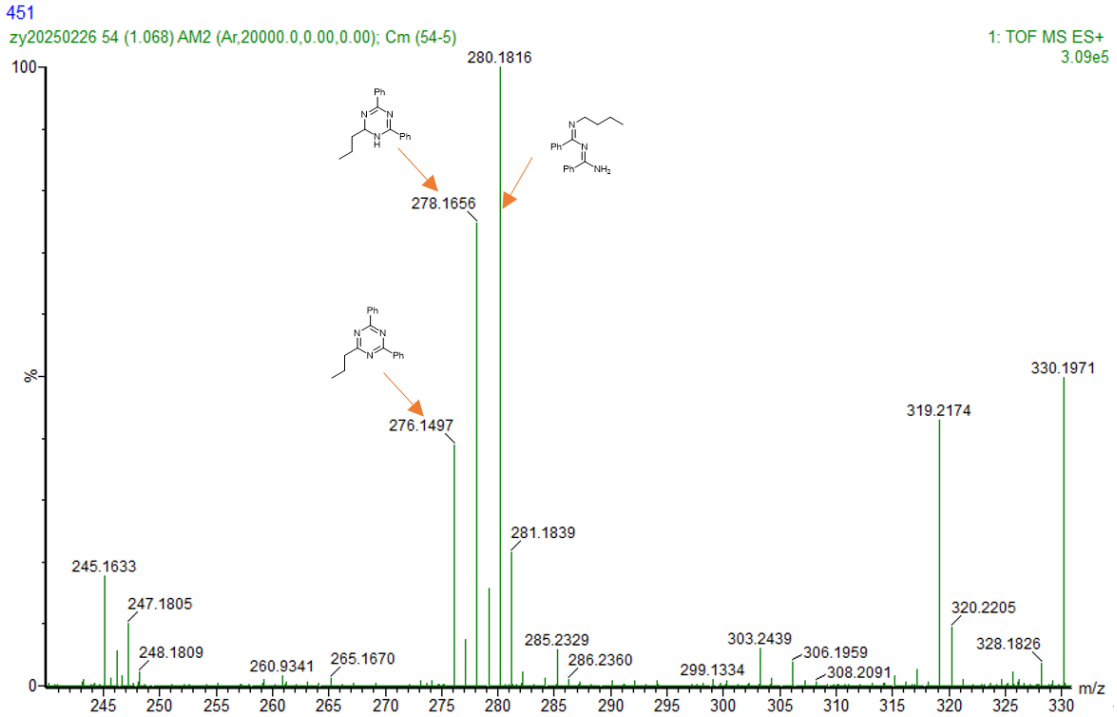
Entry	Solvent	Additive (equiv.)	Temp. (°C)	Yield (%)
1	$CoCl_2$ (0.2)	toluene	120	32
2	$FeSO_4$•$7H_2O$	toluene	120	68
3	$CuBr_2$ (0.2)	toluene	120	16
4	$NiCl_2$ (0.2)	toluene	120	75
5	$MgSO_4$ (0.2)	toluene	120	trace
6	Ag_2CO_3 (0.2)	toluene	120	40
7	**ZnI_2 (0.2)**	**toluene**	**120**	**86**
8	ZnI_2 (0.1)	toluene	120	68
9	ZnI_2 (0.5)	toluene	120	50
10	ZnI_2 (0.2)	PhCl	120	62
11	ZnI_2 (0.2)	xylene	120	36
12	ZnI_2 (0.2)	DMSO	120	0
13	ZnI_2 (0.2)	DMF	120	0
14	ZnI_2 (0.2)	toluene	100	65
15	ZnI_2 (0.2)	toluene	140	80
16[c]	ZnI_2 (0.2)	toluene	120	0
17[d]	ZnI_2 (0.2)	toluene	120	trace
18[e]	ZnI_2 (0.2)	toluene	120	trace
19[f]	ZnI_2 (0.2)	toluene	120	45

[a]Reaction conditions: **3c** (0.6 mmol), **1a** (0.6 mmol) and Lewis acid (0.2 equiv.) in solvent (2 mL) at the indicated temperature for 40 h unless mentioned otherwise. [b]Isolated yield. [c]The reaction was performed under N_2. [d]In the absence of **1a**. [e]*N*-phenylpiperidine instead of **1a**. [f]Benzaldehyde instead of **1a**.

HRMS spectra of the intermediates

The reaction of **3c** in toluene in the presence of **1a** and $ZnCl_2$ was carried out for 10 hours then took the sample for HRMS analysis.





Characterization data for compounds 4-7

***N*-(2,6-dimethylphenyl)-1-phenyl-1-(1,2,3,3a-tetrahydropyrrolo[1,2-a]quinazolin-4(5H)-yl)methanimine (*4a*).** Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (34.3 mg, 14%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28 – 7.12 (m, 6H), 6.86 (d, *J* = 7.3 Hz, 2H), 6.76 – 6.62 (m, 4H), 4.93 – 4.85 (m, 1H), 4.31 – 4.08 (m, 2H), 3.52 – 3.30 (m, 2H), 2.82 – 2.70 (m, 1H), 2.15 – 1.88 (m, 6H), 1.85 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.3, 147.8, 145.2, 134.6, 129.2, 128.1, 128.0, 127.7, 127.3, 125.5, 123.1, 121.4, 117.7, 112.4, 74.1, 48.8, 46.6, 31.4, 22.6, 21.6, 18.9, 18.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{28}N_3$ 382.2278; found 382.2272.

2-Phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5a*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (131.4 mg, 61%), mp 120 – 121 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.77 – 8.60 (m, 2H), 8.13 (d, *J* = 8.5 Hz, 1H), 7.91 – 7.75 (m, 2H), 7.64 – 7.42 (m, 6H), 7.27 – 7.15 (m, 2H), 2.89 – 2.74 (m, 4H), 1.22 – 0.80 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.1, 160.8, 152.2, 151.2, 138.5, 133.4, 131.9, 131.6, 130.6, 130.4, 128.9, 128.7, 128.6, 128.5, 125.9, 122.4, 121.6, 118.9, 53.0, 25.8, 24.0. HRMS (ESI) m/z: $[M + H]^+$Calcd for $C_{25}H_{24}N_3$ 366. 1965; found 366. 1960.

4-(4-Methyl-2-(piperidin-1-yl)phenyl)-2-phenylquinazoline (*5b*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (113.7 mg, 50%), mp 160 - 161 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.73 – 8.65 (m, 2H), 8.08 (d, *J* = 8.4 Hz, 1H), 7.86 – 7.74 (m, 2H), 7.56 – 7.37 (m, 5H), 7.01 (d, *J* = 7.8 Hz, 1H), 6.95 (s, 1H), 2.82 – 2.68 (m, 4H), 2.45 (s, 3H), 1.23 – 0.82 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.2, 160.7, 152.1, 151.2, 140.7, 138.5, 133.4, 131.6, 130.4, 129.1, 129.1, 128.7, 128.5, 128.4, 125.8, 123.2, 121.7, 119.5, 53.0, 25.8, 24.0, 21.8. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{26}N_3$ 380.2121; found 380.2125.

4-(5-Methyl-2-(piperidin-1-yl)phenyl)-2-phenylquinazoline (*5c*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (116.0 mg, 51%), mp 130 - 131 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.72 – 8.66 (m, 2H), 8.11 – 8.05 (m, 1H), 7.84 – 7.71 (m, 2H), 7.56 – 7.46 (m, 3H), 7.45 – 7.25 (m, 3H), 7.06 (d, *J* = 8.2 Hz, 1H), 2.82 – 2.66 (m, 4H), 2.38 (s, 3H), 1.22 – 0.79 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.2, 160.7, 151.1, 150.0, 138.5, 133.4, 132.1, 132.0, 131.2, 130.4, 129.0, 128.7, 128.6, 128.4, 125.9, 121.80, 119.0, 53.2, 25.9, 24.0, 20.8. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{26}N_3$ 380.2121; found 380.2123.

4-(4-Methoxy-2-(piperidin-1-yl)phenyl)-2-phenylquinazoline (*5d*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (78.2 mg, 33%), mp 139 - 140 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.74 – 8.65 (m, 2H), 8.07 (d, *J* = 8.9 Hz, 1H), 7.85 – 7.77 (m, 2H), 7.57 – 7.36 (m, 5H), 6.76 – 6.64 (m, 2H), 3.89 (s, 3H), 2.81 – 2.66 (m, 4H), 1.20 – 0.79 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.8, 161.8, 160.8, 153.7, 151.3, 138.5, 133.4, 133.0, 130.4, 129.2, 128.6, 128.5, 128.4, 125.7, 124.5, 121.7, 106.7, 105.3, 55.4, 52.8, 25.7, 24.0. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{26}N_3O$ 396.2070; found 396.2077.

4-(4-Chloro-2-(piperidin-1-yl)phenyl)-2-phenylquinazoline (*5e*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (134.1 mg, 56%), mp 130 - 131 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.72 – 8.63 (m, 2H), 8.10 (d, *J* = 8.5 Hz, 1H), 7.87 – 7.80 (m, 1H), 7.73 (d, *J* = 8.4 Hz, 1H), 7.58 – 7.40 (m, 5H), 7.20 – 7.08 (m, 2H), 2.80 – 7.70 (m, 4H), 1.23 – 0.70 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.0, 160.8, 153.2, 151.3, 138.2, 136.3, 133.7, 132.9, 130.5, 129.9, 128.6, 128.6, 128.6, 126.1, 122.2, 121.3, 119.2, 52.7, 25.6, 23.8. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{25}H_{23}ClN_3$ 400.1575; found 400.1578.

4-(5-Chloro-2-(piperidin-1-yl)phenyl)-2-phenylquinazoline (*5f*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (131.7 mg, 55%), mp 120 - 121 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.72 – 8.65 (m, 2H), 8.10 (d, *J* = 8.4 Hz, 1H), 7.89 – 7.80 (m, 1H), 7.71 (d, *J* = 8.3, 1.4 Hz, 1H), 7.57 – 7.38 (m, 6H), 7.07 (d, *J* = 8.6 , 1H), 2.82 – 2.62 (m, 4H), 1.24 – 0.70 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.6, 160.8, 151.3, 150.8, 138.2, 133.7, 133.3, 131.4, 130.6, 130.4, 128.7, 128.6, 128.5, 127.6, 126.1, 121.3, 120.3, 53.0, 25.7, 23.8. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{25}H_{23}ClN_3$ 400.1575; found 400.1572.

4-(4-Bromo-2-(piperidin-1-yl)phenyl)-2-phenylquinazoline (*5g*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (159.5 mg, 60%), mp 121 - 122 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.71 – 8.64 (m, 2H), 8.10 (d, *J* = 8.4 Hz, 1H), 7.87 – 7.80 (m, 2H), 7.57 – 7.39 (m, 5H), 7.33 – 7.24 (m, 2H), 2.80 – 2.69 (m, 4H), 1.25 – 0.80 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.0, 160.8, 153.3, 151.3, 138.2, 133.7, 133.1, 130.5, 130.4, 128.6, 128.6, 128.5, 126.1, 125.2, 125.1, 124.6, 122.2, 121.3, 52.8, 25.6, 23.8. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{25}H_{23}BrN_3$ 444.1070; found 444.1077.

4-(2-Phenylquinazolin-4-yl)-3-(piperidin-1-yl)benzonitrile (*5h*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (156.8 mg, 67%), mp 176 - 177 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.71 – 8.63 (m, 2H), 8.13 (d, *J* = 8.5 Hz, 1H), 7.90 – 7.84 (m, 1H), 7.68 – 7.62 (m, 2H), 7.57 – 7.36 (m, 6H), 2.83 – 2.71 (m, 4H), 1.27 – 0.8 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.2, 160.8, 152.5, 151.4, 138.0, 135.85, 134.0, 132.8, 130.7, 128.9, 128.7, 128.6, 127.9, 126.4, 125.4, 122.3, 120.8, 118.9, 114.1, 52.6, 25.5, 23.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{23}N_4$ 391.1917; found 391.1910.

3-(2-Phenylquinazolin-4-yl)-4-(piperidin-1-yl)benzonitrile (*5i*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (152.1 mg, 65%), mp 137 - 138 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.72 – 8.65 (m, 2H), 8.13 (d, *J* = 8.4 Hz, 1H), 7.91 – 7.82 (m, 2H), 7.74 – 7.64 (m, 2H), 7.59 – 7.42 (m, 4H), 7.12 (d, *J* = 8.6 Hz, 1H), 2.94 – 2.75 (m, 4H), 1.29 – 0.28 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.0, 160.9, 155.1, 151.6, 137.9, 136.3, 134.4, 134.11, 130.8, 130.3, 129.0, 128.7, 128.6, 127.8, 126.6, 120.7, 119.3, 118.7, 103.8, 52.0, 25.3, 23.7. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{23}N_4$ 391.1917; found 391.1925.

***N*,*N*-diethyl-2-(2-phenylquinazolin-4-yl)aniline (*5j*).** Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (127.1 mg, 60%), mp 113 - 114 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.74 – 8.64 (m, 2H), 8.10 (d, *J* = 8.4 Hz, 1H), 7.85 – 7.77 (m, 1H), 7.69 (d, *J* = 8.4 Hz, 1H), 7.57 – 7.39 (m, 6H), 7.18 – 7.07 (m, 2H), 2.50 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.6, 160., 151.7, 151.2, 138.5, 133.5, 132.0, 130.4, 130.4, 129.8, 128.7, 128.7, 128.6, 127.8, 126.4, 122.0, 121.1, 117.6, 43.4. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{24}H_{24}N_3$ 354.1965; found 354.1956.

6-Methyl-2-phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5k*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (113.6 mg, 50%), mp 128 - 129 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.74 – 8.67 (m, 2H), 8.03 (d, *J* = 8.5 Hz, 1H),7.73 – 7.50 (m, 7H), 7.26 – 7.16 (m, 2H), 2.88 – 2.75 (m, 4H), 2.48 (s, 3H), 1.28 – 0.88 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.1, 160.0, 152.2, 149.8, 138.6, 135.7, 135.6, 132.0, 131.8, 130.5, 130.2, 128.5, 128.2, 127.7, 122.4, 121.4, 118.9, 52.9, 25.8, 24.0, 21.7. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{26}N_3$ 380.2121; found 380.2125.

6-Chloro-2-phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5l*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (131.7 mg, 55%), mp 133 - 134 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.65 – 8.57 (m, 2H), 7.99 – 7.93 (m, 1H), 7.72 – 7.65 (m, 2H), 7.57 – 7.39 (m, 5H), 7.20 – 7.07 (m, 2H), 2.80 – 2.63 (m, 4H), 1.23 – 0.76 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.1, 161.1, 149.7, 138.0, 134.3, 131.9, 131.3, 131.2, 131.0, 130.7, 130.1, 128.6, 128.6, 128.1, 122.7, 121.8, 119.1, 53.0, 29.7, 25.7, 23.9. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{25}H_{23}ClN_3$ 400.1575; found 400.1577.

7-Ethyl-2-phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5m*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (141.5 mg, 60%), mp 142 - 143 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.74 – 8.68 (m, 2H), 7.93 (s, 1H), 7.69 (d, *J* = 8.5 Hz, 1H), 7.61 – 7.47 (m, 5H), 7.33 – 7.15 (m, 3H), 2.98 – 2.70 (m, 6H), 1.40 (t, *J* = 7.6 Hz, 3H), 1.28 – 0.08 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 169.5, 160.8, 152.2, 151.6, 150.4, 138.6, 132.0, 131.6, 130.4, 130.3, 128.6, 128.5, 127.3, 126.0, 122.3, 120.1, 118.9, 53.0, 29.3, 25.8, 24.0, 14.93. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{27}H_{28}N_3$ 394.2278; found 394.2273.

7-Chloro-2-phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5n*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (136.5 mg, 57%), mp 150 - 151 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.73 – 8.67 (m, 2H), 8.12 (d, *J* = 2.1 Hz, 1H), 7.72 (d, *J* = 8.9 Hz, 1H), 7.60 – 7.50 (m, 5H), 7.41 – 7.36 (m, 2H), 7.27 – 7.16 (m, 2H), 2.88 – 2.72 (m, 4H),1.31 – 0.90 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.0, 161.7, 152.1, 151.8, 139.4, 138.0, 131.7, 131.5, 130.9, 130.8, 130.5, 128.8, 128.6, 127.5, 126.8, 122.6, 120.0, 118.9, 53.1, 25.8, 23.9. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{25}H_{23}ClN_3$ 400.1575; found 400.1574.

8-Methyl-2-phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5o*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (84.1 mg, 37%), mp 160 - 161 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.85 – 8.75 (m, 2H), 7.70 (d, *J* = 7.0 Hz, 1H), 7.64 – 7.48 (m, 6H), 7.38 – 7.30 (m, 1H), 7.26 – 7.14 (m, 2H), 2.97 – 2.75 (m, 7H), 1.27 – 1.10 (m, 4H), 1.01 – 0.88 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.1, 159.5, 152.2, 150.2, 138.8, 136.6, 133.2, 132.3, 131.6, 130.4, 130.2, 128.6, 128.5, 126.5, 125.5, 122.3, 121.6, 118.9, 53.0, 25.8, 24.0, 17.4. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{26}N_3$ 380.2121; found 380.2127.

8-Bromo-2-phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5p*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (111.7 mg, 42%), mp 185 - 186 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 – 8.76 (m, 2H), 8.16 (d, *J* = 7.4 Hz, 1H), 7.73 (d, *J* = 8.3 Hz, 1H), 7.59 – 7.52 (m, 5H), 7.26 – 7.14 (m, 3H), 2.86 – 2.73 (m, 4H), 1.28 – 0.85 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.7, 161.3, 152.2, 148.5, 138.0, 136.8, 131.6, 130.9, 130.8, 129.0, 128.6, 128.6, 128.5, 126.2, 124.0, 123.0, 122.6, 119.1, 53.1, 25.9, 23.9. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{25}H_{23}BrN_3$ 444.1070; found 444.1066.

8-Chloro-2-phenyl-4-(2-(piperidin-1-yl)phenyl)quinazoline (*5q*). Petroleum ether/ethyl acetate (30:1) as eluent; Yellow solid (93.4 mg, 39%), mp 175 - 176 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.83 – 8.76 (m, 2H), 7.95 (d, *J* = 6.1 Hz, 1H), 7.69 (d, *J* = 7.1 Hz, 1H), 7.60 – 7.50 (m, 5H), 7.35 (t, *J* = 8.0 Hz, 1H), 7.26 – 7.15 (m, 2H), 2.84 – 2.71 (m, 4H), 1.30 – 0.84 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 170.6, 161.1, 147.8, 138.0, 133.2, 132.9, 131.8, 131.6, 130.8, 128.9, 128.6, 128.6, 128.5, 127.8, 125.5, 122.9, 122.6, 119.1, 53.1, 25.8, 23.9. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{25}H_{23}ClN_3$ 400.1575; found 400.1573.

1,4,6-Triphenyl-2-(2-(piperidin-1-yl)phenyl)-1,2-dihydro-1,3,5-triazine (*6a*). Petroleum ether/ethyl acetate (20:1) as eluent; Yellow solid (59.2 mg, 42%), mp 120 - 121 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.40 – 8.30 (m, 2H), 7.83 (d, *J* = 7.8 Hz, 1H), 7.69 – 7.60 (m, 2H), 7.45 – 7.17 (m, 8H), 7.10 – 6.95 (m, 5H), 6.87 – 6.81 (m, 2H), 3.57 – 3.36 (m, 2H), 2.80 – 2.96 (m, 2H), 1.88 – 1.51 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.2, 157.6, 150.5, 144.2, 138.7, 137.0, 135.7, 130.9, 130.2, 129.9, 129.5, 128.4, 128.4, 128.1, 128.0, 128.0, 125.3, 124.7, 124.6, 120.2, 73.4, 55.0, 26.7, 24.4. HRMS (ESI) m/z: $[M + H]^+$Calcd for $C_{32}H_{31}N_4$ 471.2543; found 471.2537.

2-(4-Bromo-2-(piperidin-1-yl)phenyl)-1,4,6-triphenyl-1,2-dihydro-1,3,5-triazine (*6b*). Petroleum ether/ethyl acetate (20:1) as eluent; Yellow solid (95.4 mg, 58%), mp 202 - 203 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.37 – 8.29 (m, 2H), 7.71 – 7.57 (m, 3H), 7.47 – 7.23 (m, 7H), 7.15 – 6.99 (m, 4H), 6.89 – 6.78 (m, 3H), 3.53 – 3.34 (m, 2H), 2.95 – 2.80 (m, 2H), 1.87 – 1.46 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.2, 157.8, 151.9, 144.0, 137.7, 136.8, 135.5, 131.0, 130.4, 129.9, 129.5, 128.5, 128.4, 128.0, 127.9, 127.5, 125.5, 124.6, 123.7, 123.0, 73.3, 54.9, 26.6, 24.2. HRMS (ESI) m/z: $[M + H]^+$Calcd for $C_{32}H_{30}BrN_4$ 549.1648; found 549.1640.

2-(5-Bromo-2-(piperidin-1-yl)phenyl)-1,4,6-triphenyl-1,2-dihydro-1,3,5-triazine (*6c*). Petroleum ether/ethyl acetate (20:1) as eluent; Yellow solid (88.8 mg, 54%), mp 215-216 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.38 – 8.30 (m, 2H), 7.90 (d, *J* = 2.4 Hz, 1H), 7.67 – 7.61 (m, 2H), 7.47 – 7.26 (m, 7H), 7.12 – 6.99 (m, 4H), 6.91 (s, 1H), 6.80 (d, *J* = 7.4 Hz, 2H), 3.57 – 3.27 (m, 2H), 2.94 – 2.67 (m, 2H), 1.90 – 1.45 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.3, 157.8, 149.8, 143.9, 140.8, 136.8, 135.5, 132.5, 130.9, 130.9, 130.4, 129.8, 128.5, 128.4, 128.0, 128.0, 125.6, 124.8, 122.2, 117.3, 73.3, 54.9, 26.6, 24.2. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{32}H_{30}BN_4$ 549.1648; found 549.1647.

1-(4-Chlorophenyl)-4,6-diphenyl-2-(2-(piperidin-1-yl)phenyl)-1,2-dihydro-1,3,5-triazine (*6d*). Petroleum ether/ethyl acetate (20:1) as eluent; Yellow solid (55.9 mg, 37%), mp 130 - 131 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.38 – 8.30 (m, 2H), 7.79 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.65 – 7.59 (m, 2H), 7.47 – 7.16 (m, 8H), 7.07 – 6.98 (m, 3H), 6.93 (s, 1H), 6.83 – 6.77 (m, 2H), 3.56 – 3.38 (m, 2H), 2.96 – 2.81 (m, 2H), 1.87 – 1.55 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.9, 157.5, 150.4, 142.8, 138.2, 136.8, 135.4, 131.1, 130.7, 130.3, 129.8, 129.6, 128.5, 128.0, 127.9, 125.6, 124.7, 120.2, 73.4, 55.0, 26.7, 24.3. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{32}H_{30}ClN_4$ 505.2154; found 505.2160.

1-Ethyl-2-methyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7a*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow solid (60.7 mg, 73%), mp 74 - 75 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.29 – 8.20 (m, 2H), 7.70 – 7.63 (m, 2H), 7.55 – 7.37 (m, 6H), 5.17 (q, *J* = 6.1 Hz, 1H), 3.50 – 3.24 (m, 2H), 1.50 (d, *J* = 6.1 Hz, 3H), 1.21 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.2, 160.0, 137.1, 135.1, 131.0, 130.1, 129.0, 128.7, 128.0, 127.9, 68.8, 45.3, 19.8, 15.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{18}H_{20}N_3$ 278.1652; found 278.1660.

2-Ethyl-4,6-diphenyl-1-propyl-1,2-dihydro-1,3,5-triazine (*7b*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow solid (77.8 mg, 85%), mp 60 - 61 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.29 – 8.21 (m, 2H), 7.71 – 7.64 (m, 2H), 7.55 – 7.36 (m, 6H), 4.99 (t, *J* = 6.2 Hz, 1H), 3.69 – 3.02 (m, 2H), 2.01 – 1.46 (m, 4H), 1.14 (t, *J* = 7.5 Hz, 3H), 0.74 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.1, 160.2, 137.1, 135.1, 131.0, 130.0, 129.3, 128.7, 128.6, 128.0, 127.9, 126.8, 73.8, 52.8, 27.2, 23.2, 11.0, 9.1. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{20}H_{24}N_3$ 306.1965; found 306.1972.

1-Butyl-4,6-diphenyl-2-propyl-1,2-dihydro-1,3,5-triazine (*7c*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (85.9 mg, 86%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.29 – 8.21 (m, 2H), 7.71 – 7.63 (m, 2H), 7.56 – 7.32 (m, 6H), 5.06 (t, *J* = 6.4 Hz, 1H), 3.76 – 2.98 (m, 2H), 1.97 – 1.06 (m, 8H), 1.01 (t, *J* = 7.4 Hz, 3H),0.74 (t, *J* = 7.3 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.9, 160.1, 137.1, 135.1, 131.0, 130.0, 129.3, 128.7, 128.0, 127.9, 72.3, 50.7, 36.2, 32.0, 19.6, 17.8, 14.3, 13.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{22}H_{28}N_3$ 334.2278; found 334.2268.

2-Butyl-1-pentyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7d*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (88.8 mg, 82%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.33 – 8.22 (m, 2H), 7.71 – 7.63 (m, 2H), 7.54 – 7.40 (m, 6H), 5.10 (t, *J* = 6.4 Hz, 1H), 3.71 – 3.05 (m, 2H), 2.02 – 0.99 (m, 12H), 0.94 (t, *J* = 7.3 Hz, 3H), 0.77 (t, *J* = 6.7 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.2, 160.4, 136.7, 134.8, 131.2, 130.5, 129.3, 128.7, 128.1, 128.1, 72.1, 51.2, 33.7, 29.6, 28.4, 26.6, 22.8, 22.0, 14.1, 13.8. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{24}H_{32}N_3$ 362.2591; found 362.2591.

1-Hexyl-2-pentyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7e*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (96.9 mg, 83%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.26 (d, *J* = 8.0 Hz, 2H), 7.69 (d, *J* = 7.1 Hz, 2H), 7.58 – 7.37 (m, 6H), 5.08 (t, *J* = 6.4 Hz, 1H), 3.71 – 3.08 (m, 2H), 2.00 – 0.87 (m, 17H), 0.80 (t, *J* = 7.3 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.9, 160.2, 137.1, 135.1, 131.0, 130.1, 129.3, 128.7, 127.9, 72.6, 51.0, 34.0, 31.9, 31.1, 29.9, 25.9, 24.2, 22.6, 22.4, 14.0, 13.9. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{26}H_{36}N_3$ 390.2904; found 390.2900.

1-Heptyl-2-hexyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7f*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (95.1 mg, 76%).^{1}H NMR (400 MHz, $CDCl_3$) δ 8.21 – 8.11 (m, 2H), 7.62 – 7.57 (m, 2H), 7.50 – 7.29 (m, 6H), 4.98 (t, *J* = 6.3 Hz, 1H), 3.62 – 2.98 (m, 2H), 1.87 – 0.97 (m, 20H), 0.83 – 0.68 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.9, 160.1, 137.1, 135.1, 131.0, 130.0, 129.3, 128.7, 127.9, 127.9(2), 72.6, 51.0, 34.0, 31.8, 31.5, 29.9, 29.4, 28.6, 26.2, 24.5, 22.6, 22.5, 14.1, 14.0. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{28}H_{40}N_3$ 418.3217; found 418.3224.

1-Nonyl-2-octyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7g*). **P**etroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (95.1 mg, 67%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.17 – 8.12 (m, 2H), 7.61 – 7.55 (m, 2H), 7.46 – 7.28 (m, 6H), 4.97 (t, *J* = 6.3 Hz, 1H), 3.60 – 2.96 (m,

2H), 1.97 – 0.62 (m, 34H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.88, 160.17, 137.04, 135.05, 130.99, 130.06, 129.29, 128.67, 128.62, 127.95, 72.57, 51.04, 33.98, 31.87, 31.84, 31.76, 29.89, 29.69, 29.53, 29.26, 29.10, 28.93, 26.25, 24.47, 22.68, 22.60, 14.11, 14.08. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{32}H_{48}N_3$ 474.3843; found 474.3840.

1-Decyl-2-nonyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7h*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (99.2 mg, 66%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 – 8.09 (m, 2H), 7.65 – 7.55 (m, 2H), 7.49 – 7.28 (m, 6H), 4.98 (t, *J* = 6.4 Hz, 1H), 3.62 – 2.97 (m, 2H), 1.90 – 0.97 (m, 32H), 0.84 – 0.75 (m, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.9, 160.2, 137.0, 135.1, 131.0, 130.1, 129.3, 128.7, 128.5, 128.0, 72.5, 51.1, 34.0, 33.9, 31.9, 31.8, 29.9, 29.7, 29.6, 29.4, 29.3, 29.2, 28.9, 26.3, 24.5, 22.7, 22.7, 14.1, 14.1. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{34}H_{52}N_3$ 502.4156; found 502.4161.

1-Isobutyl-2-isopropyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7i*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (77.9 mg, 78%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 – 8.23 (m, 2H), 7.76 – 7.69 (m, 2H), 7.53 – 7.42 (m, 6H), 4.74 (d, *J* = 7.4 Hz, 1H), 3.62 – 3.51 (m, 1H), 3.04 – 2.96 (m, 1H), 2.36 – 1.85 (m, 2H), 1.21 – 0.54 (m, 12H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.6, 160.1, 135.2, 131.0, 130.1, 129.6, 128.7, 128.0, 128.0, 127.9, 59.7, 52.2, 33.4, 29.0, 20.0, 19.6, 18.4, 18.0. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{22}H_{28}N_3$ 334.2278; found 334.2274.

2-Isobutyl-1-isopentyl-4,6-diphenyl-1,2-dihydro-1,3,5-triazine (*7j*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (81.2 mg, 75%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 – 8.13 (m, 2H), 7.64 – 7.56 (m, 2H), 7.48 – 7.38 (m, 3H), 7.36 – 7.28 (m, 3H), 5.04 (t, *J* = 6.8 Hz, 1H), 3.60 – 2.98 (m, 2H), 2.03 – 1.28 (m, 6H), 1.05 – 0.56 (m, 12H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.6, 160.2, 137.1, 135.0, 131.1, 130.0, 129.3, 128.7, 128.0, 127.9, 70.8, 49.3, 42.4, 39.0, 25.4, 23.7, 23.2, 23.0, 22.6, 21.9. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{24}H_{32}N_3$ 362.2591; found 362.2599.

1-Benzyl-2,4,6-triphenyl-1,2-dihydro-1,3,5-triazine (*7k*).[2] Petroleum ether/ethyl acetate (10:1) as eluent; Yellow solid (74.6 mg, 62%), mp 140 – 141 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.29 – 8.23 (m, 2H), 7.66 – 7.61 (m, 2H), 7.59 – 7.52 (m, 2H), 7.49 – 7.41 (m, 3H), 7.42 – 7.36 (m, 5H), 7.35 – 7.27 (m, 3H), 7.24 – 7.19 (m, 2H), 5.99 (s, 1H), 4.96 (d, *J* = 15.4 Hz, 1H), 4.16 (d, *J* = 15.5 Hz, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.2, 159.0, 141.3, 137.0, 135.7, 134.8, 130.8, 130.3, 129.0, 129.0, 128.9, 128.8, 128.7, 128.2, 128.1, 128.0, 127.5, 126.7, 74.1, 53.1. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{28}H_{24}N_3$ 402.1965; found 402.1969.

1-Butyl-4,6-bis(4-methoxyphenyl)-2-propyl-1,2-dihydro-1,3,5-triazine (*7l*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (59.0mg, 50%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 – 7.99 (m, 2H), 7.53 – 7.45 (m, 2H), 7.23 – 7.10 (m, 4H), 4.95 (t, *J* = 6.3 Hz, 1H), 3.67 – 2.94 (m, 2H), 2.36 – 2.27 (m, 6H), 1.84 – 0.97 (m, 8H), 0.92 (t, *J* = 7.4 Hz, 3H), 0.67 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.8, 160.2, 141.3, 140.1, 134.3, 132.2, 129.3, 129.3, 128.7, 127.9, 72.2, 50.8, 36.1, 32.1, 21.5, 21.5, 19.6, 17.9, 14.3, 13.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{24}H_{32}N_3O_2$ 394.2489; found 394.2496.

1-Butyl-2-propyl-4,6-di-m-tolyl-1,2-dihydro-1,3,5-triazine (*7m*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (59.6 mg, 55%).^{1}H NMR (400 MHz, $CDCl_3$) δ 8.28 (dd, *J* = 7.5, 2.2 Hz, 2H), 7.72 (dd, *J* = 7.8, 1.8 Hz, 2H), 7.53 – 7.42 (m, 6H), 4.74 (d, *J* = 7.4 Hz, 1H), 3.56 (dd, *J* = 13.9, 9.5 Hz, 1H), 2.99 (dd, *J* = 13.9, 5.3 Hz, 1H), 2.34 – 2.18 (m, 1H), 1.98 – 1.89 (m, 1H), 1.18 (dd, *J* = 6.7, 4.9 Hz, 6H), 0.74 (dd, *J* = 52.2, 6.6 Hz, 6H).

^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 – 7.95 (m, 2H), 7.41 – 7.33 (m, 2H), 7.30 – 7.13 (m, 4H), 4.98 (t, *J* = 6.3 Hz, 1H), 3.61 – 2.96 (m, 2H), 2.39 – 2.28 (m, 6H), 1.89 – 0.97 (m, 8H), 0.94 (t, *J* = 7.3 Hz, 3H), 0.67 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.1, 160.4, 138.5, 137.6, 137.0 135.0, 131.7, 130.9, 129.8, 128.5, 128.4, 127.9, 126.4, 125.2, 72.1, 50.7, 36.2, 32.0, 21.5, 21.5, 19.6, 17.8, 14.3, 13.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{24}H_{32}N_3$ 362.2591; found 362.2590.

1-Butyl-4,6-bis(3-methoxyphenyl)-2-propyl-1,2-dihydro-1,3,5-triazine (*7n*). Petroleum ether/ethyl acetate (8:1) as eluent; Yellow oil (60.1 mg, 51%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.84 – 7.70 (m, 2H), 7.36 – 7.09 (m, 4H), 7.00 – 6.88 (m, 2H), 4.99 (t, *J* = 6.3 Hz, 1H), 3.89 – 2.97 (m, 8H), 1.93 – 0.99 (m, 8H), 0.93 (t, *J* = 7.3 Hz, 3H), 0.69 (t, *J* = 7.3 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.7, 160.0, 159.8, 159.4, 138.5, 136.3, 129.7, 129.0, 121.6, 120.6, 116.7, 116.5, 114.9, 112.5, 72.2, 55.5, 55.4, 50.8, 39.8, 36.2, 32.0, 19.6, 17.8, 14.3, 13.8, 13.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{24}H_{32}N_3O_2$ 394.2489; found 394.2486.

4,6-Bis(3-bromophenyl)-1-butyl-2-propyl-1,2-dihydro-1,3,5-triazine (*7o*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (88.0 mg, 60%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.36 – 8.33 (m, 1H), 8.15 (d, *J* = 7.8 Hz, 1H), 7.77 (t, *J* = 1.9 Hz, 1H), 7.66 (d, *J* = 8.1 Hz, 1H), 7.61 – 7.52 (m, 2H), 7.37 (t, *J* = 7.8 Hz, 1H), 7.32 – 7.22 (m, 1H), 5.06 (t, *J* = 6.3 Hz, 1H), 3.63 – 3.07 (m, 2H),, 1.93 – 1.06 (m, 8H), 1.02 (t, *J* = 7.2 Hz, 3H), 0.77 (t, *J* = 7.3 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 162.8, 158.8, 139.0, 136.9, 134.1, 133.1, 132.0, 130.8, 130.3, 129.6, 127.8, 126.5, 122.8, 122.3, 72.4, 50.7, 36.4, 31.9, 19.6, 17.7, 14.2, 13.5. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{22}H_{26}Br_2N_3$ 490.0488; found 490.0485.

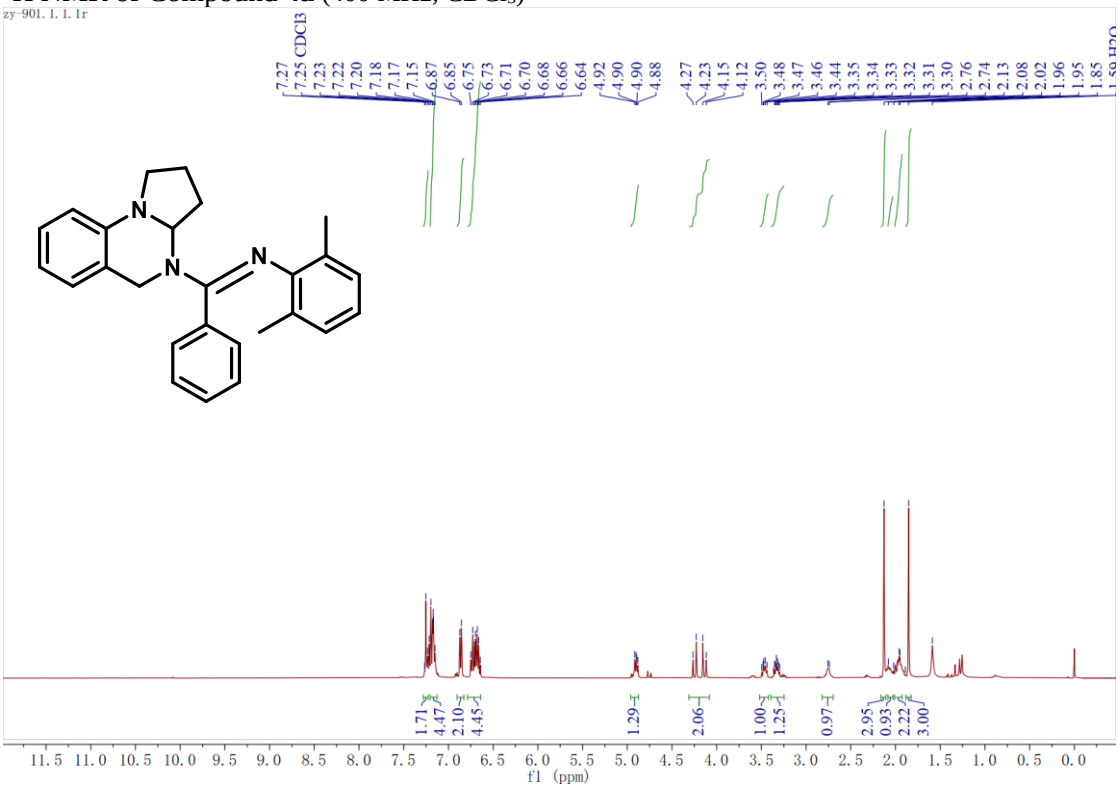
1-Butyl-4,6-bis(3-chlorophenyl)-2-propyl-1,2-dihydro-1,3,5-triazine (*7p*). Petroleum ether/ethyl acetate (10:1) as eluent; Yellow oil (77.0 mg, 64%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.15 – 7.99 (m, 2H), 7.55 (s, 1H), 7.48 – 7.22 (m, 5H), 4.99 (t, *J* = 6.3 Hz, 1H), 3.56 – 2.99 (m, 2H), 1.86 – 1.32 (m, 6H), 1.17 – 0.89 (m, 5H), 0.70 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 164.1, 160.4, 138.5, 137.6, 137.0, 135.0, 131.7, 130.9, 129.8, 128.5, 128.4, 127.9, 126.4, 125.2, 72.1, 50.7, 36.2, 32.0, 19.6, 17.8, 14.3, 13.6. HRMS (ESI) m/z: $[M + H]^+$ Calcd for $C_{22}H_{26}Cl_2N_3$ 402.1498; found 402.1494.

References

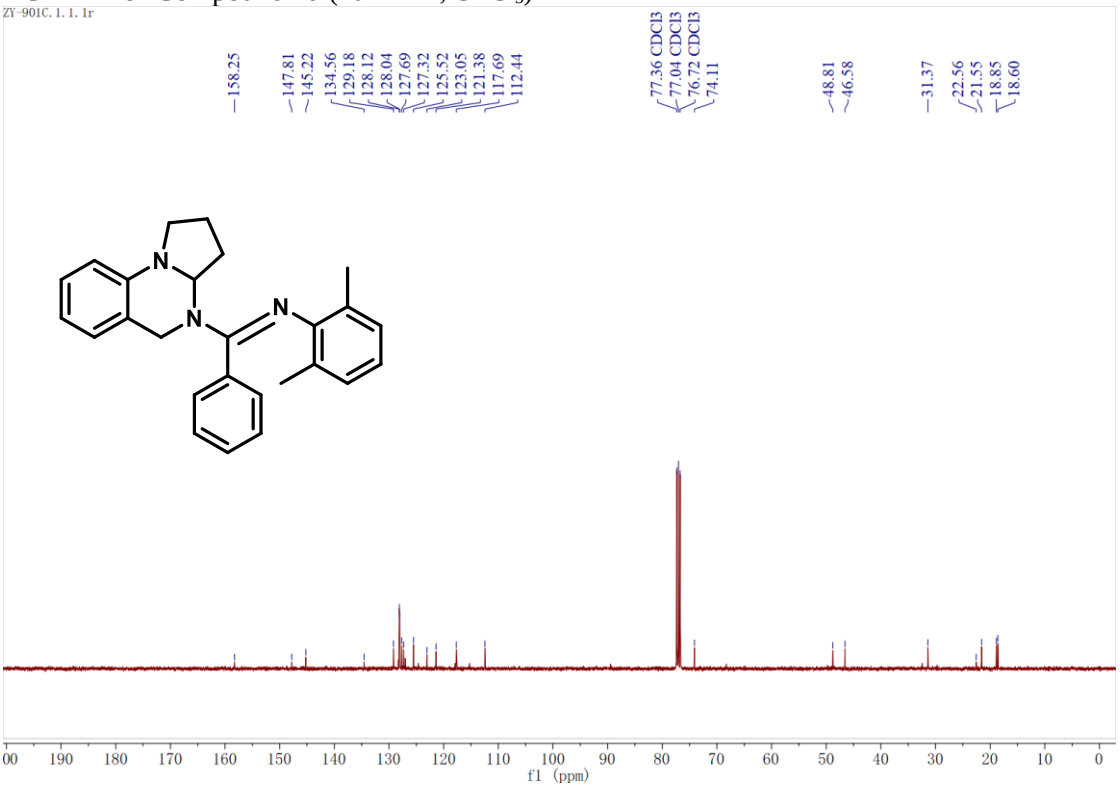
1. a) Wang, S.; Shen, Y.-B.; Li, L.-F.; Qiu, B.; Yu, L.; Liu, Q.; Xiao, J., N-Alkylation-Initiated Redox-Neutral [5 + 2] Annulation of 3-Alkylindoles with o-Aminobenzaldehydes: Access to Indole-1,2-Fused 1,4- Benzodiazepines. *Org. Lett.* **2019,** *21*, 8904-8908; b) Vaibhav, P. C., Ayyakkannu, R., Arunachalam, S.; Kuo, C. H., Photoredox synthesis of functionalized quinazolines via copper-catalyzed aerobic oxidative C_{sp2}–H annulation of amidines with terminal alkynes. *Green Chem*. **2021**, *23*, 5024–5030; c) Gong, Z.-R.; Zhao, Y.; Xu, B.-Y.; Yang, Z.; Ren, B.-Q.; Yang, H.; Zeng, C.-F.; Chen, R.-Q.; Xu, Y.-J.; Li, Q., Identiffcation of novel 3-aryl-1-aminoisoquinolines-based $KRAS^{G12C}$ inhibitors: Rational drug design and expedient construction by C–H functionalization/annulation. *Bioorg Chem*. **2024**, *142*, 106954; d) Bruce, C. H.; Allen, S. K.; Robert, C. C.; Yang, S.-T., Parallel Solid-Phase Synthesis and High-Throughput ^{1}H NMR Evaluation of a 96-Member 1,2,4-Trisubstituted-pyrimidin-6-one-5-carboxylic Acid Library. *J. Comb. Chem*. **2009**, *11*, 469–480.
2. Guo, H.-H.; Lin, J.-Y.; Liu, Q.; Li, X., Construction of 1,2-dihydro-1,3,5-triazines via reactions involving amidines. *Org. Biomol. Chem.* **2023**, *21*, 4269–4275.

NMR Spectra of 4-7

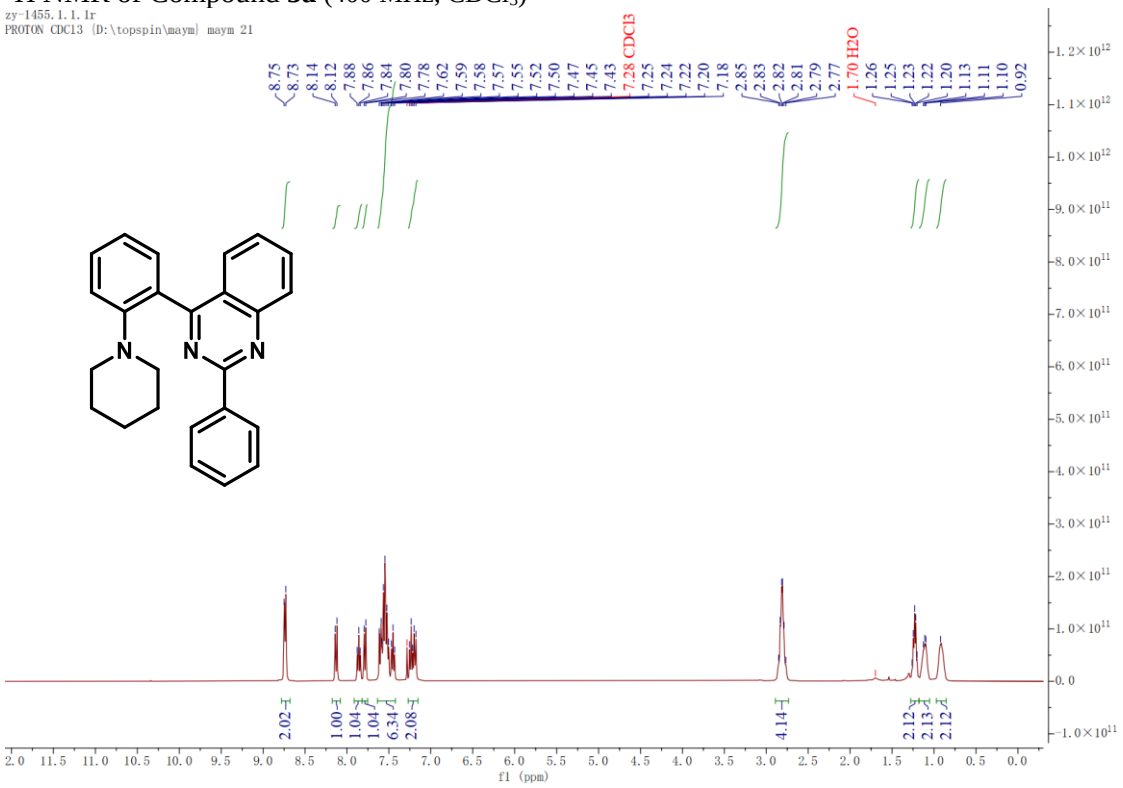
^{1}H NMR of Compound **4a** (400 MHz, $CDCl_3$)



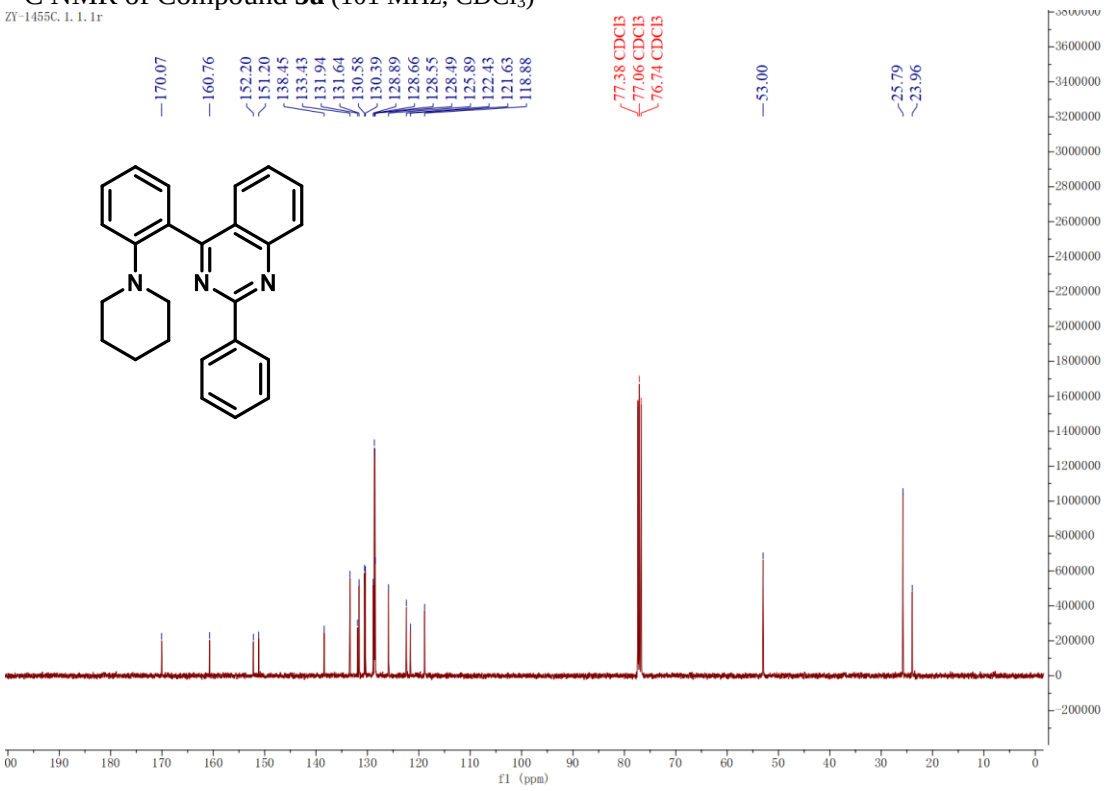
^{13}C NMR of Compound **4a** (101 MHz, $CDCl_3$)



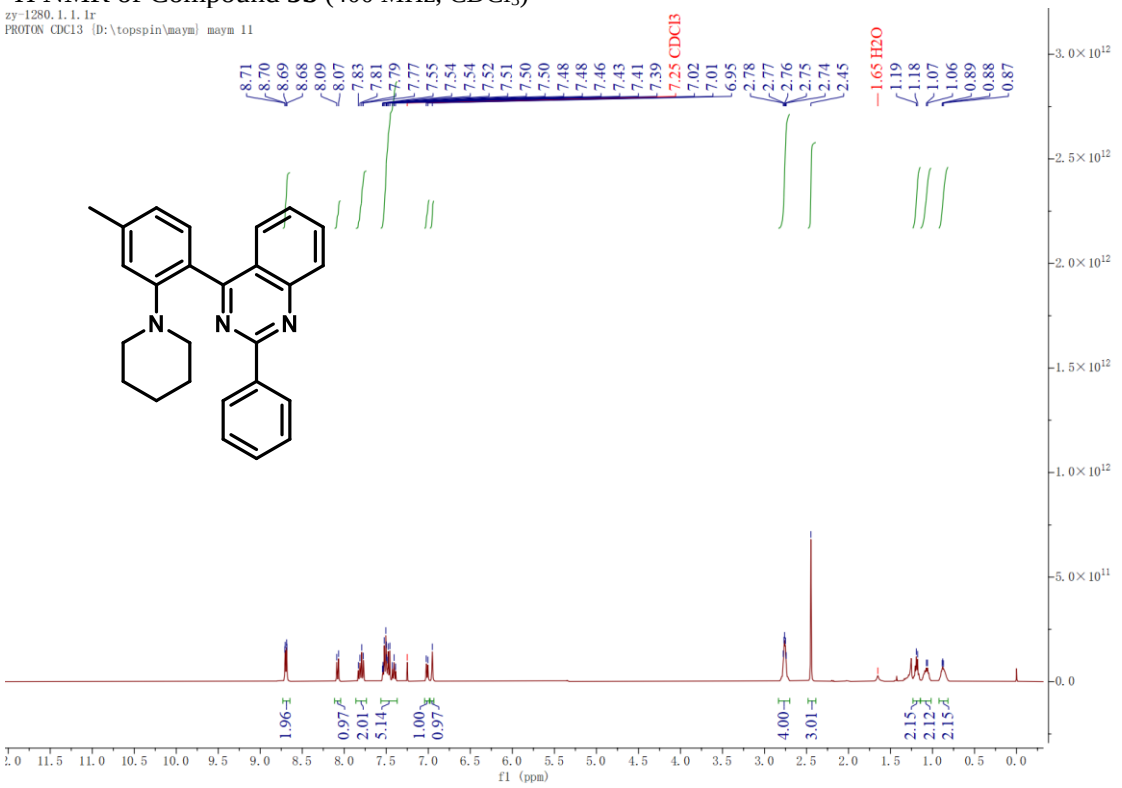
^{1}H NMR of Compound **5a** (400 MHz, $CDCl_3$)



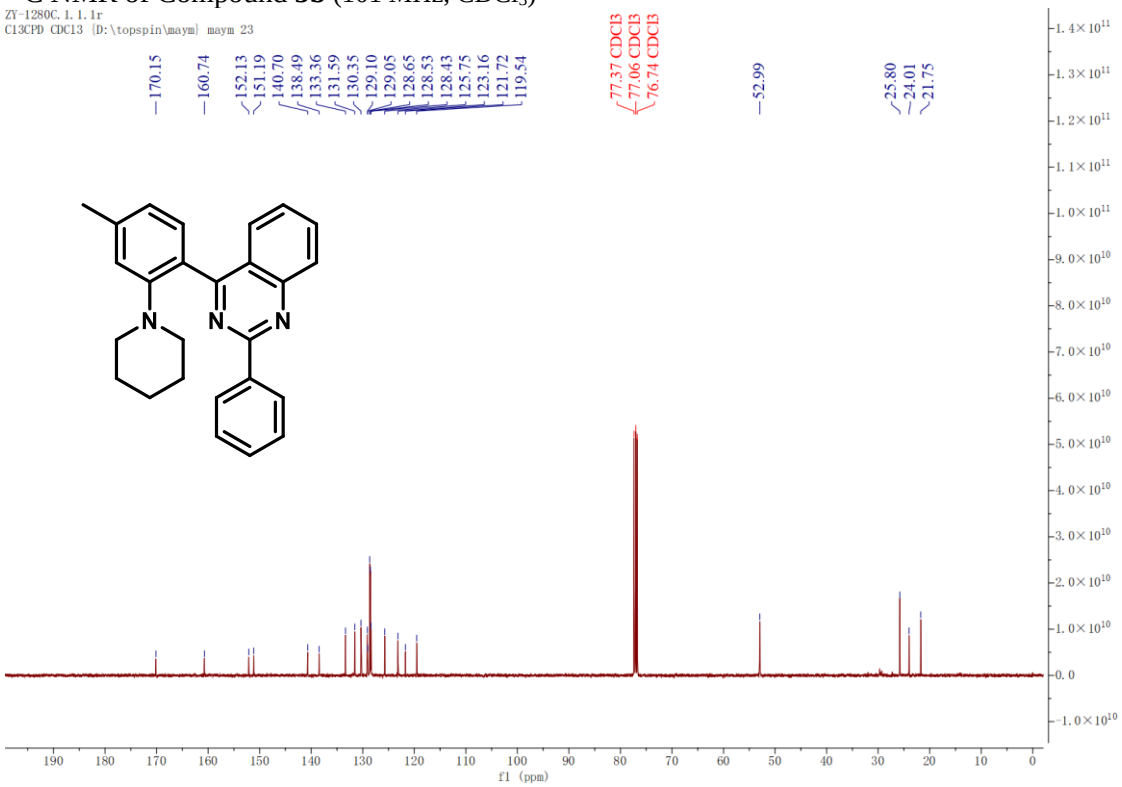
^{13}C NMR of Compound **5a** (101 MHz, $CDCl_3$)



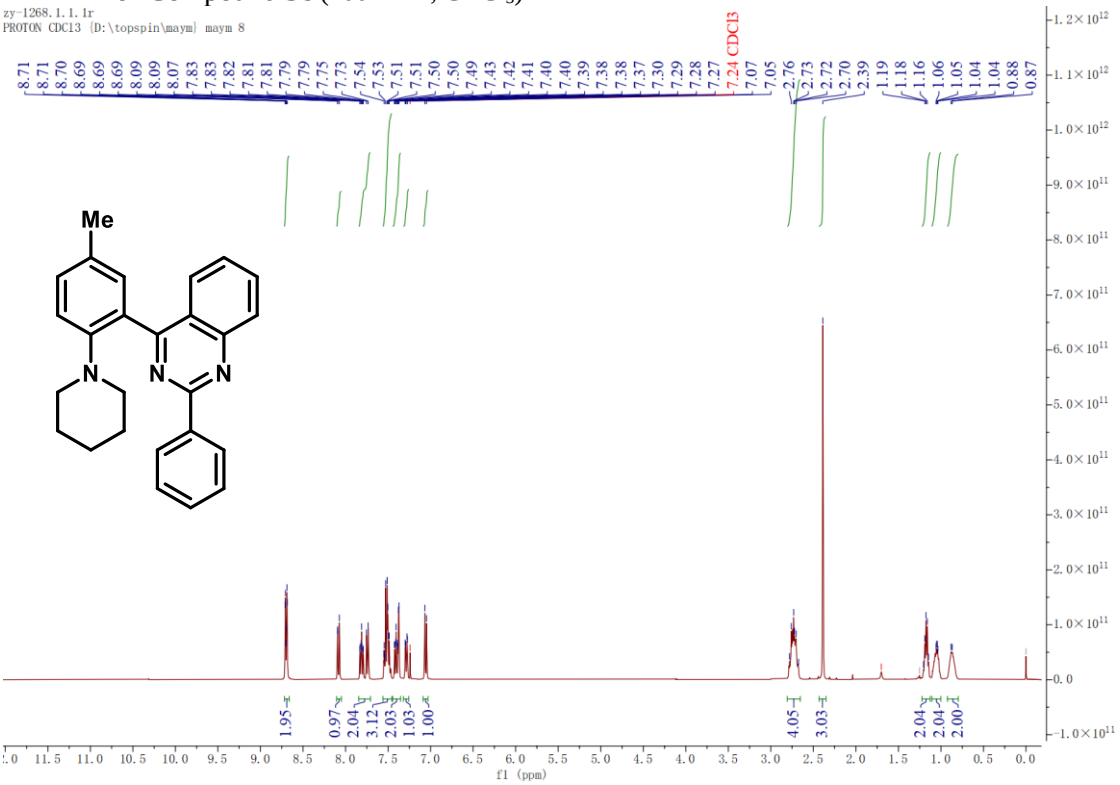
^{1}H NMR of Compound **5b** (400 MHz, $CDCl_3$)



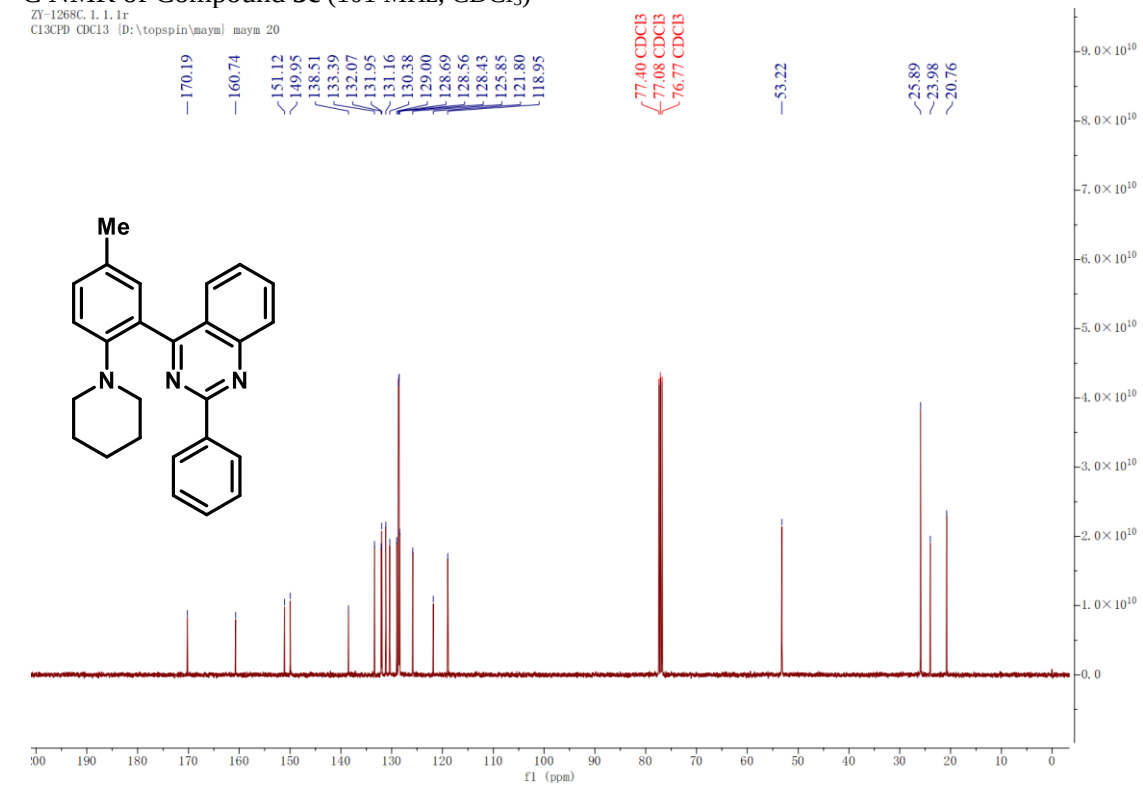
^{13}C NMR of Compound **5b** (101 MHz, $CDCl_3$)



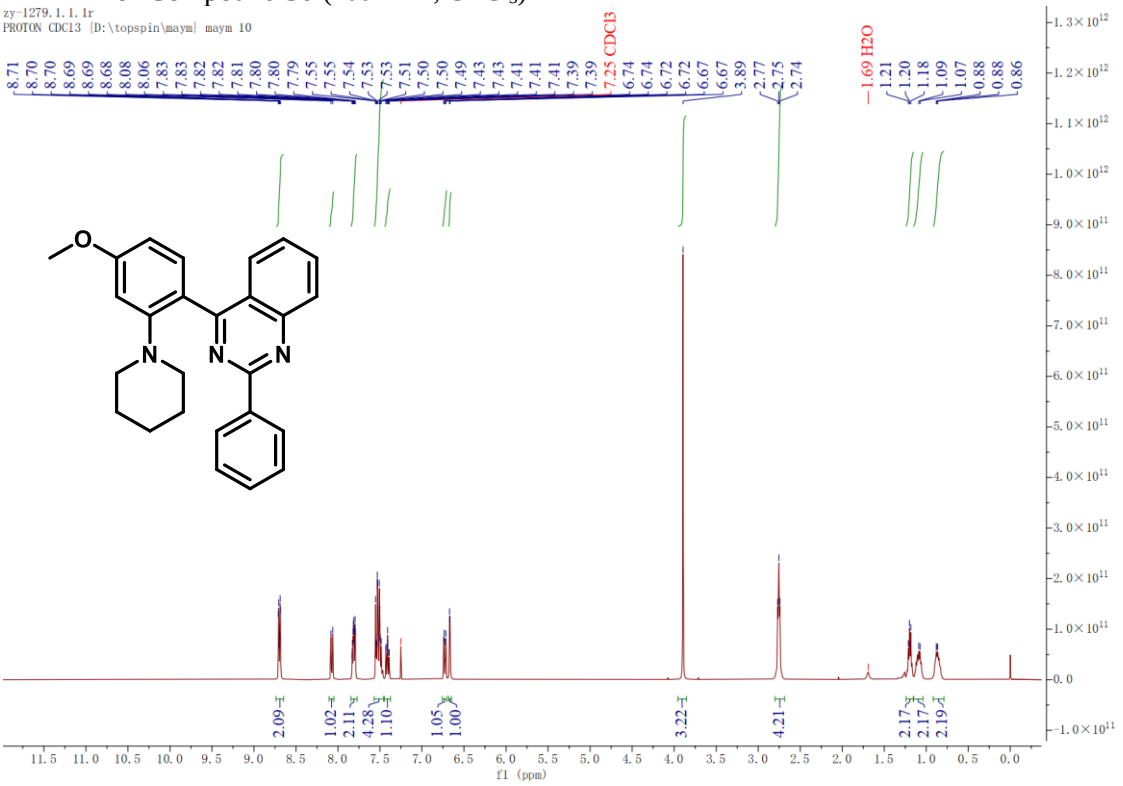
^{1}H NMR of Compound **5c** (400 MHz, $CDCl_3$)



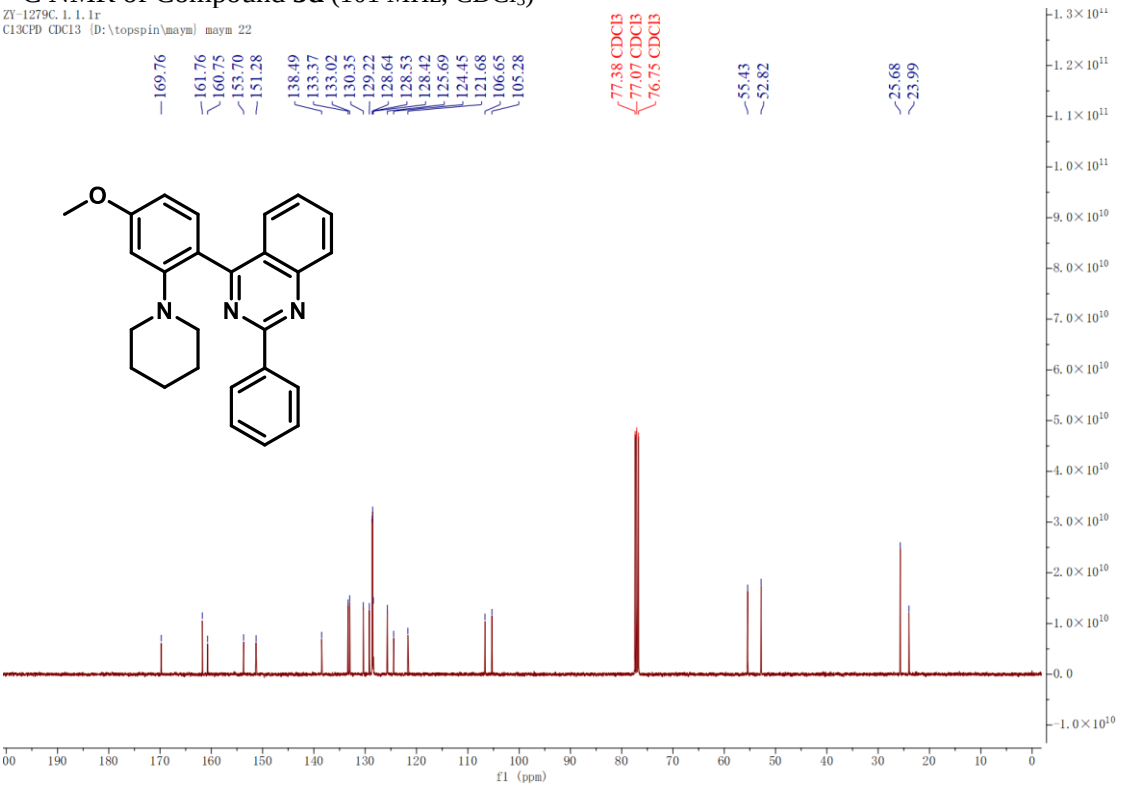
^{13}C NMR of Compound **5c** (101 MHz, $CDCl_3$)



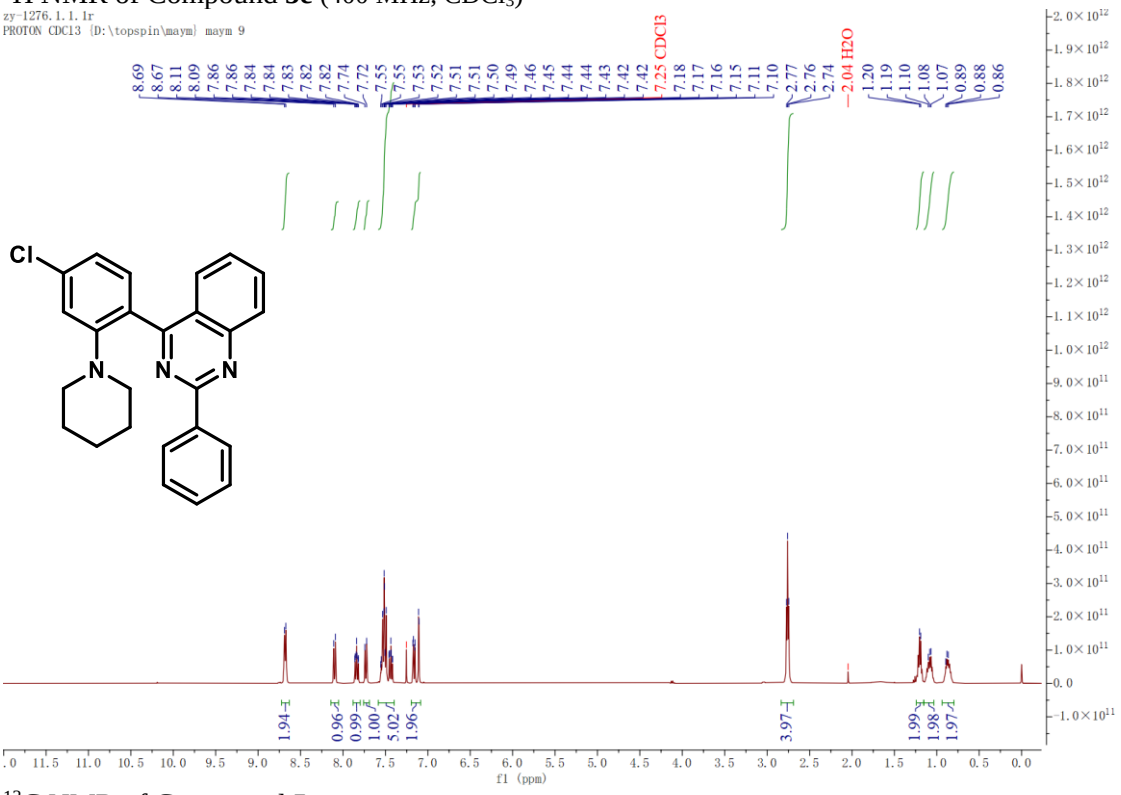
^{1}H NMR of Compound **5d** (400 MHz, $CDCl_3$)



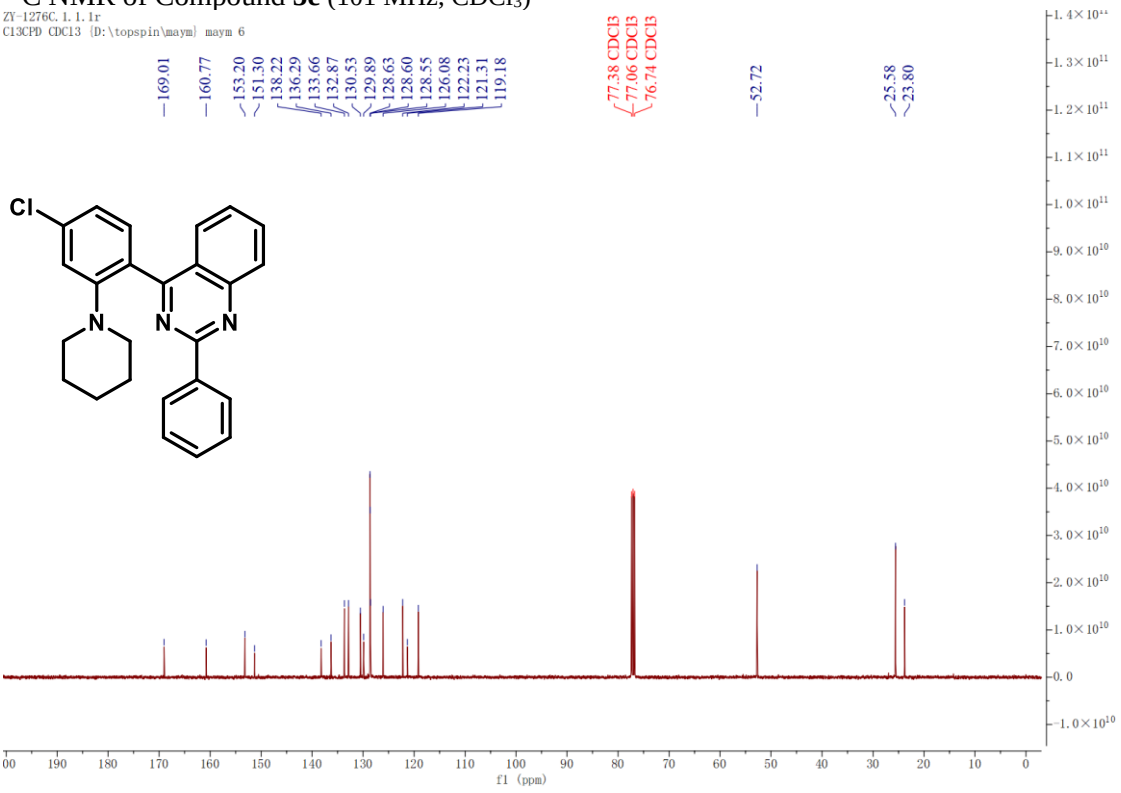
^{13}C NMR of Compound **5d** (101 MHz, $CDCl_3$)



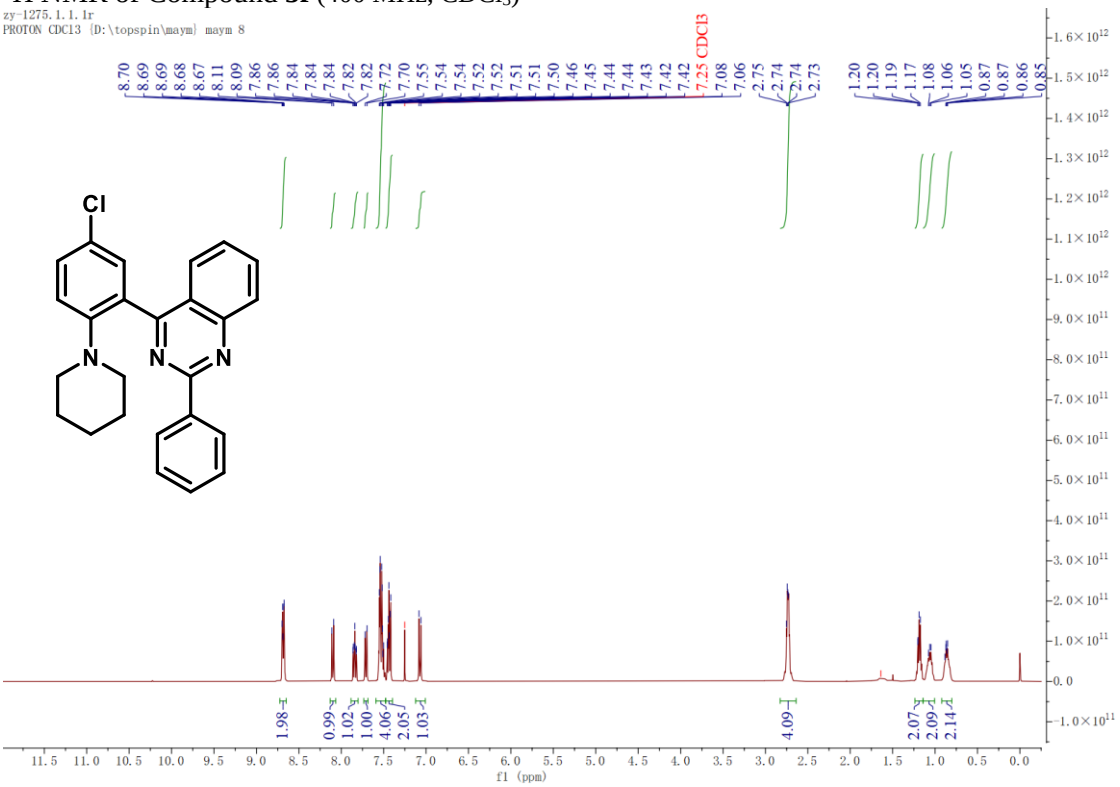
^{1}H NMR of Compound **5e** (400 MHz, $CDCl_3$)



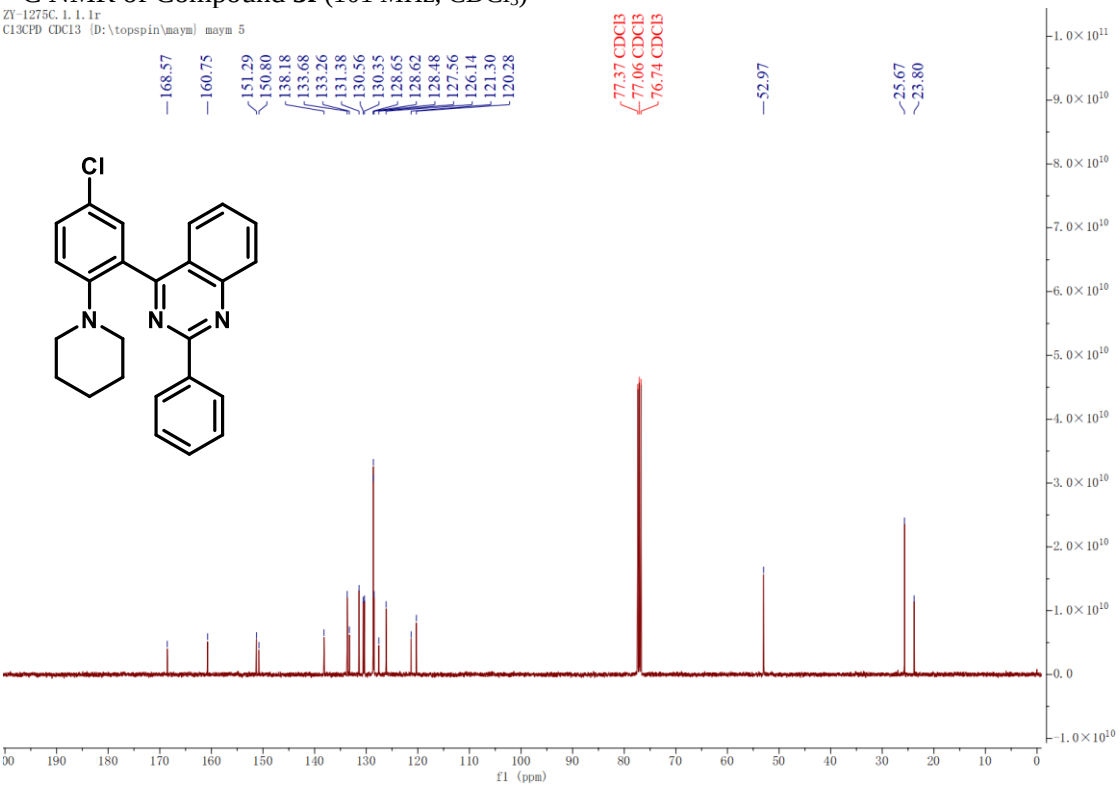
^{13}C NMR of Compound **5e** (101 MHz, $CDCl_3$)



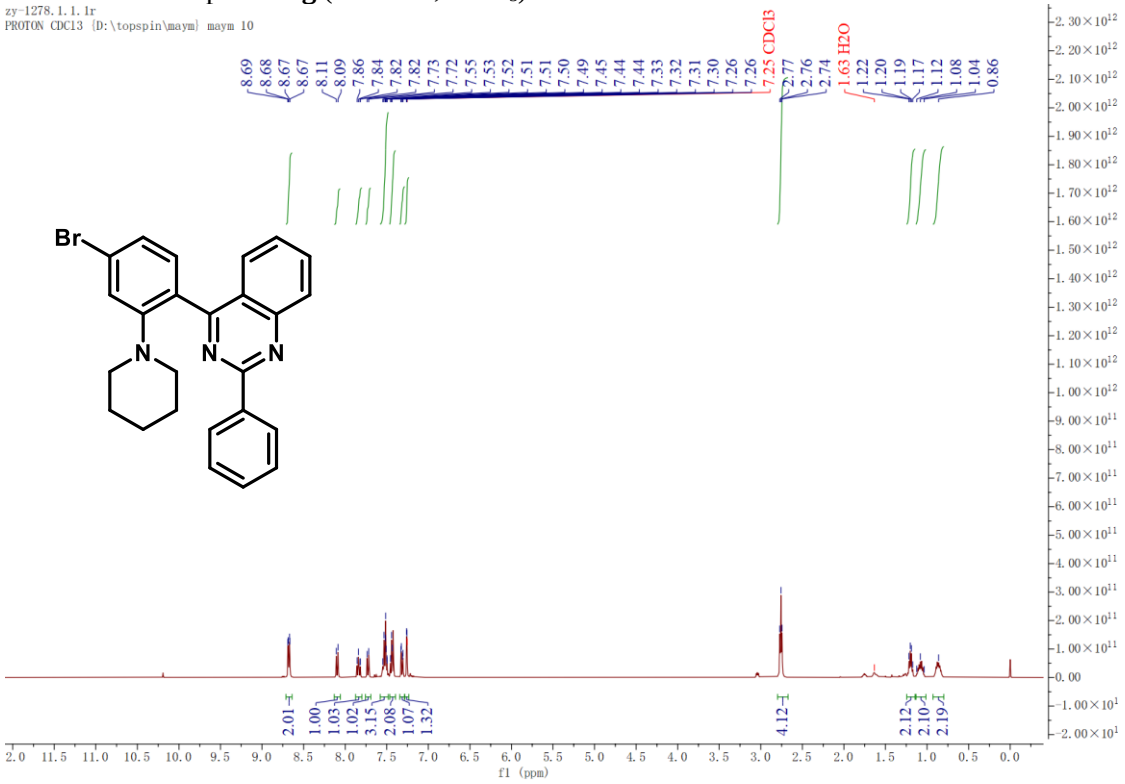
^{1}H NMR of Compound **5f** (400 MHz, $CDCl_3$)



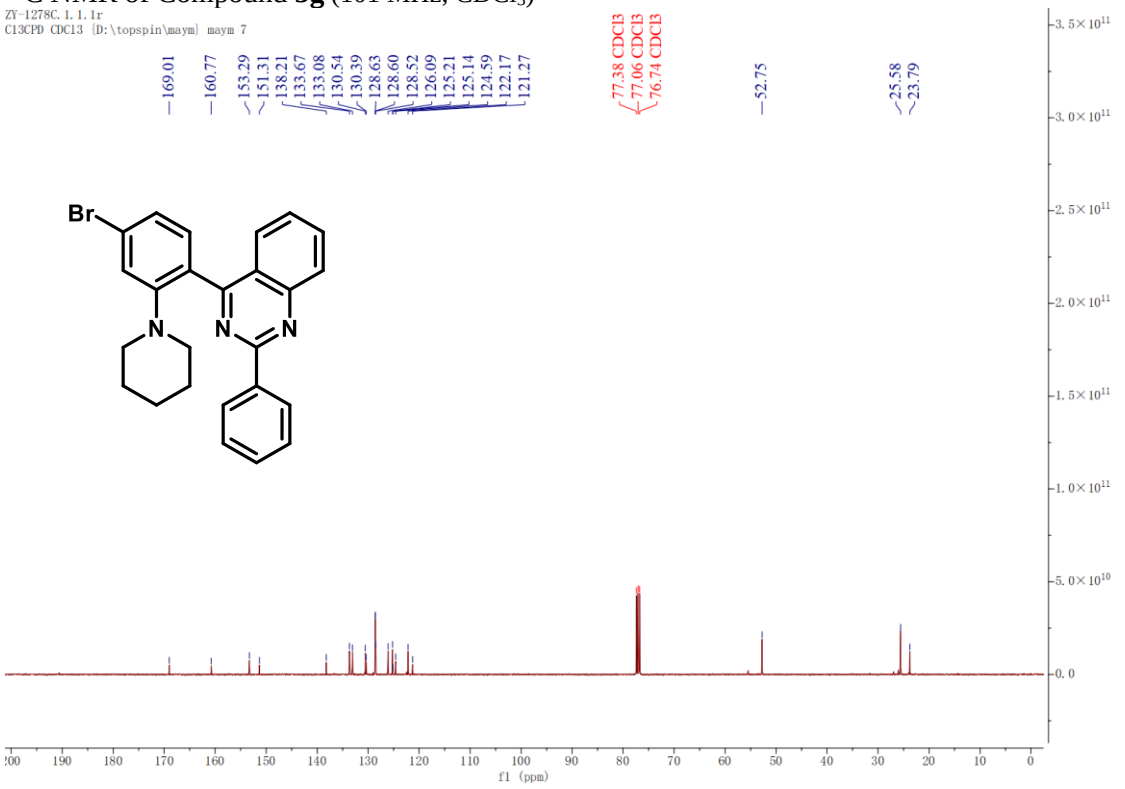
^{13}C NMR of Compound **5f** (101 MHz, $CDCl_3$)



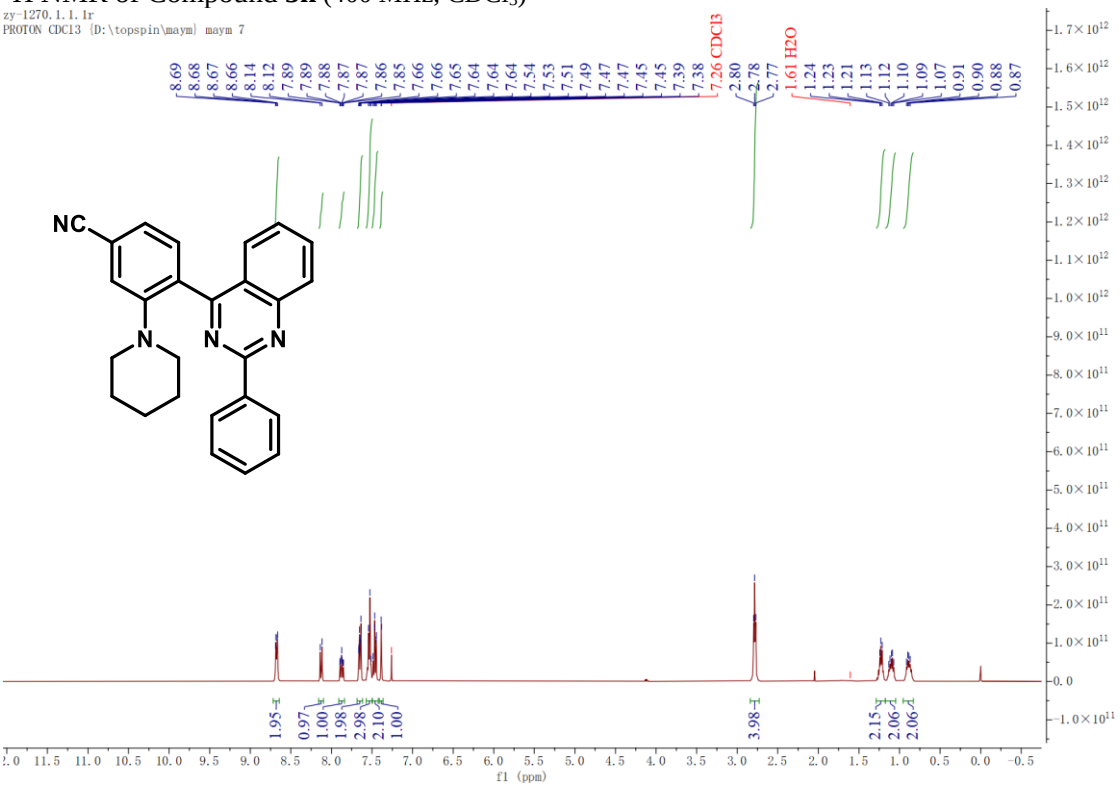
^{1}H NMR of Compound **5g** (400 MHz, $CDCl_3$)



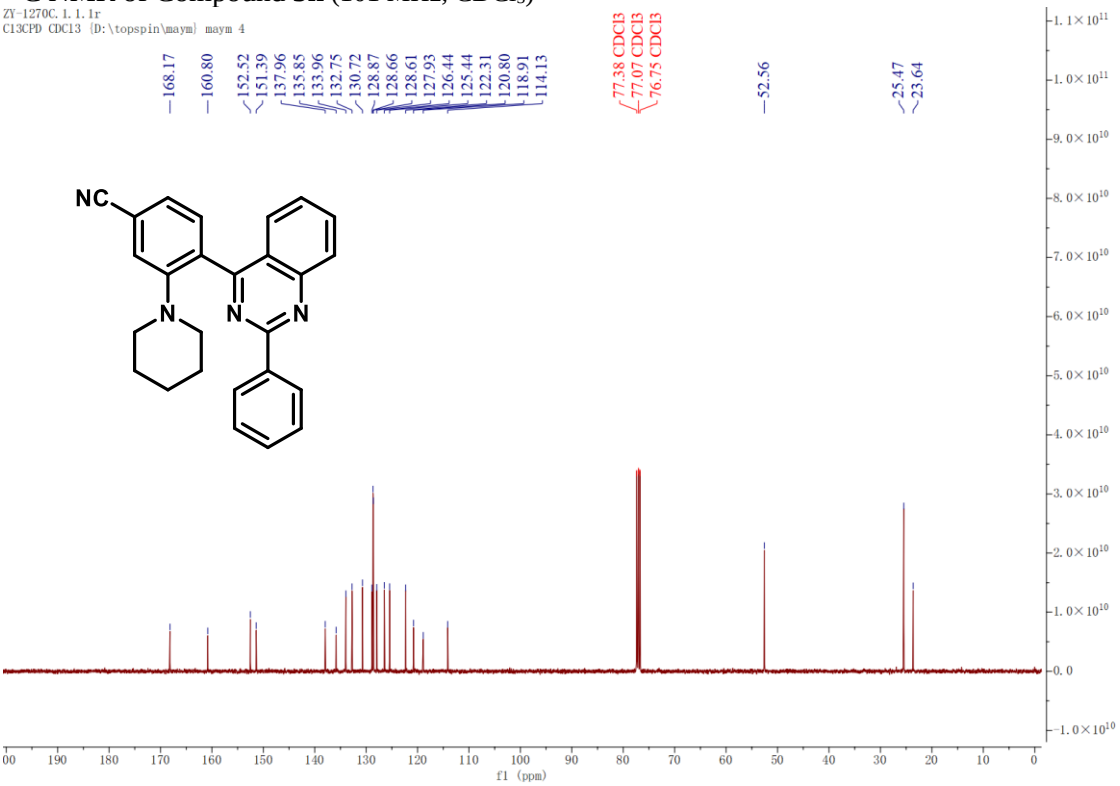
^{13}C NMR of Compound **5g** (101 MHz, $CDCl_3$)



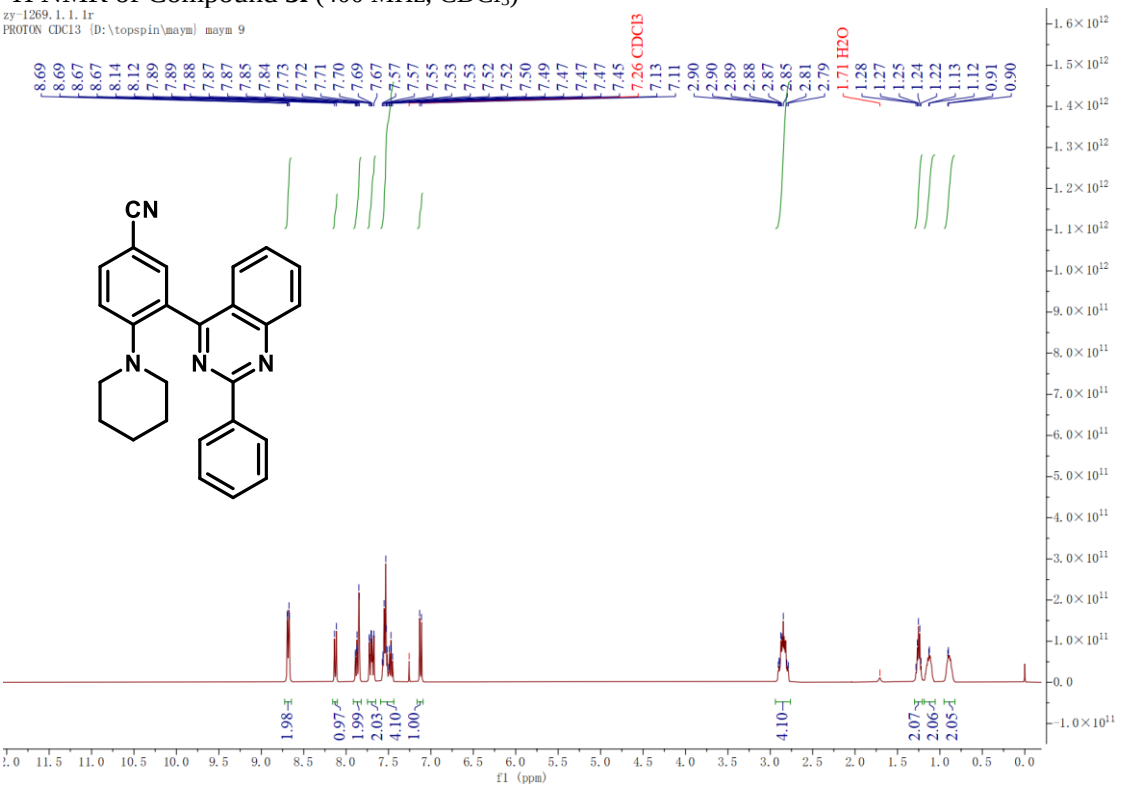
^{1}H NMR of Compound **5h** (400 MHz, $CDCl_3$)



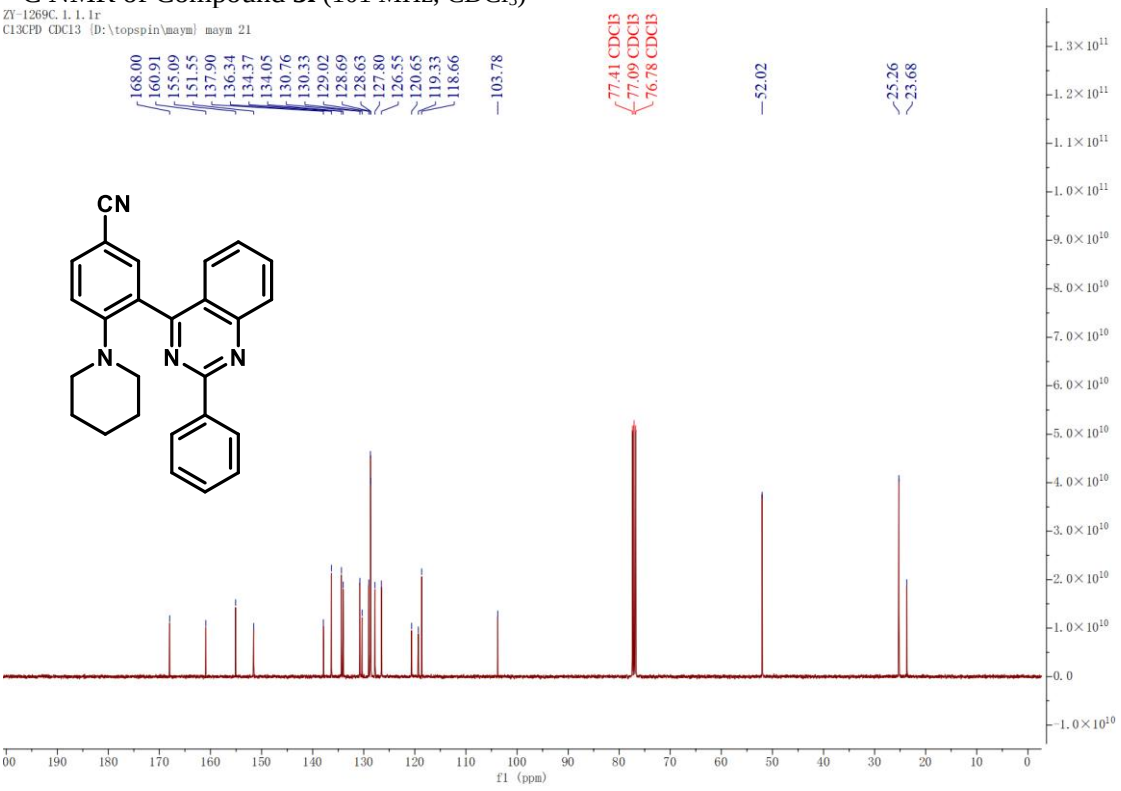
^{13}C NMR of Compound **5h** (101 MHz, $CDCl_3$)



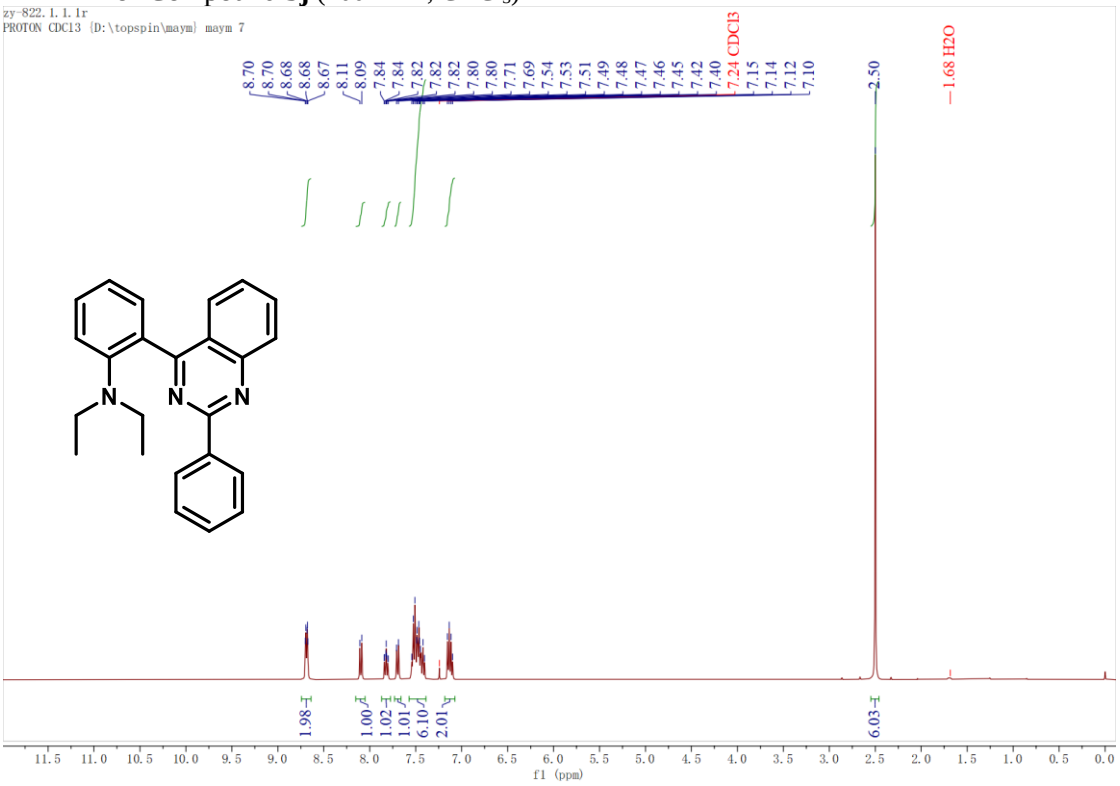
^{1}H NMR of Compound **5i** (400 MHz, $CDCl_3$)



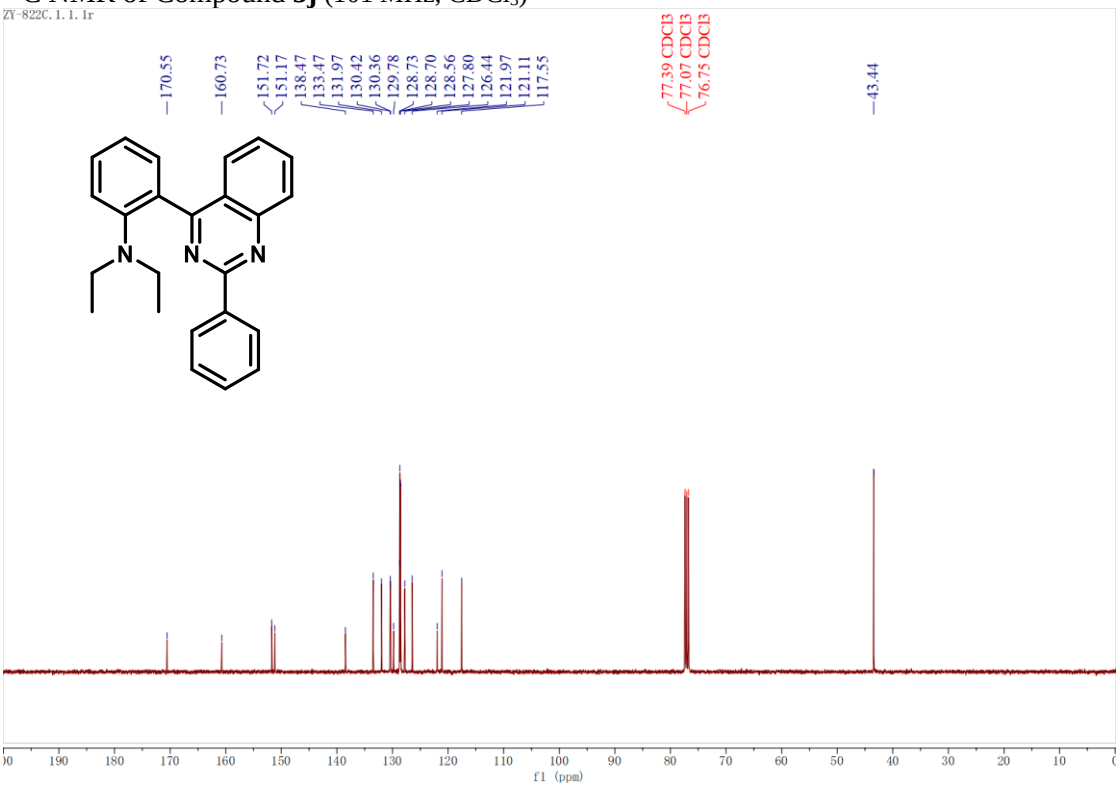
^{13}C NMR of Compound **5i** (101 MHz, $CDCl_3$)



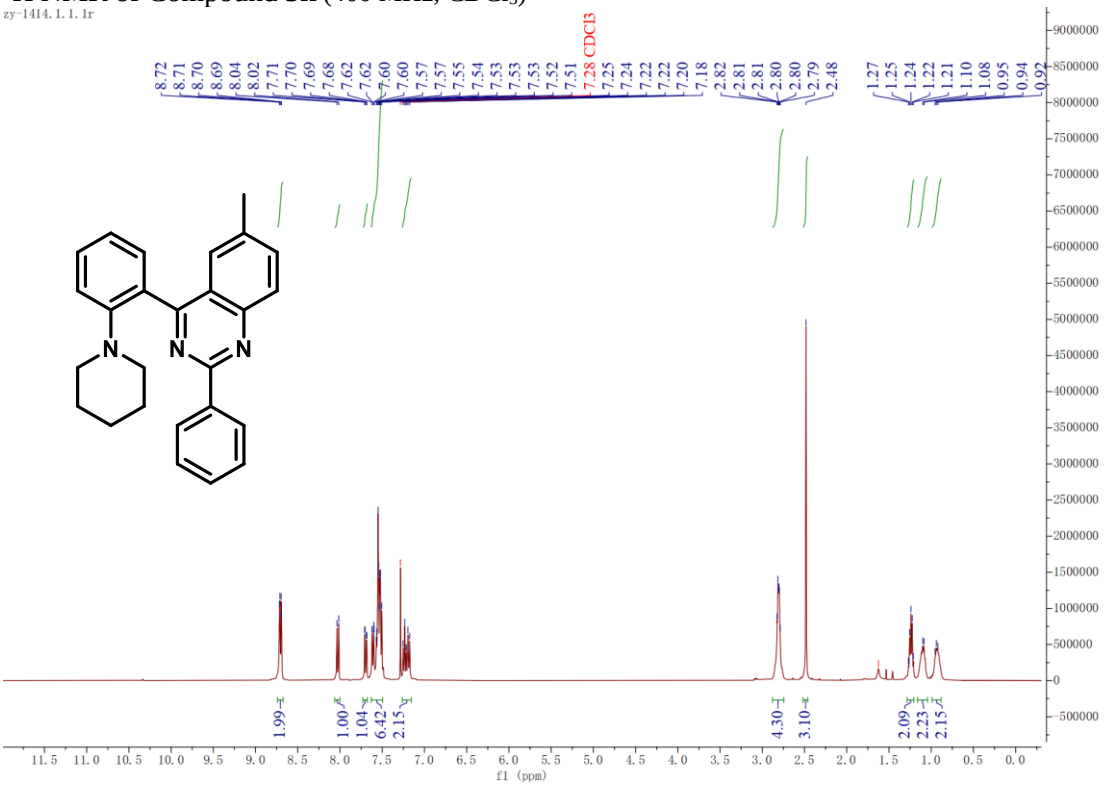
^{1}H NMR of Compound **5j** (400 MHz, $CDCl_3$)



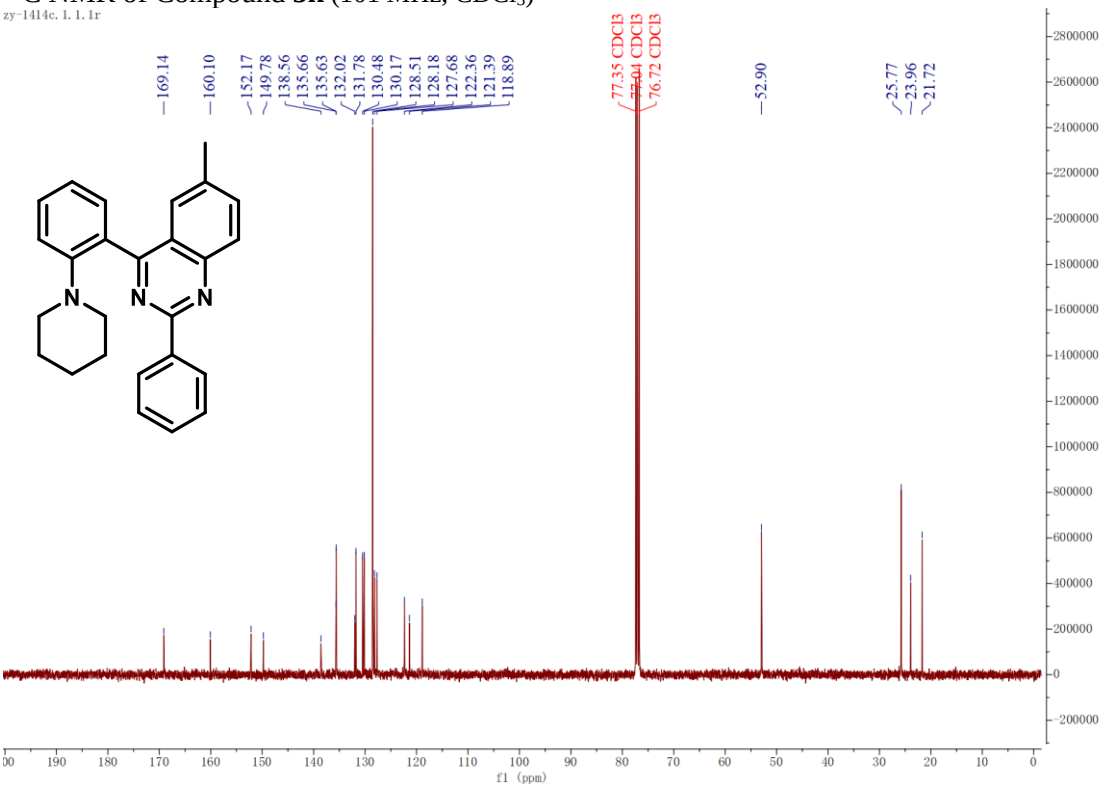
^{13}C NMR of Compound **5j** (101 MHz, $CDCl_3$)



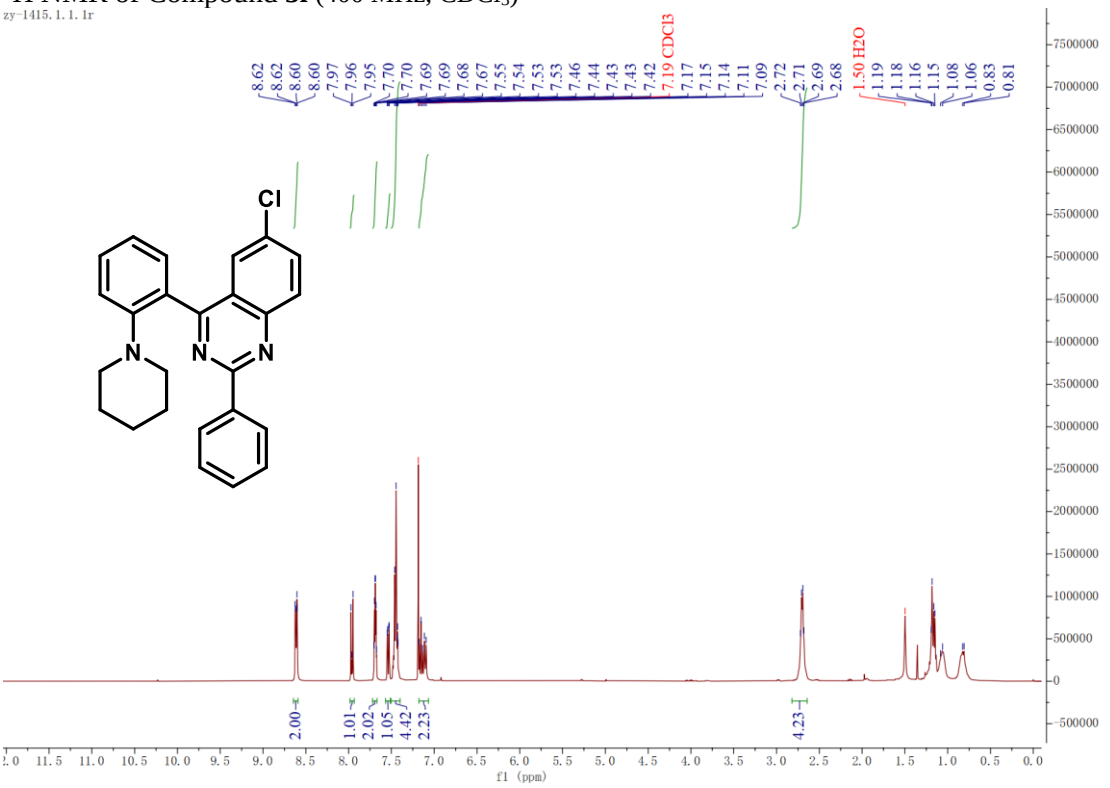
^{1}H NMR of Compound **5k** (400 MHz, $CDCl_3$)



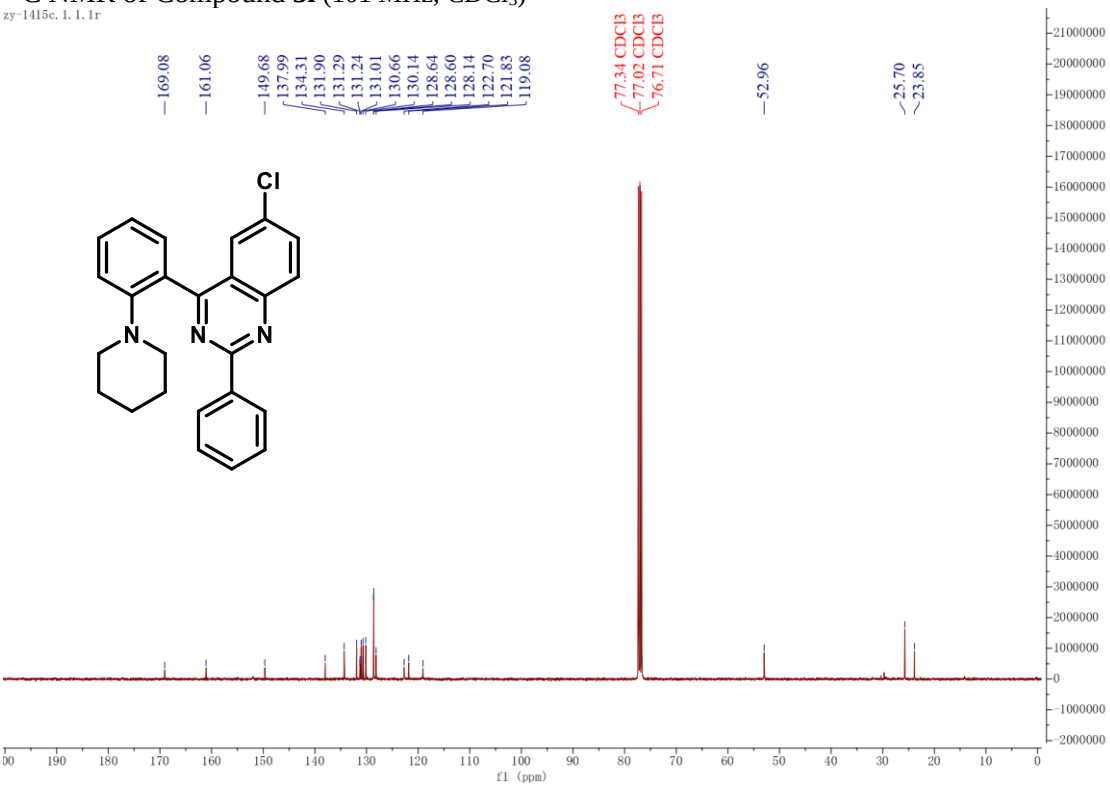
^{13}C NMR of Compound **5k** (101 MHz, $CDCl_3$)



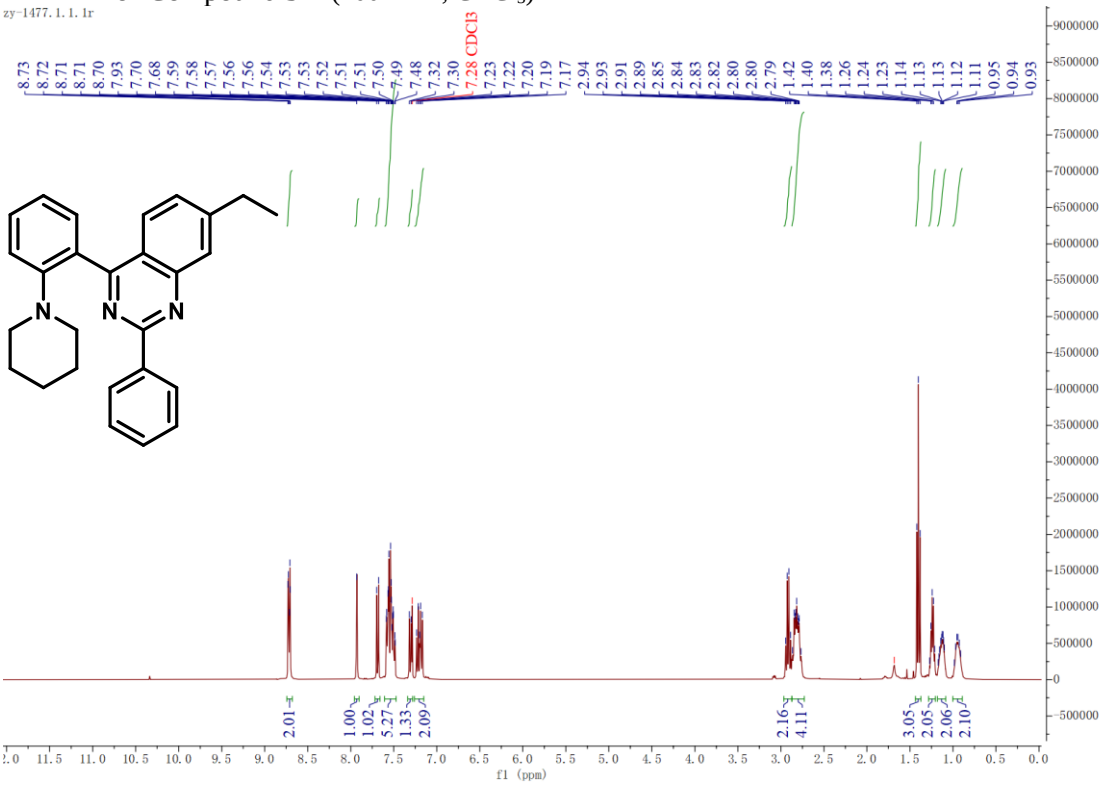
^{1}H NMR of Compound **5l** (400 MHz, $CDCl_3$)



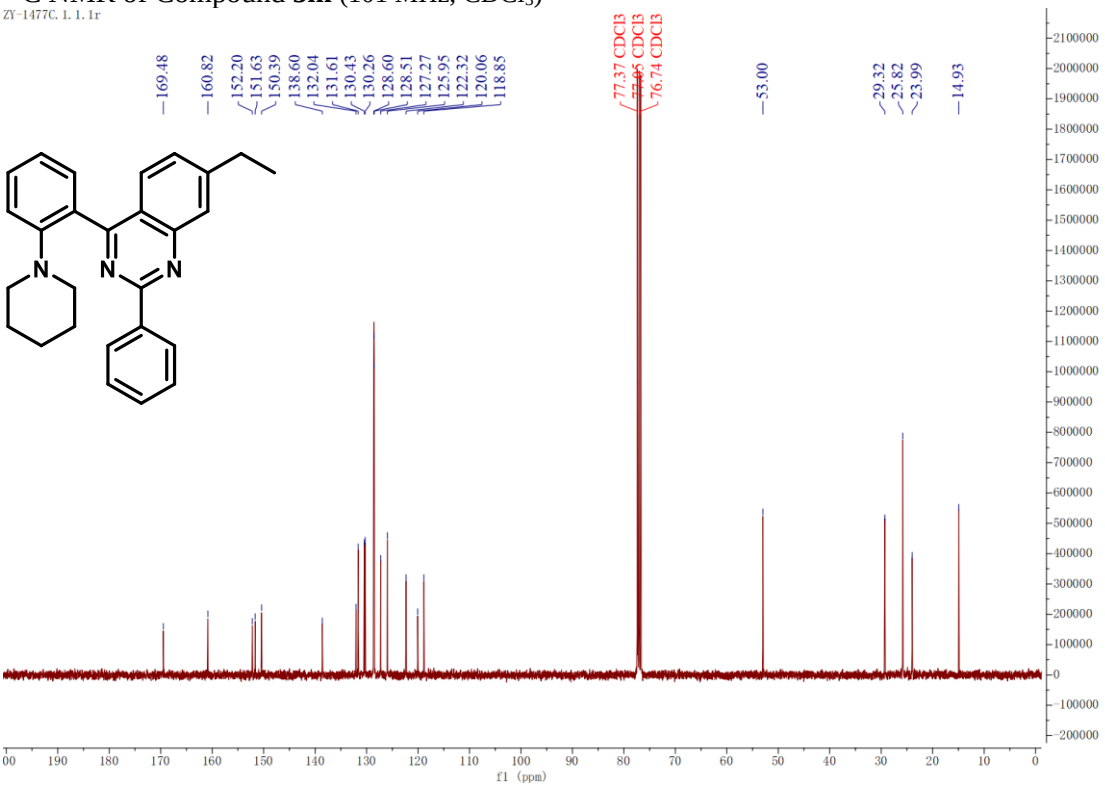
^{13}C NMR of Compound **5l** (101 MHz, $CDCl_3$)



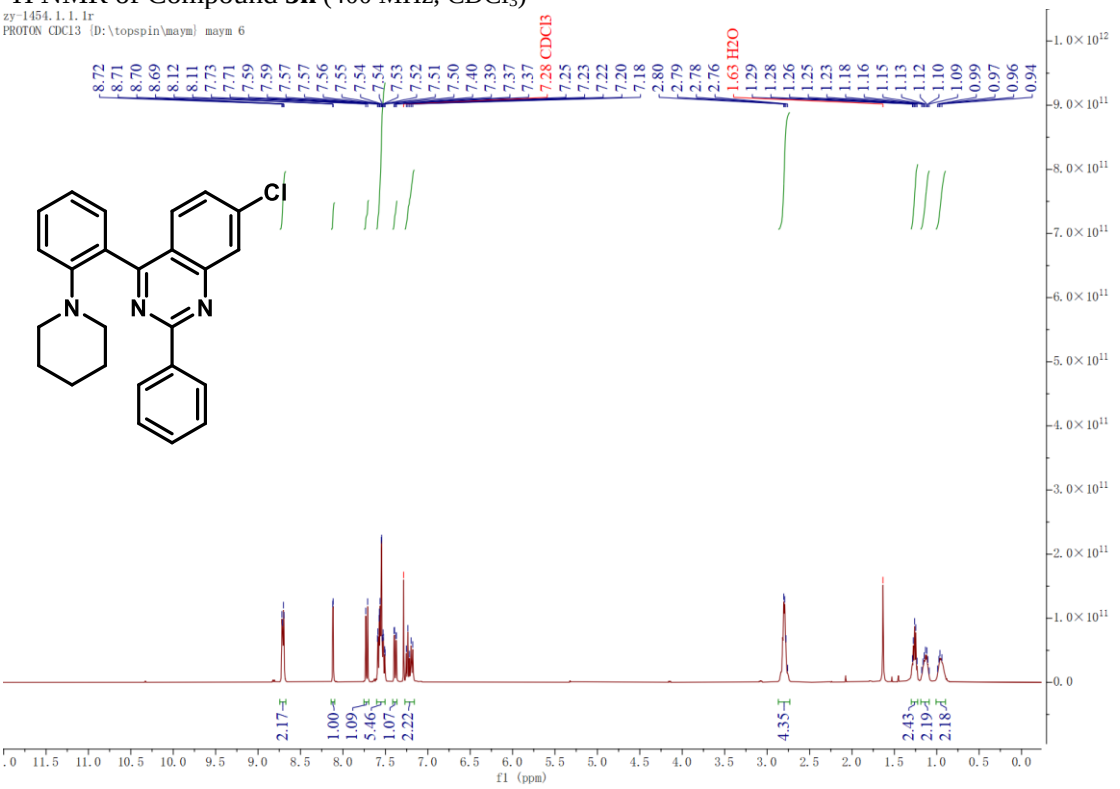
^{1}H NMR of Compound **5m** (400 MHz, $CDCl_3$)



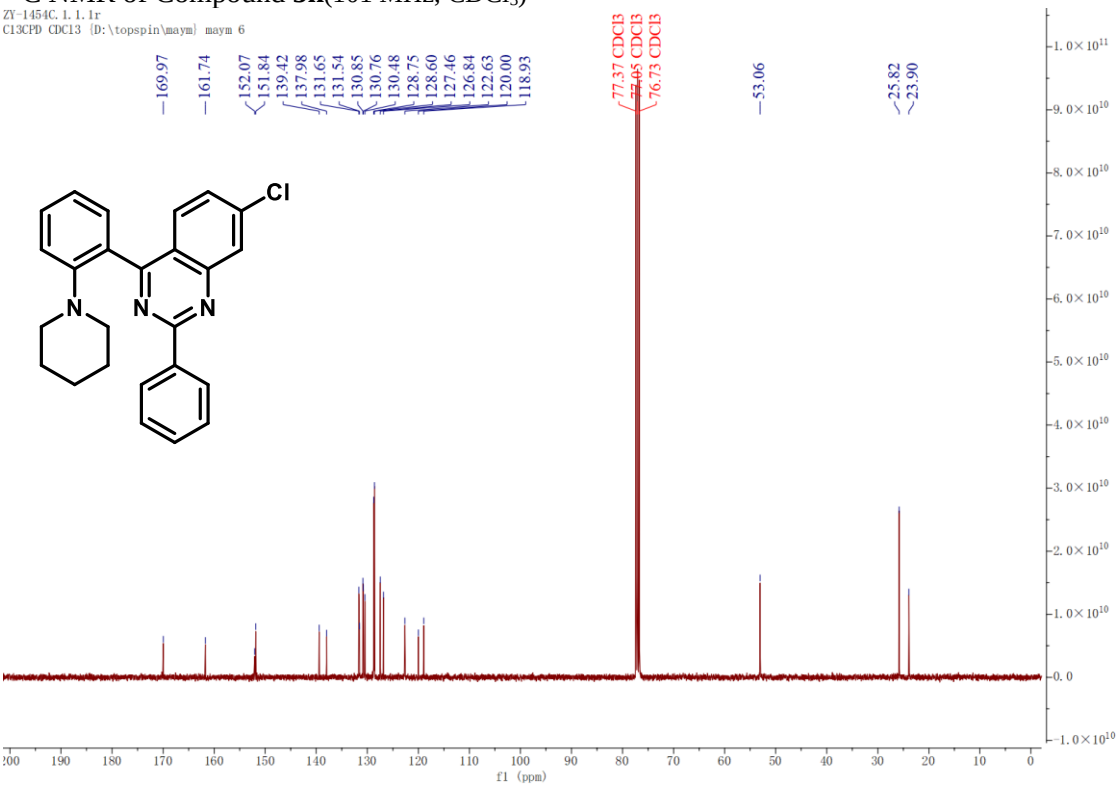
^{13}C NMR of Compound **5m** (101 MHz, $CDCl_3$)



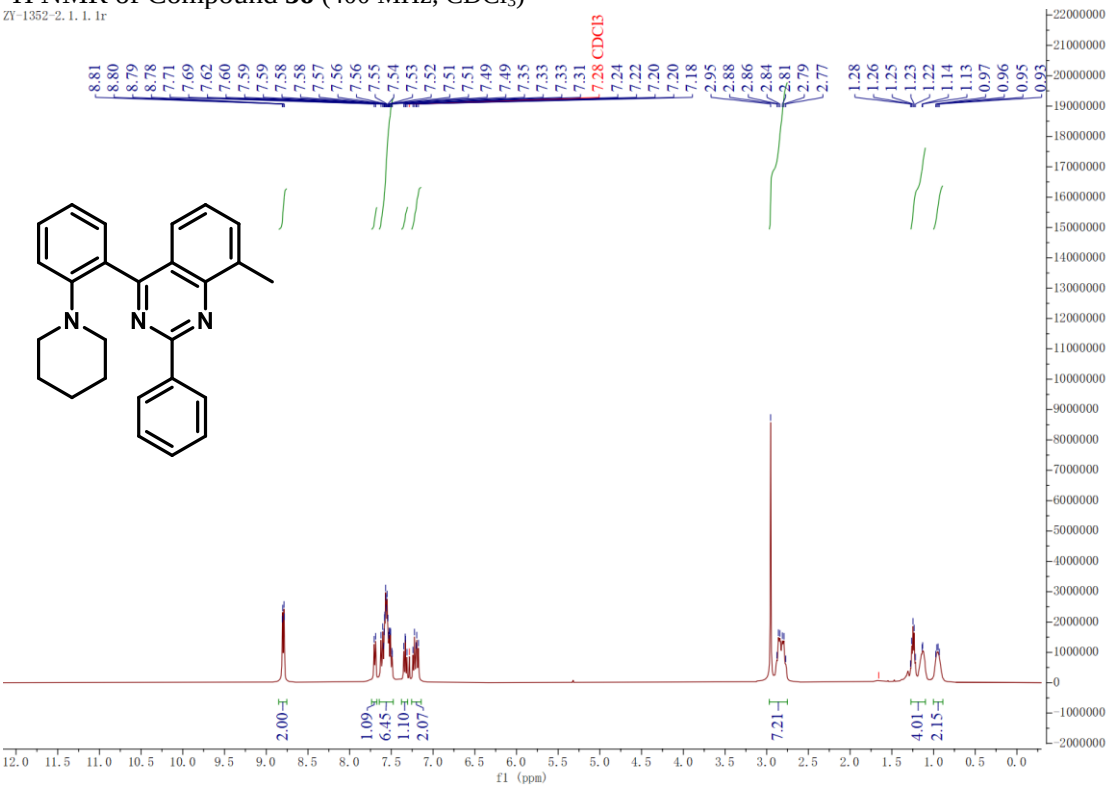
^{1}H NMR of Compound **5n** (400 MHz, $CDCl_3$)



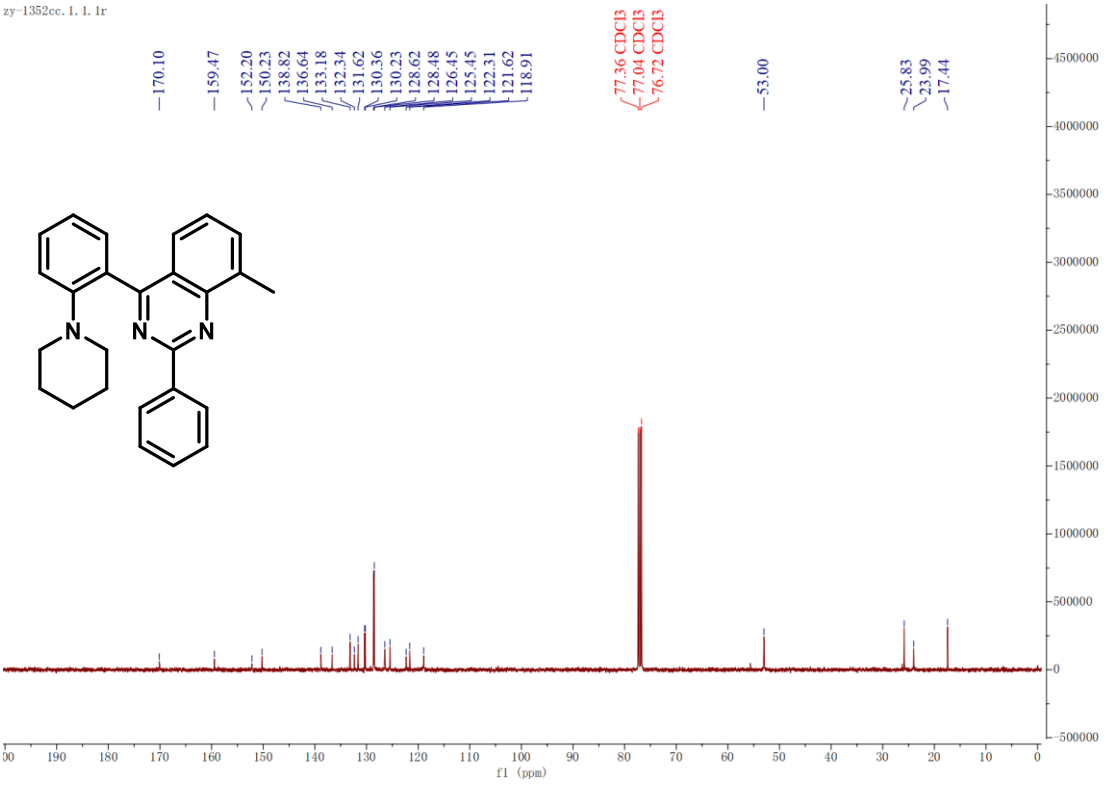
^{13}C NMR of Compound **5n**(101 MHz, $CDCl_3$)



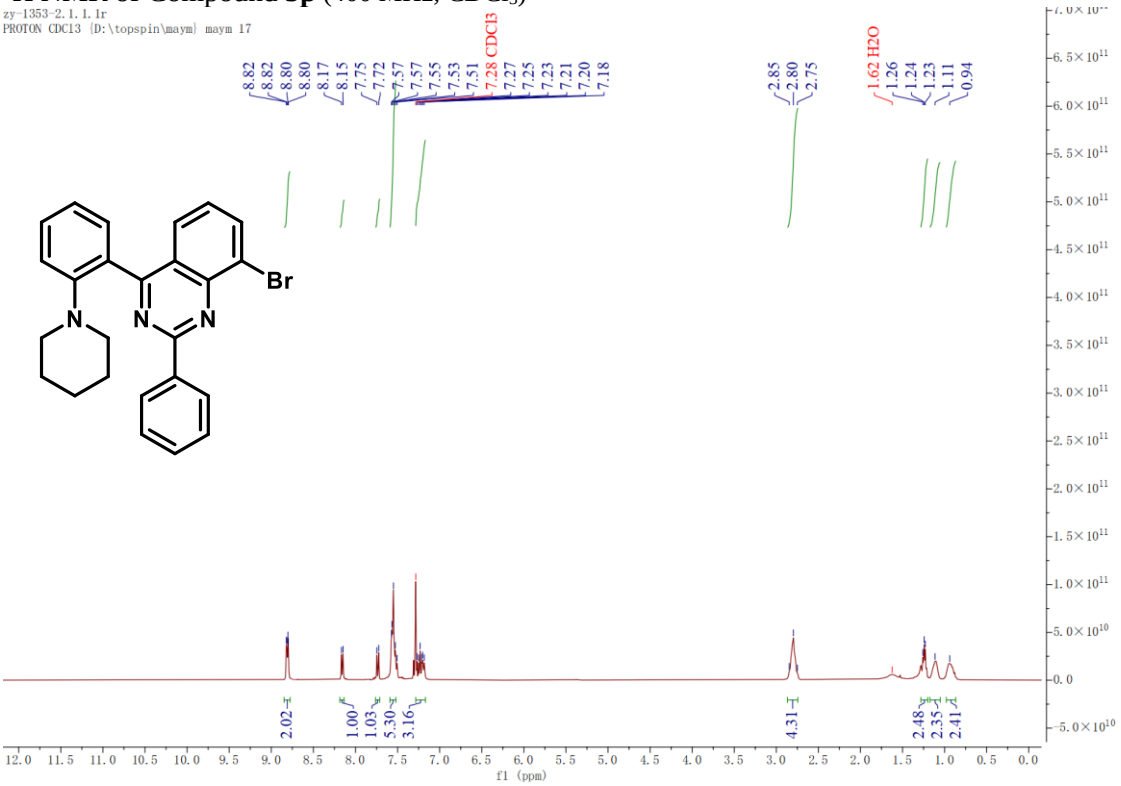
^{1}H NMR of Compound **5o** (400 MHz, $CDCl_3$)



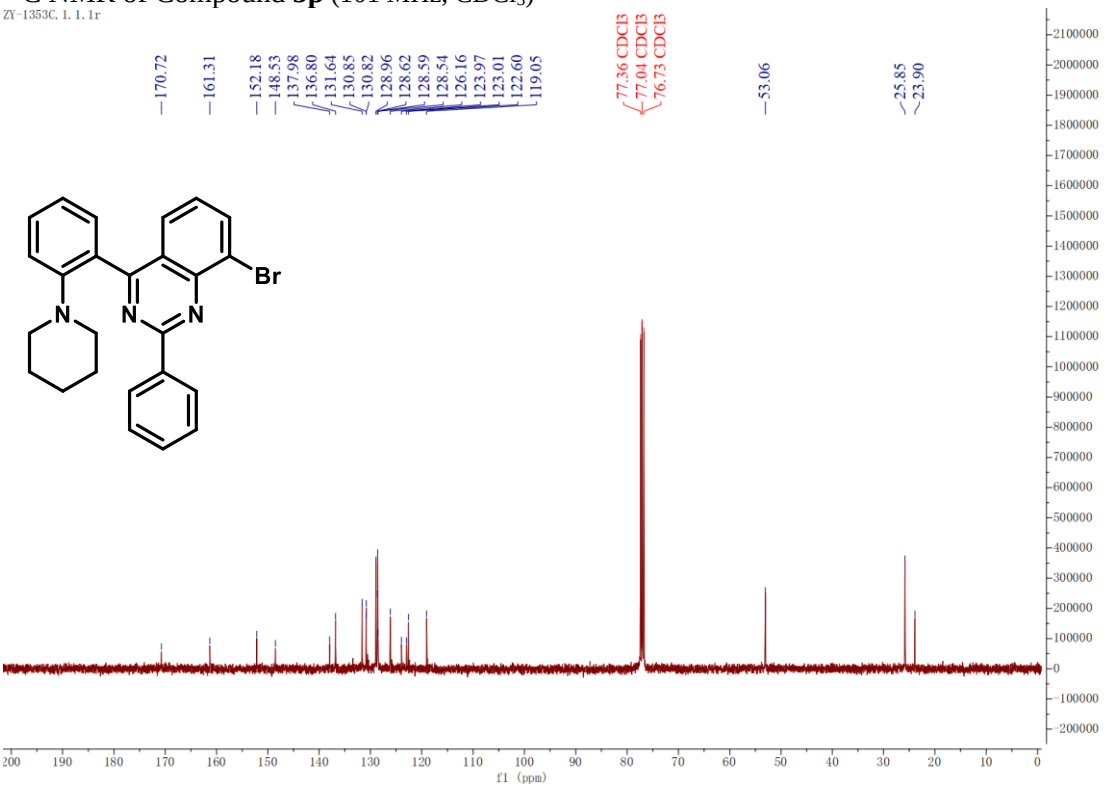
^{13}C NMR of Compound **5o** (101 MHz, $CDCl_3$)



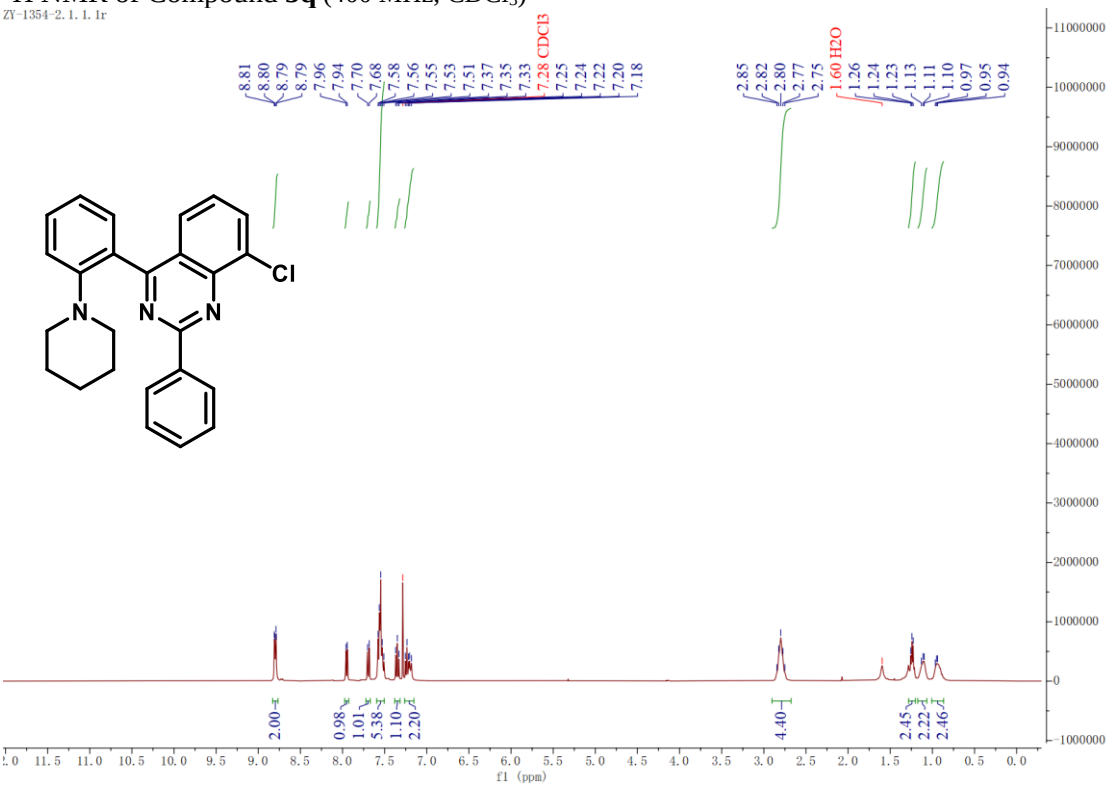
^{1}H NMR of Compound **5p** (400 MHz, $CDCl_3$)



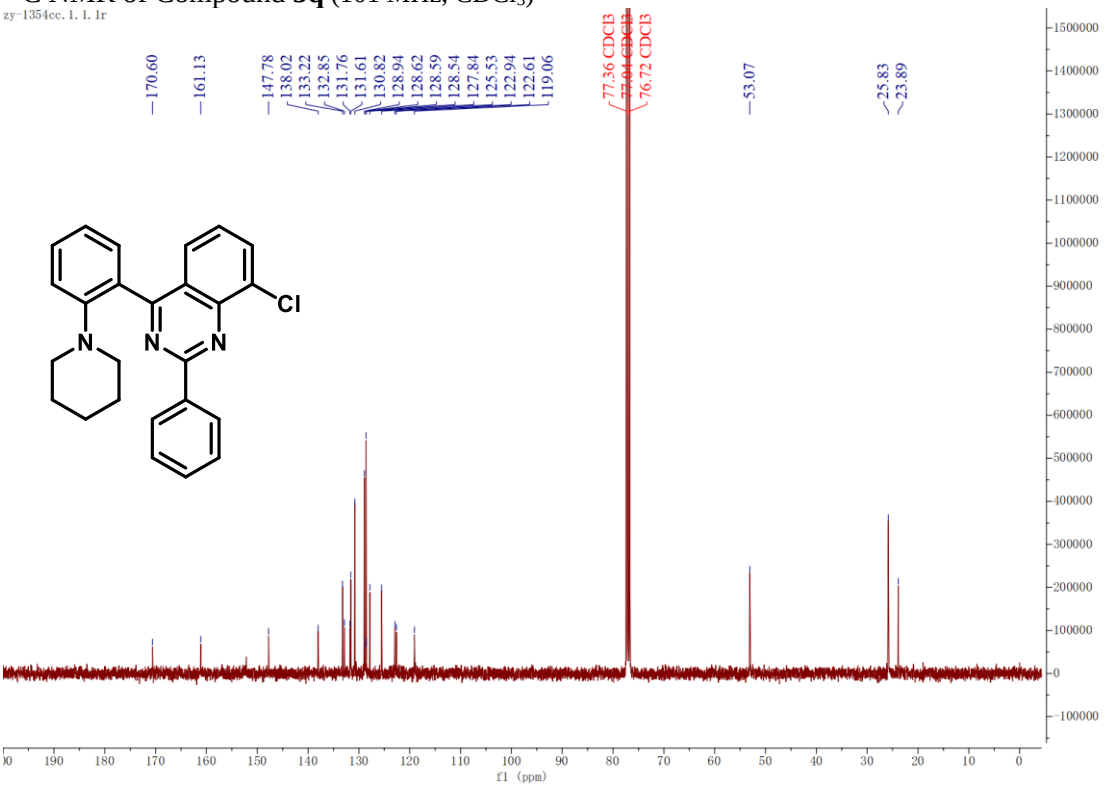
^{13}C NMR of Compound **5p** (101 MHz, $CDCl_3$)



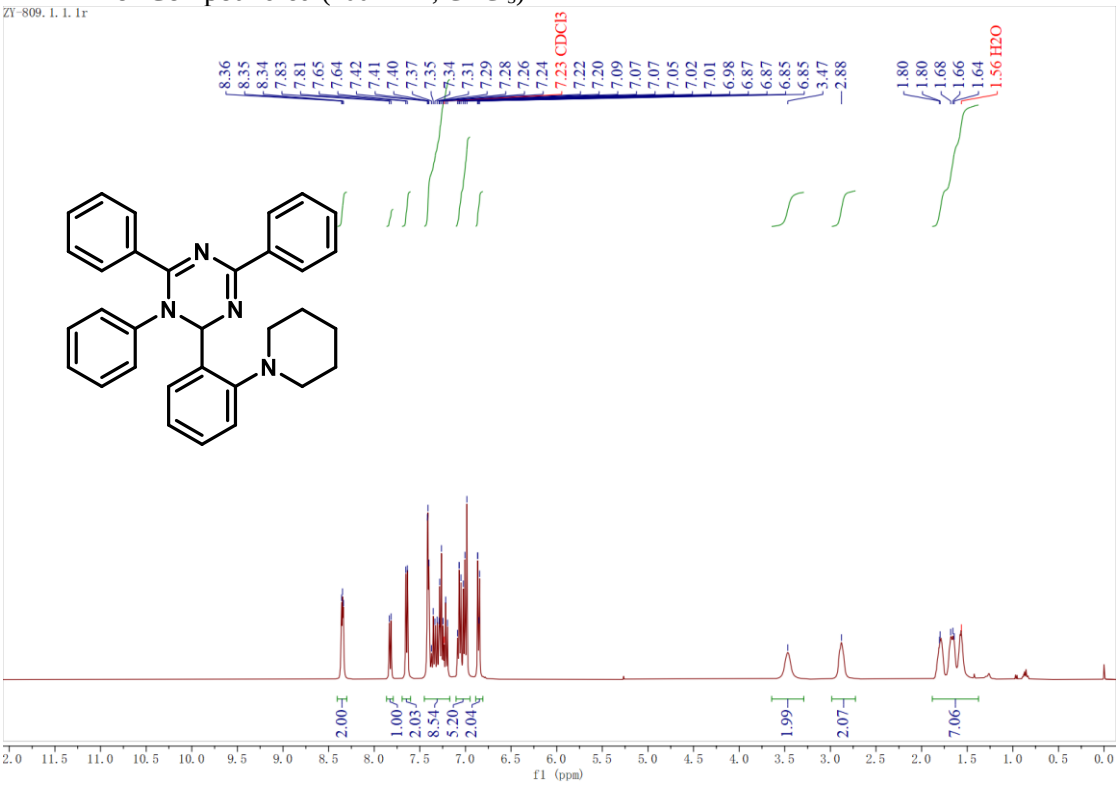
^{1}H NMR of Compound **5q** (400 MHz, $CDCl_3$)



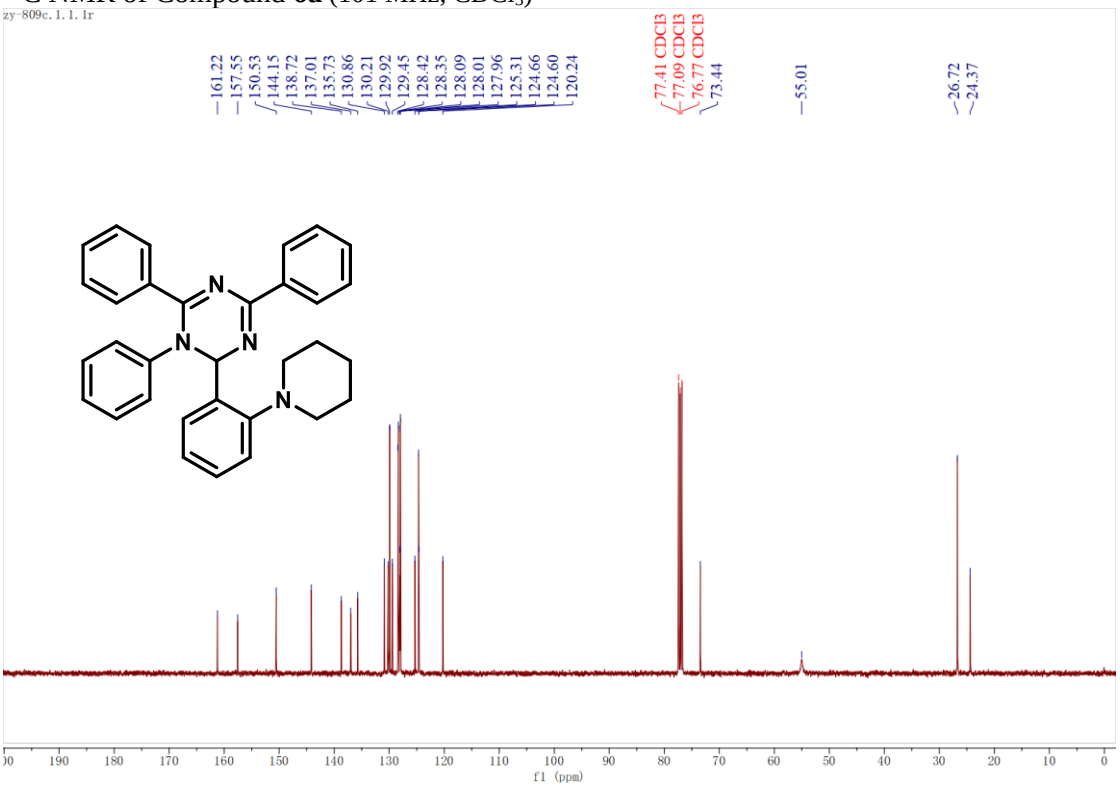
^{13}C NMR of Compound **5q** (101 MHz, $CDCl_3$)



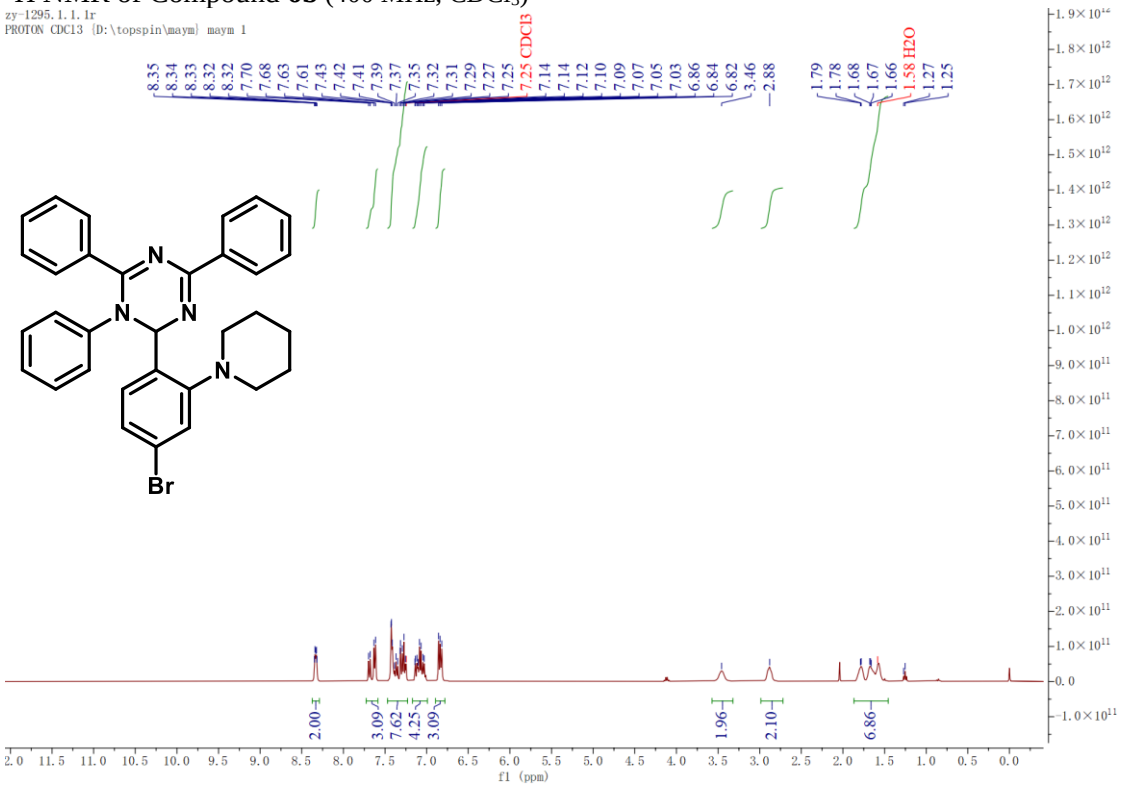
^{1}H NMR of Compound **6a** (400 MHz, $CDCl_3$)



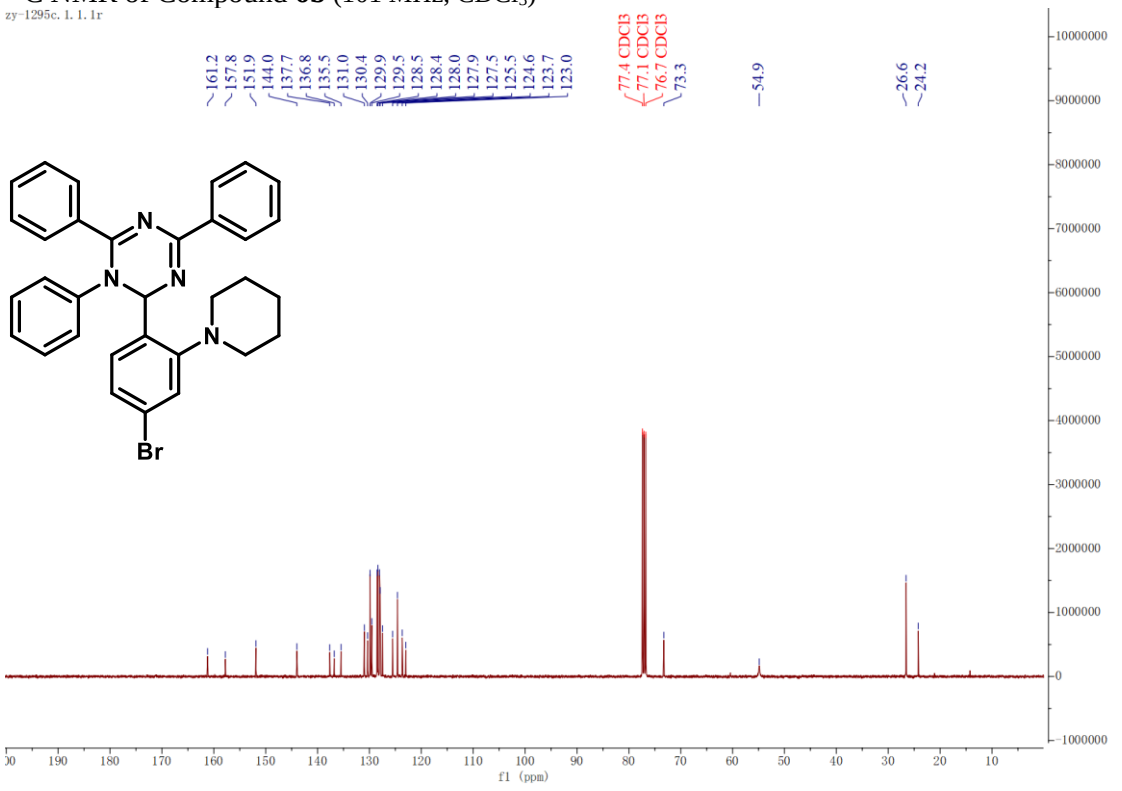
^{13}C NMR of Compound **6a** (101 MHz, $CDCl_3$)



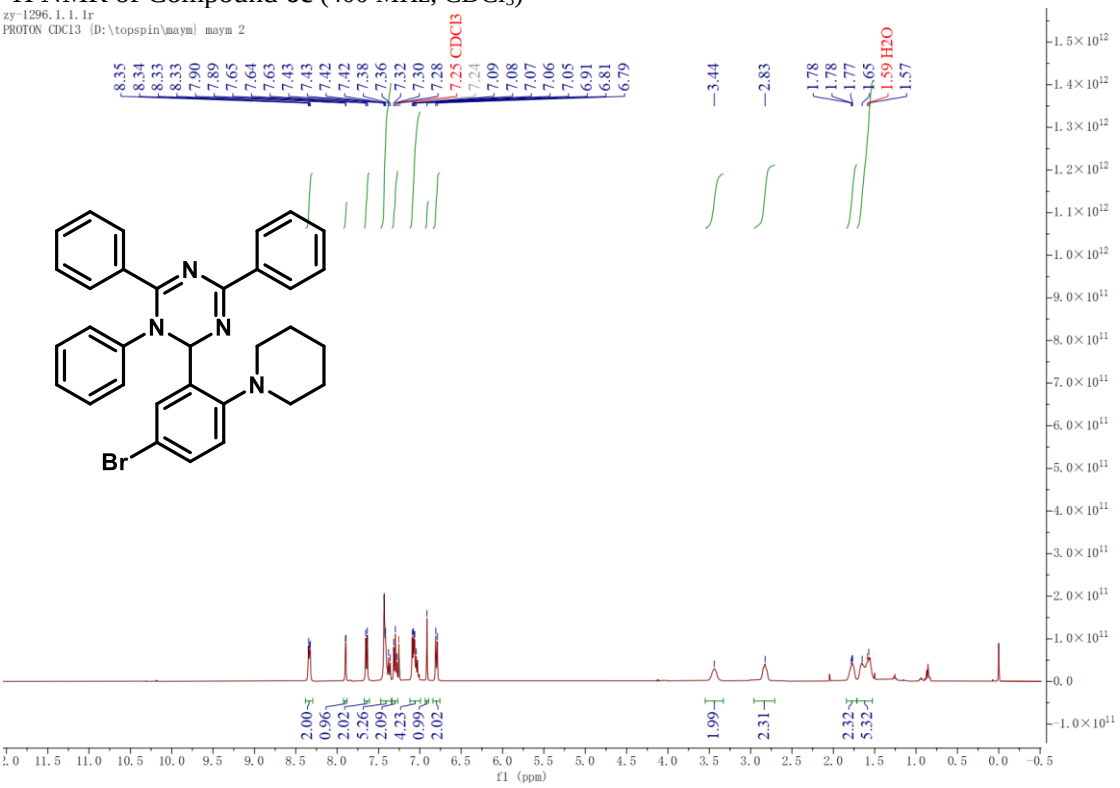
^{1}H NMR of Compound **6b** (400 MHz, $CDCl_3$)



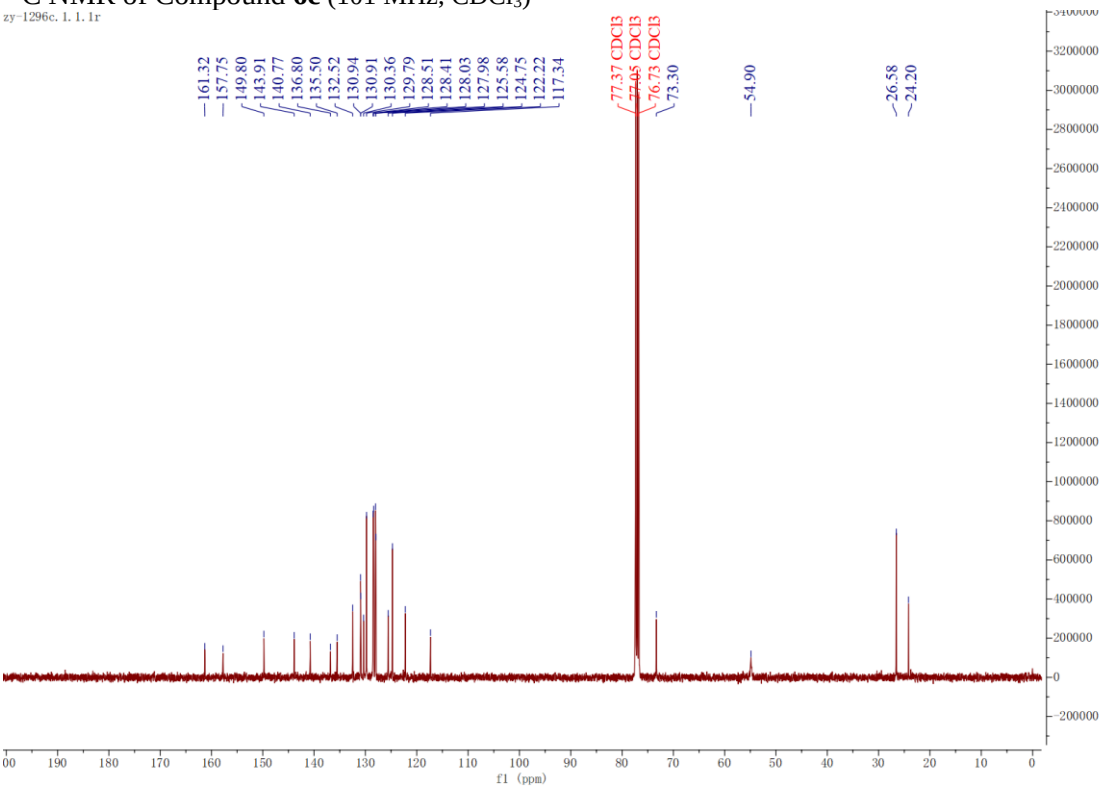
^{13}C NMR of Compound **6b** (101 MHz, $CDCl_3$)



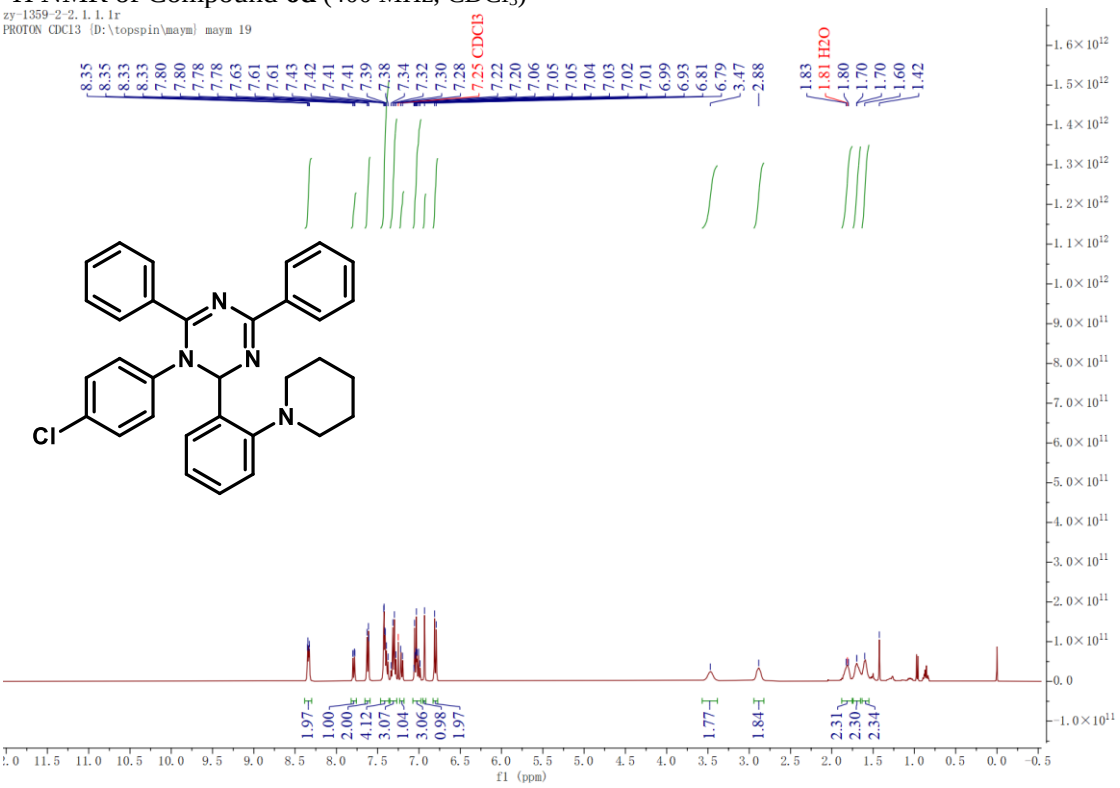
^{1}H NMR of Compound **6c** (400 MHz, $CDCl_3$)



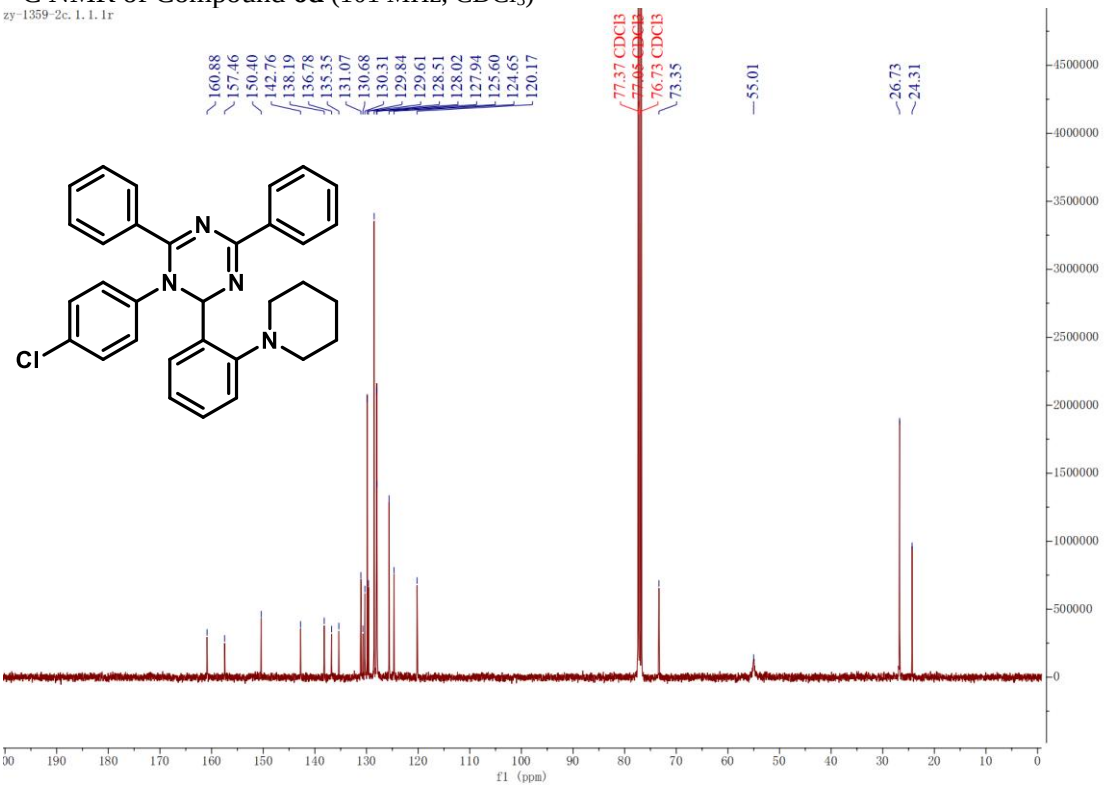
^{13}C NMR of Compound **6c** (101 MHz, $CDCl_3$)



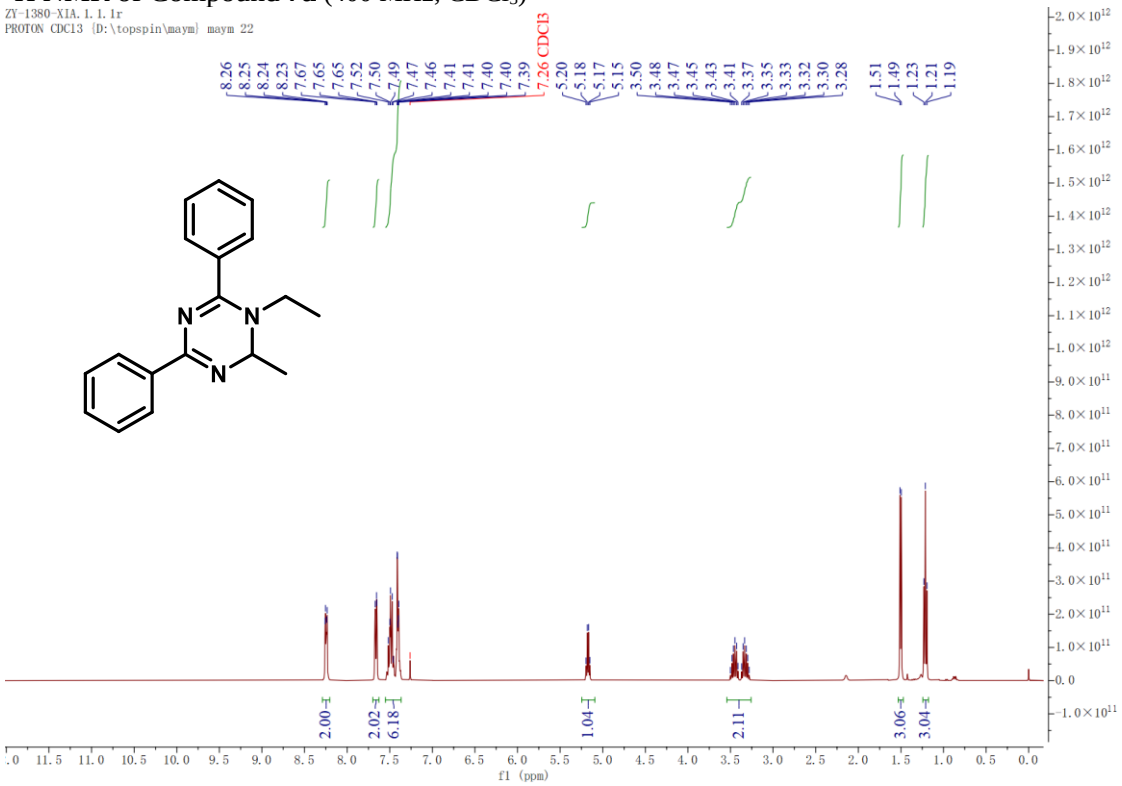
^{1}H NMR of Compound **6d** (400 MHz, $CDCl_3$)



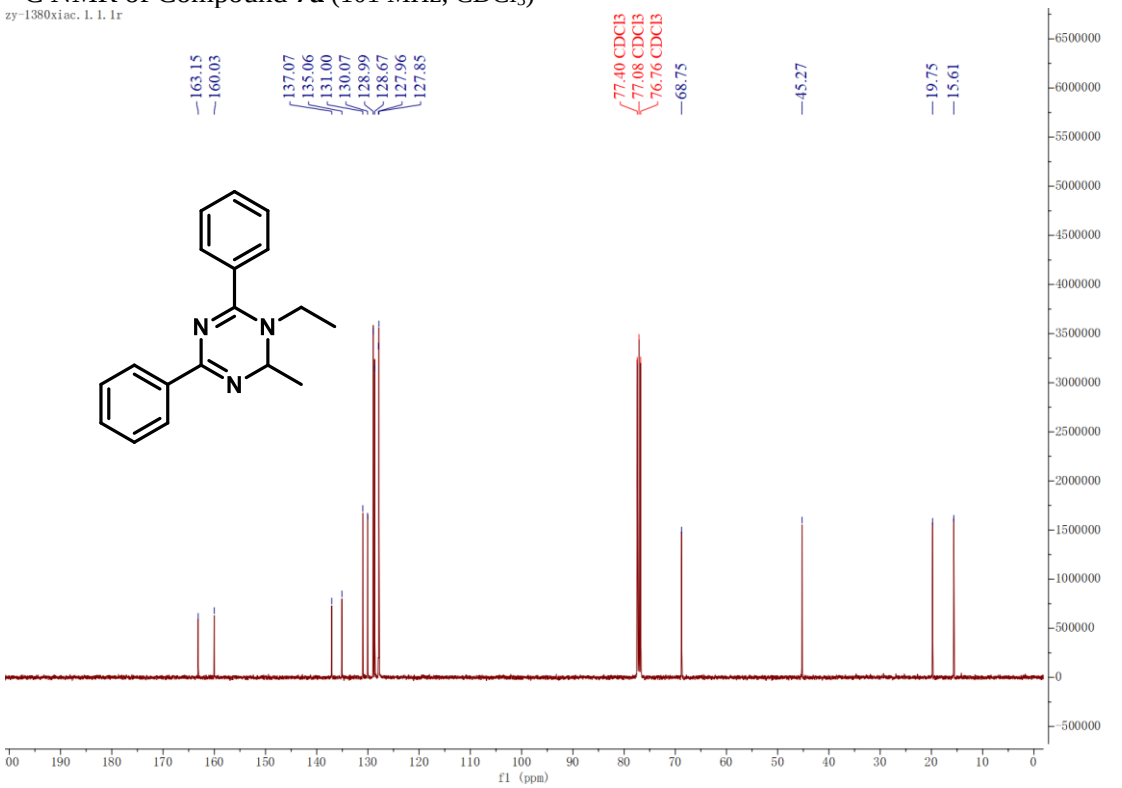
^{13}C NMR of Compound **6d** (101 MHz, $CDCl_3$)



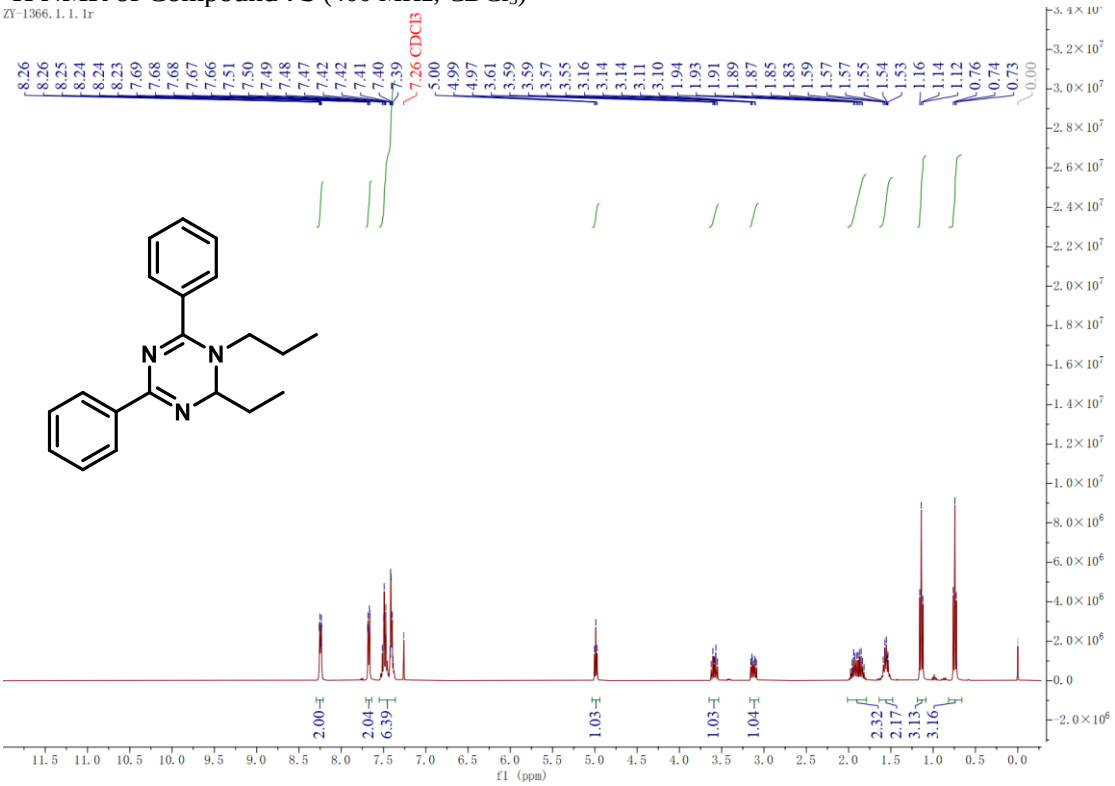
^{1}H NMR of Compound **7a** (400 MHz, $CDCl_3$)



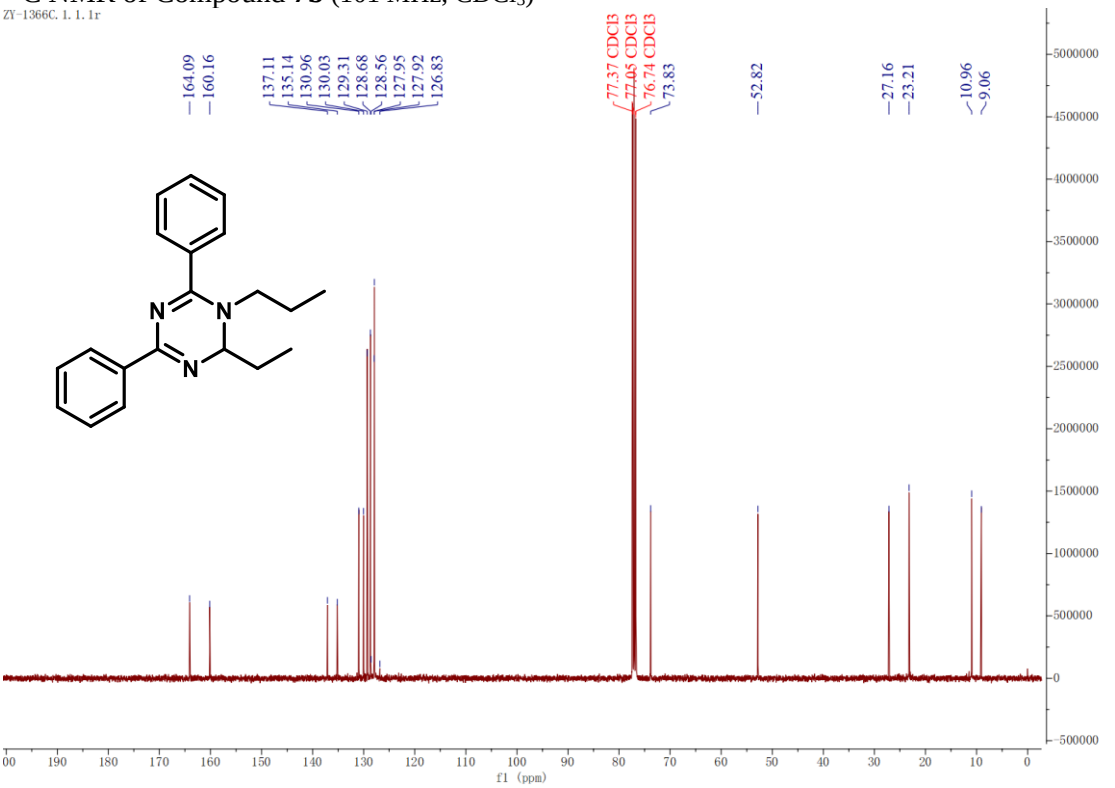
^{13}C NMR of Compound **7a** (101 MHz, $CDCl_3$)



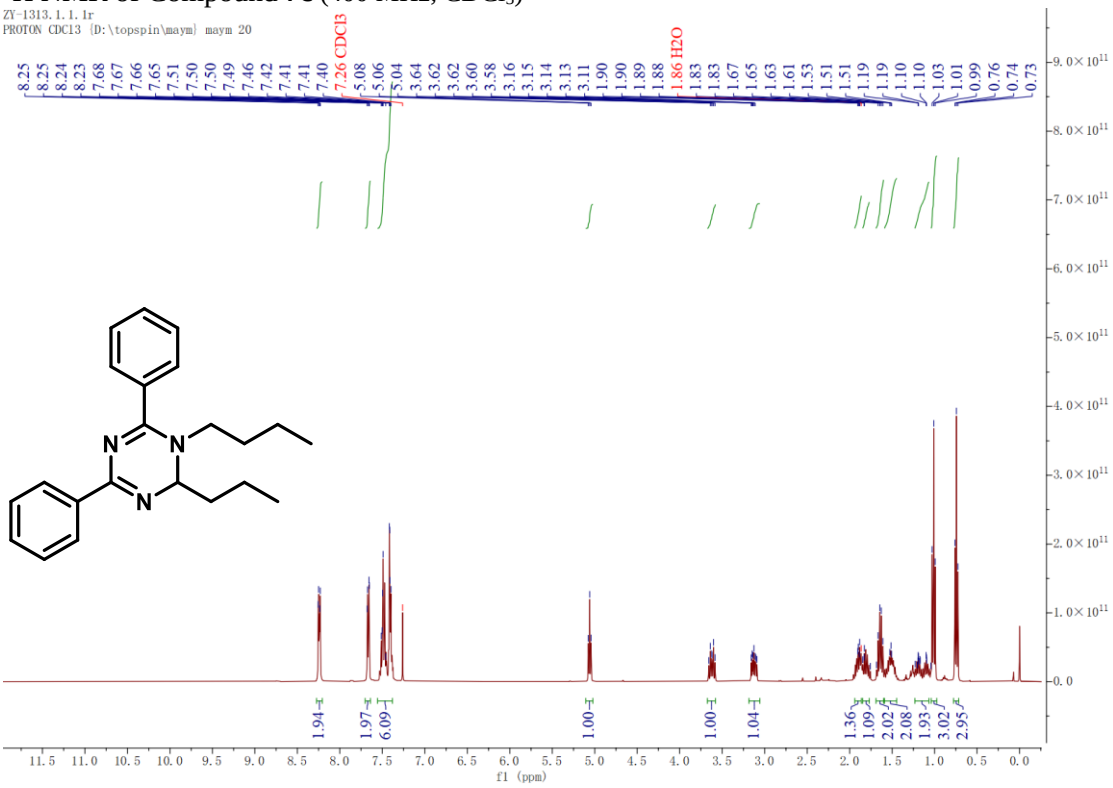
^{1}H NMR of Compound **7b** (400 MHz, $CDCl_3$)



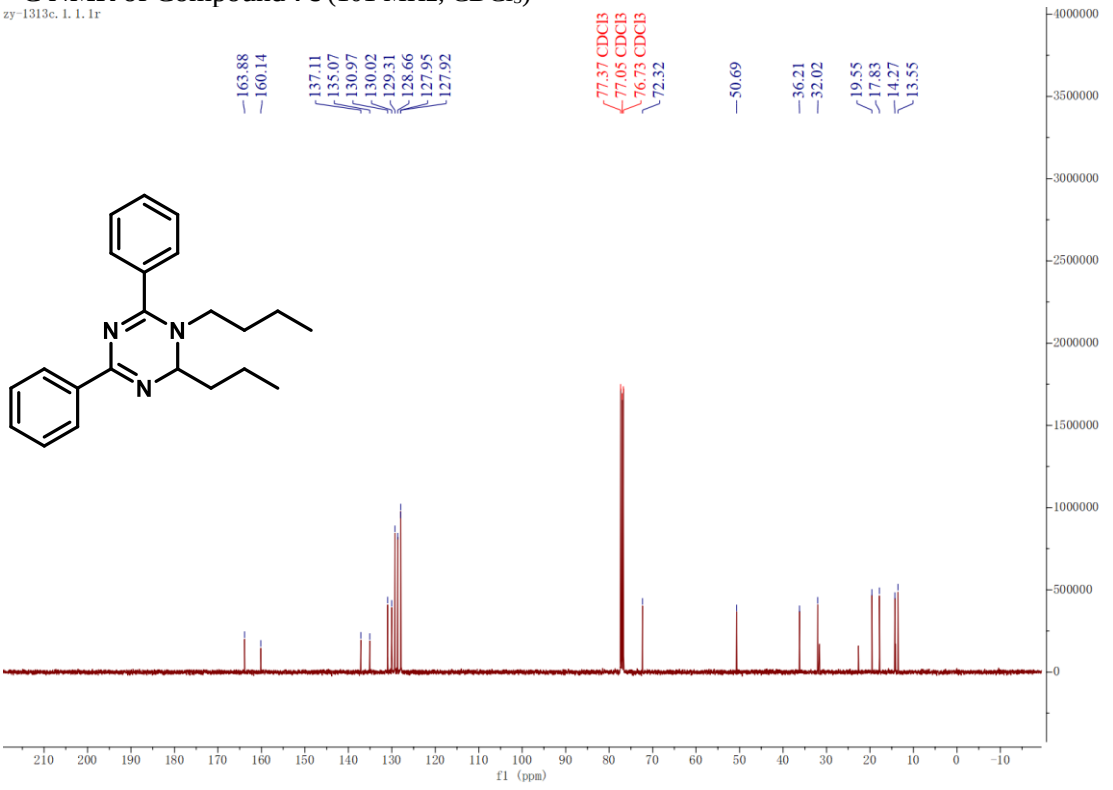
^{13}C NMR of Compound **7b** (101 MHz, $CDCl_3$)



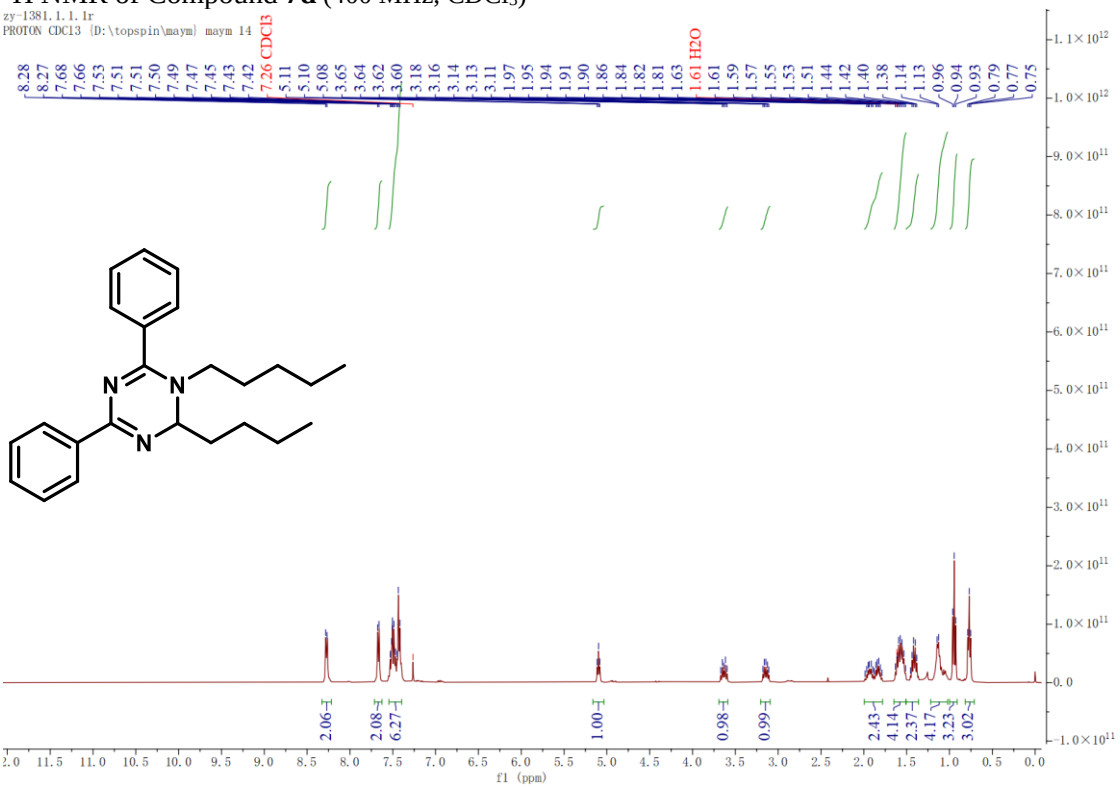
^{1}H NMR of Compound **7c** (400 MHz, $CDCl_3$)



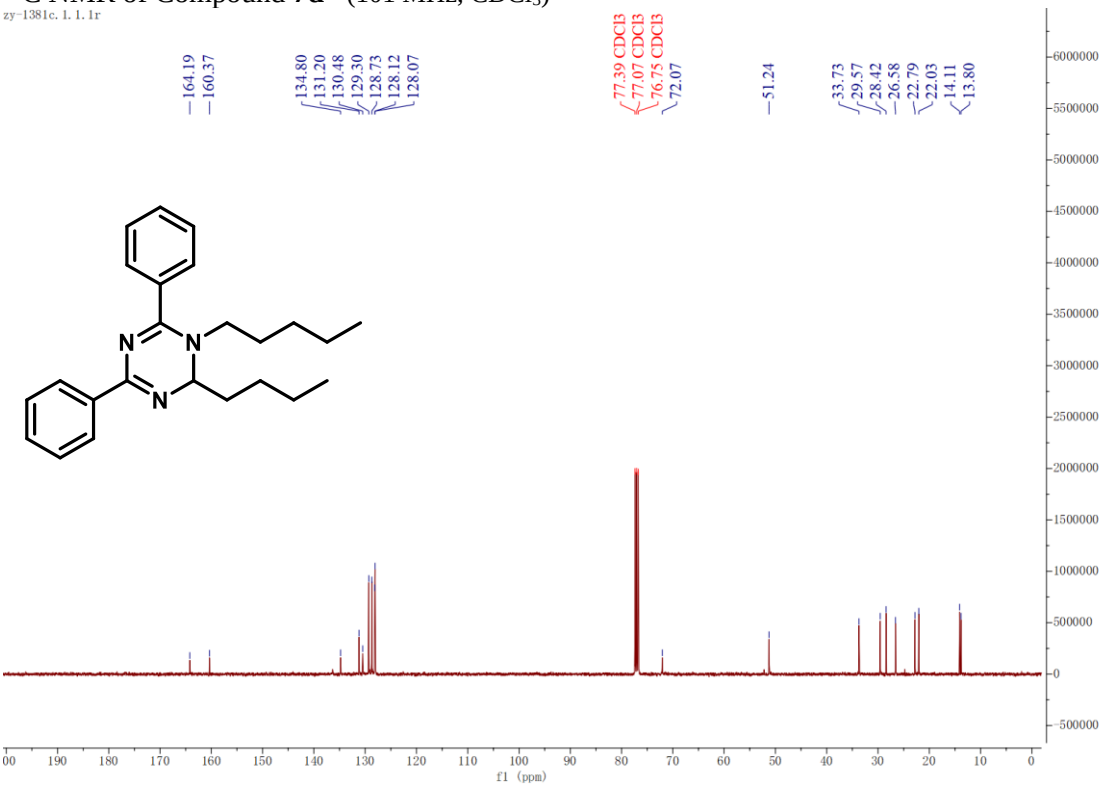
^{13}C NMR of Compound **7c** (101 MHz, $CDCl_3$)



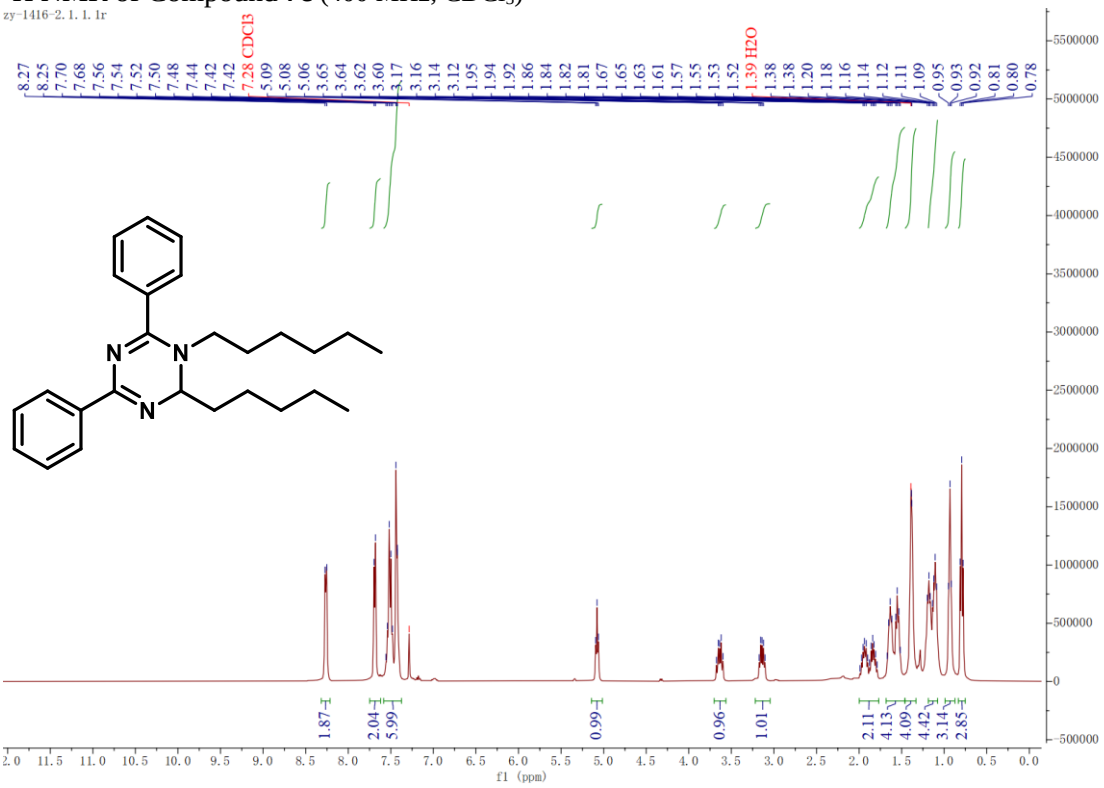
^{1}H NMR of Compound **7d** (400 MHz, $CDCl_3$)



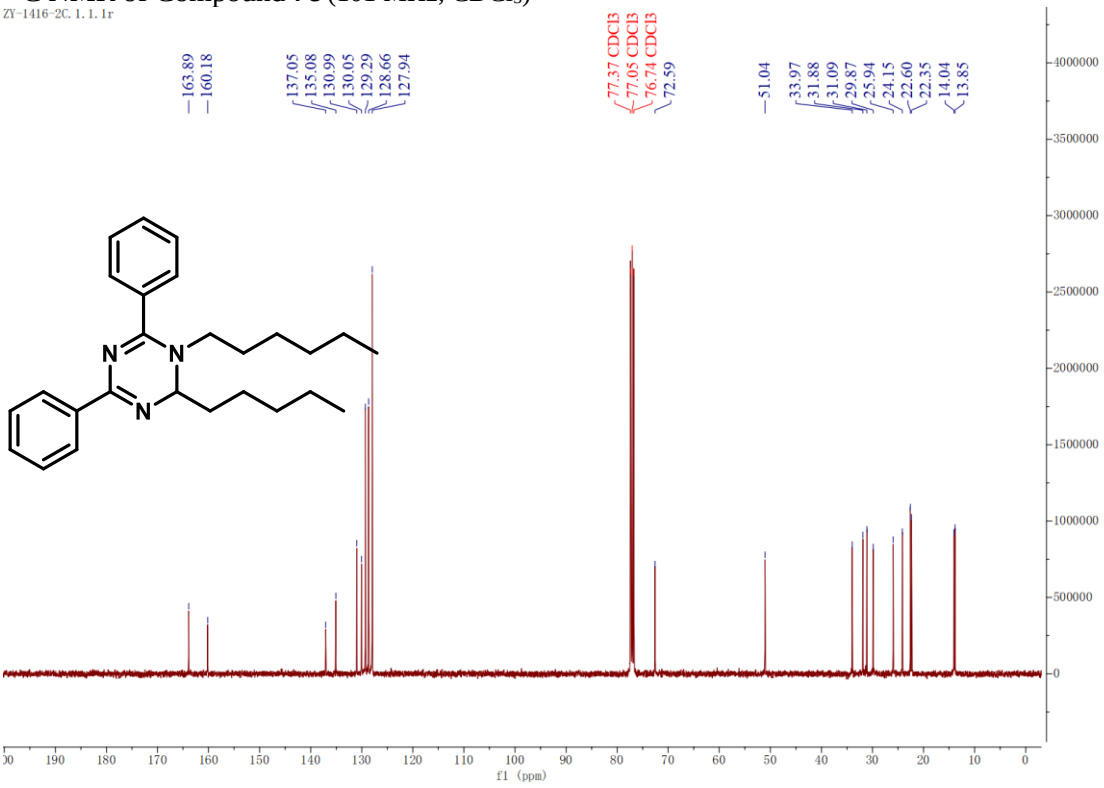
^{13}C NMR of Compound **7d** (101 MHz, $CDCl_3$)



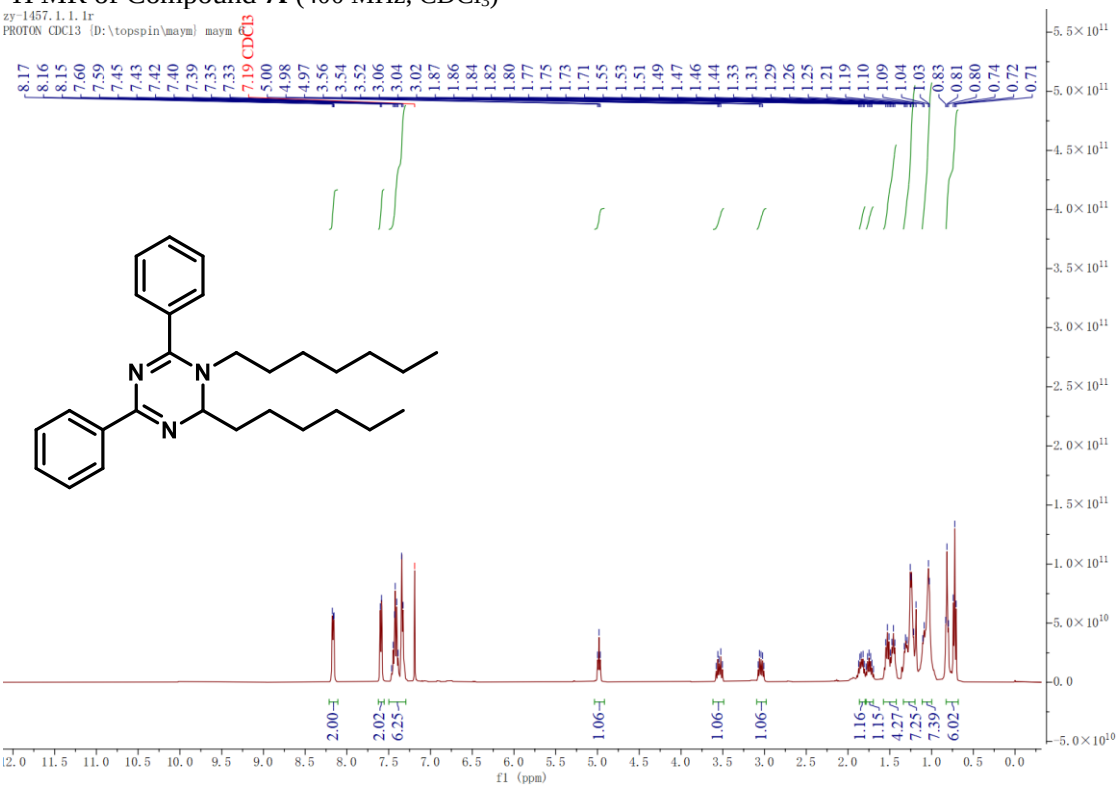
^{1}H NMR of Compound **7e** (400 MHz, $CDCl_3$)



^{13}C NMR of Compound **7e** (101 MHz, $CDCl_3$)

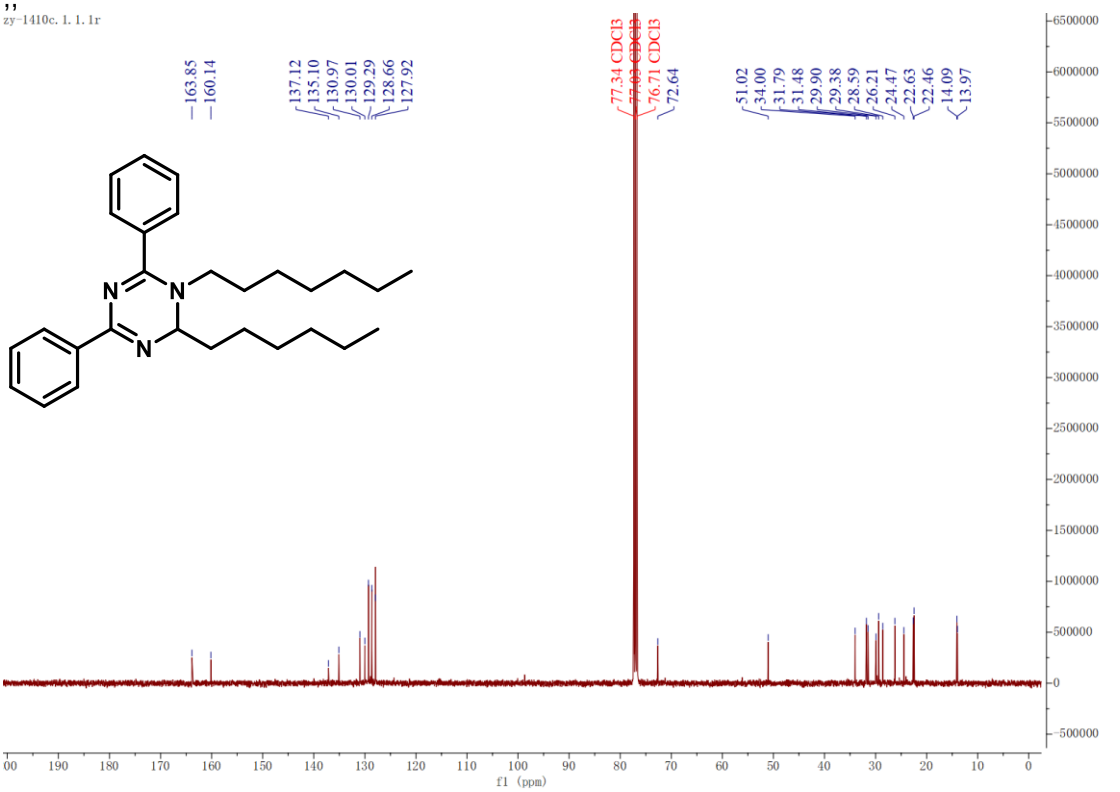


^{1}H MR of Compound **7f** (400 MHz, $CDCl_3$)

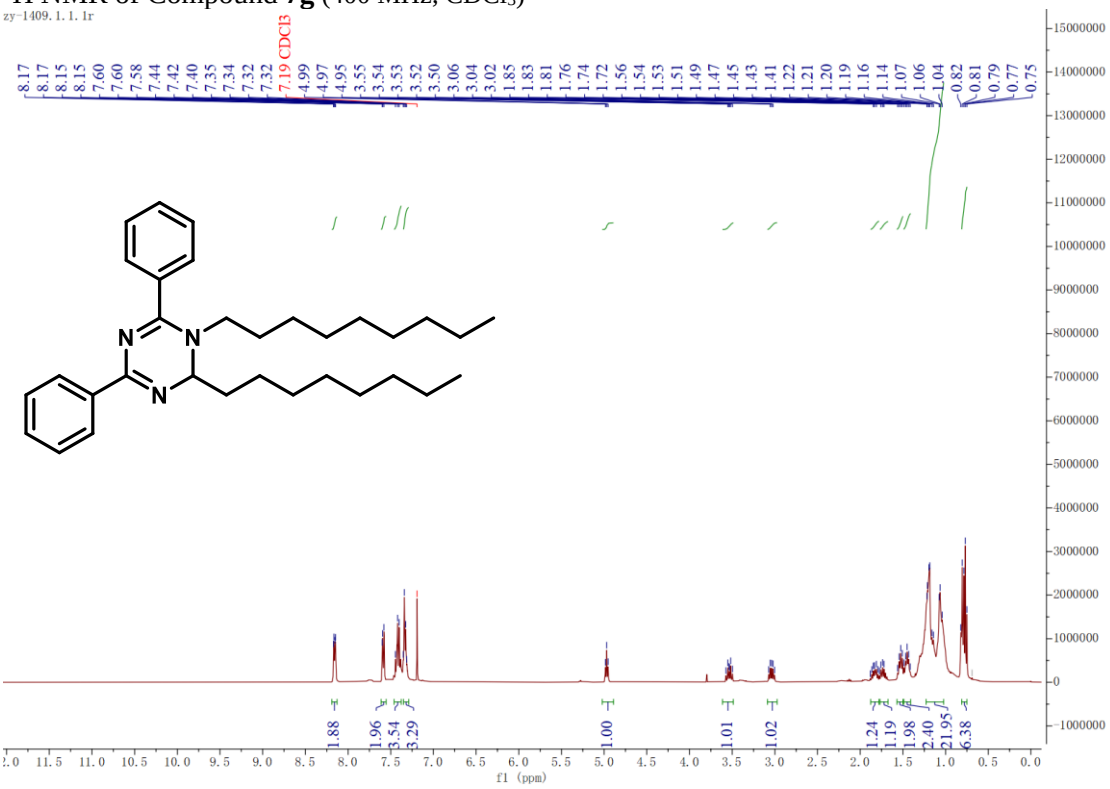


^{13}C NMR of Compound **7f** (101 MHz, $CDCl_3$)

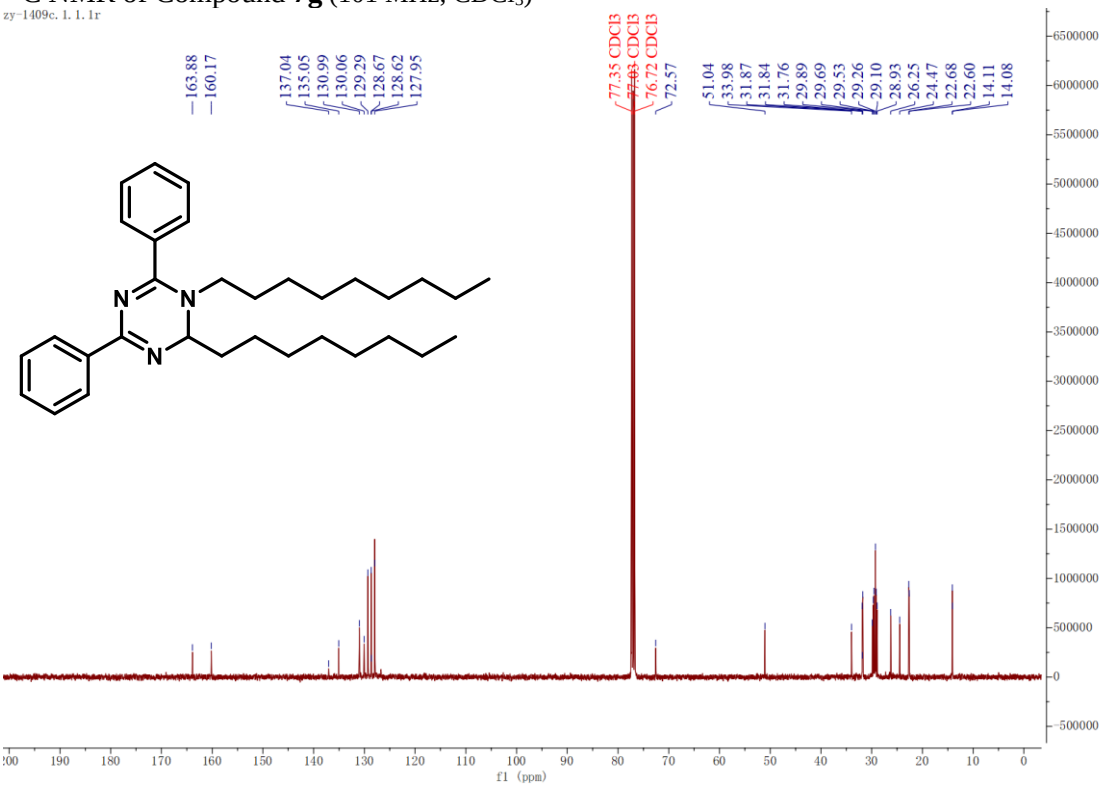
,,



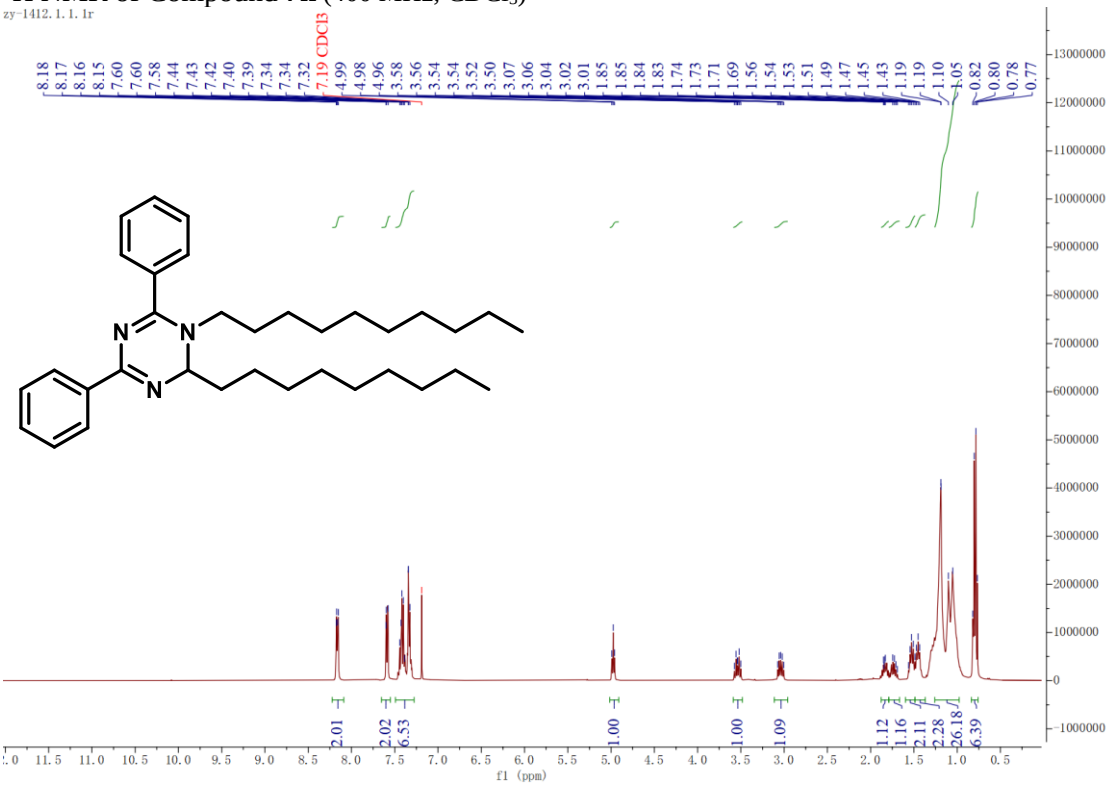
^{1}H NMR of Compound **7g** (400 MHz, $CDCl_3$)



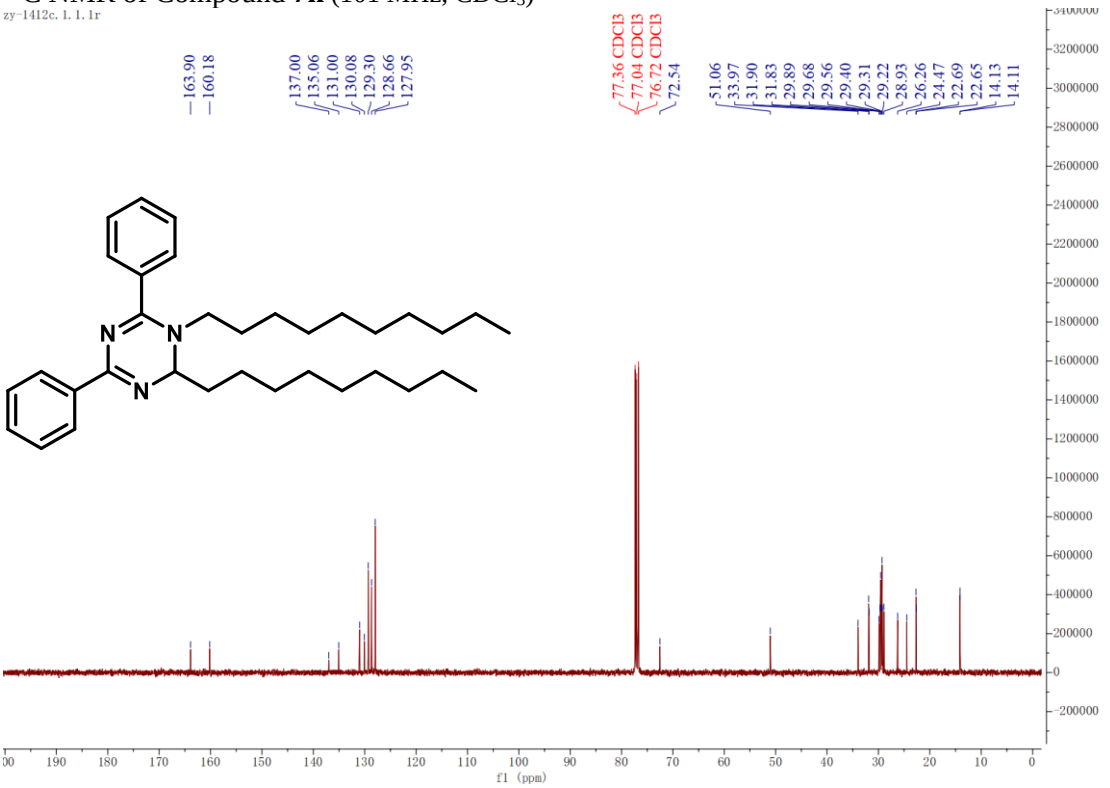
^{13}C NMR of Compound **7g** (101 MHz, $CDCl_3$)



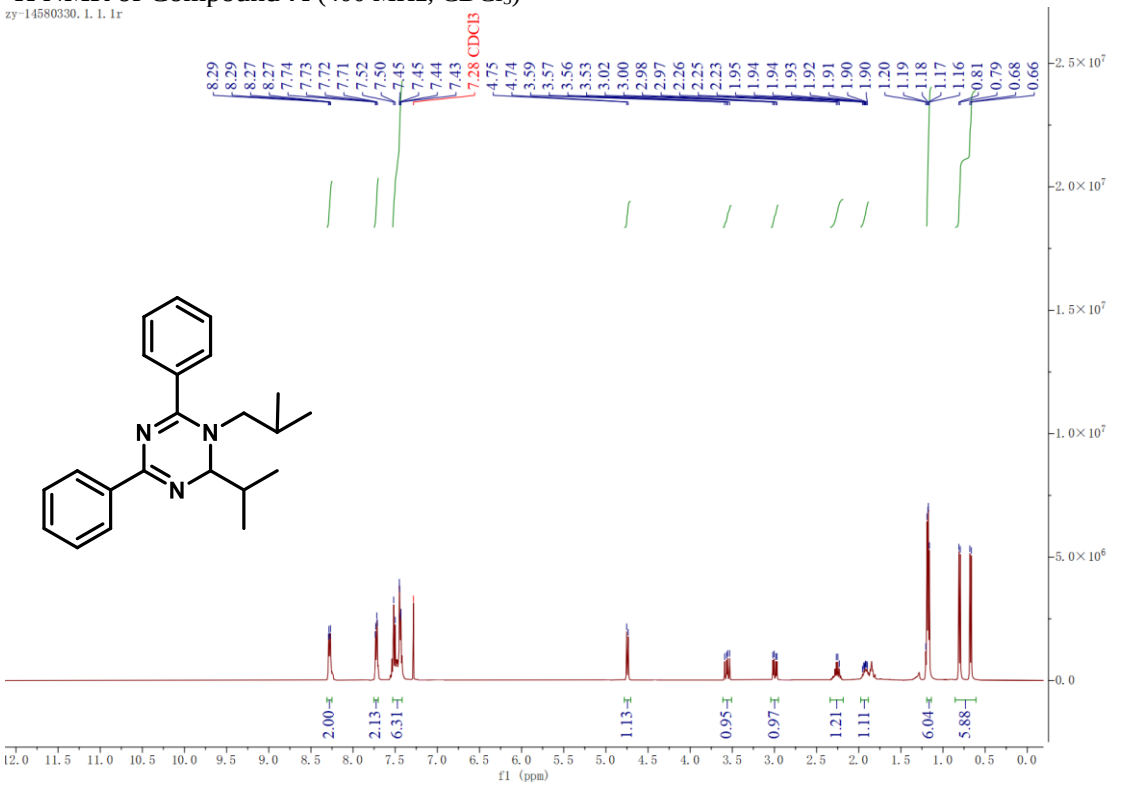
^{1}H NMR of Compound **7h** (400 MHz, $CDCl_3$)



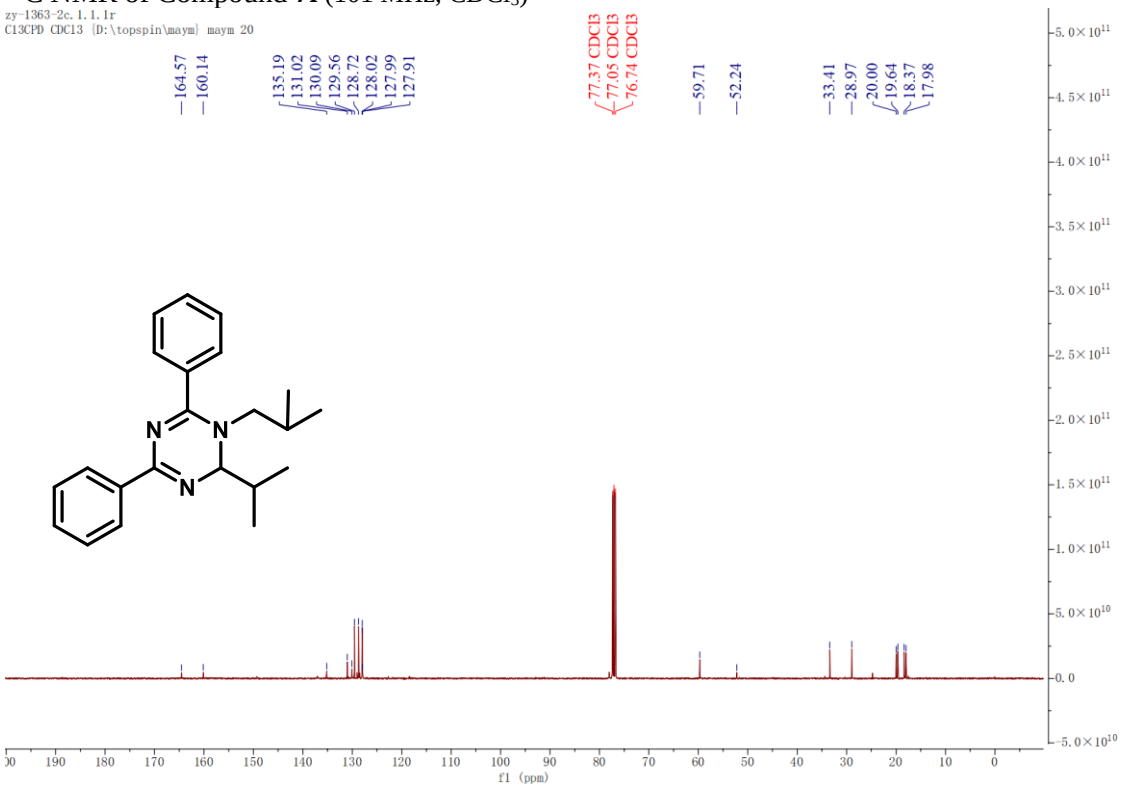
^{13}C NMR of Compound **7h** (101 MHz, $CDCl_3$)



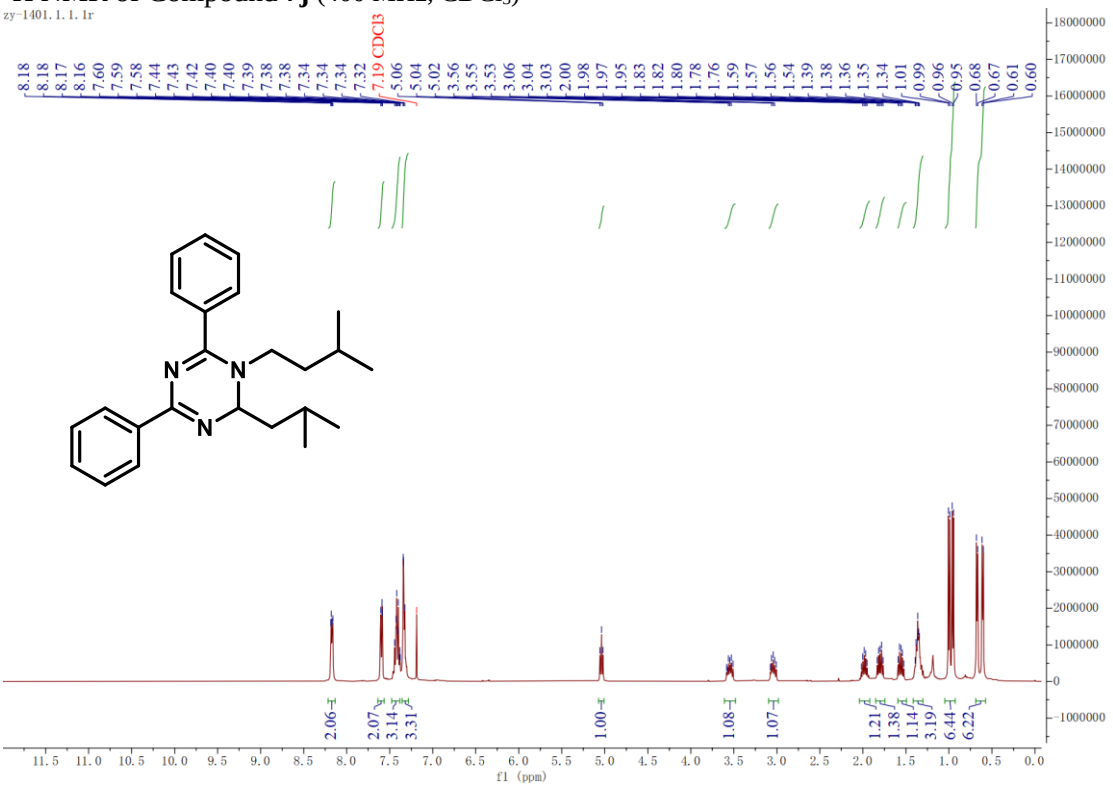
^{1}H NMR of Compound **7i** (400 MHz, $CDCl_3$)



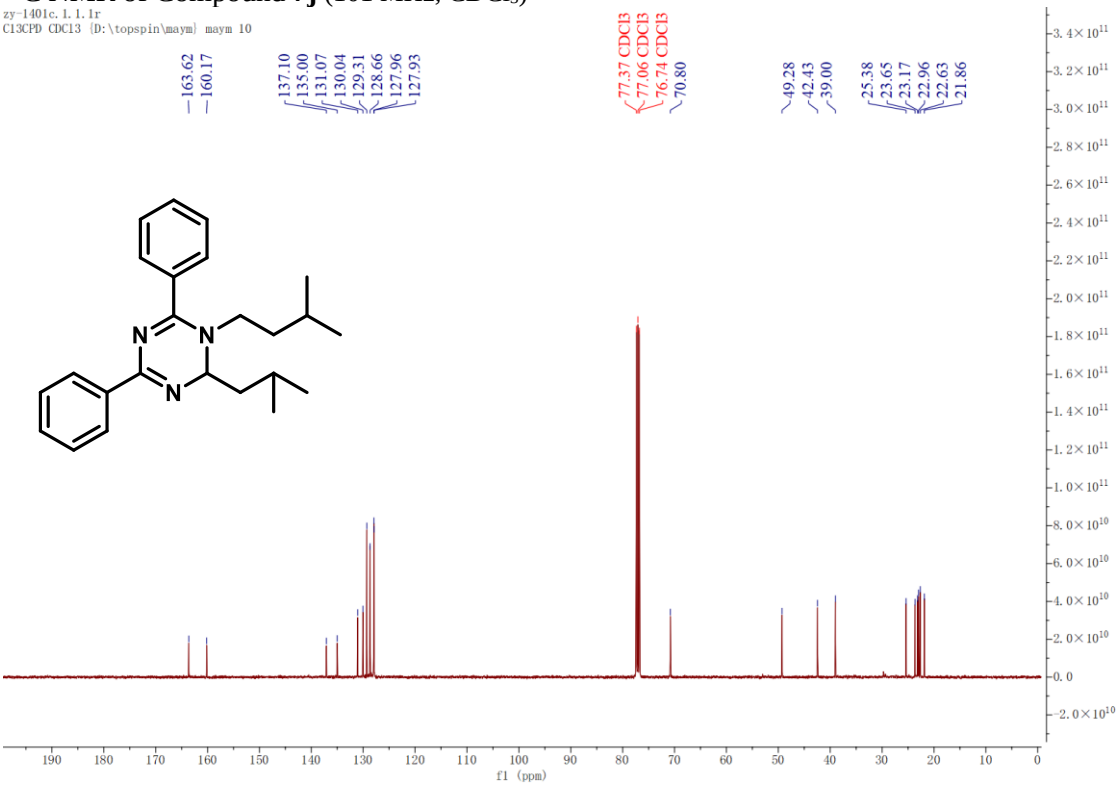
^{13}C NMR of Compound **7i** (101 MHz, $CDCl_3$)



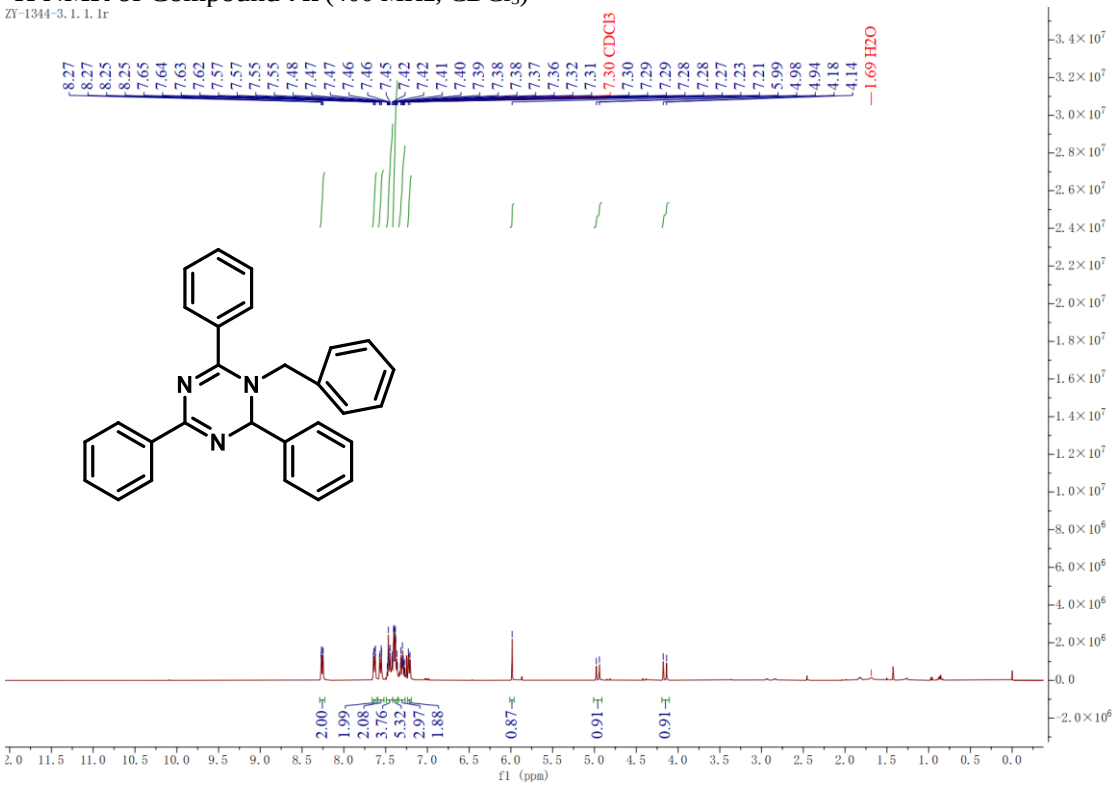
^{1}H NMR of Compound **7j** (400 MHz, $CDCl_3$)



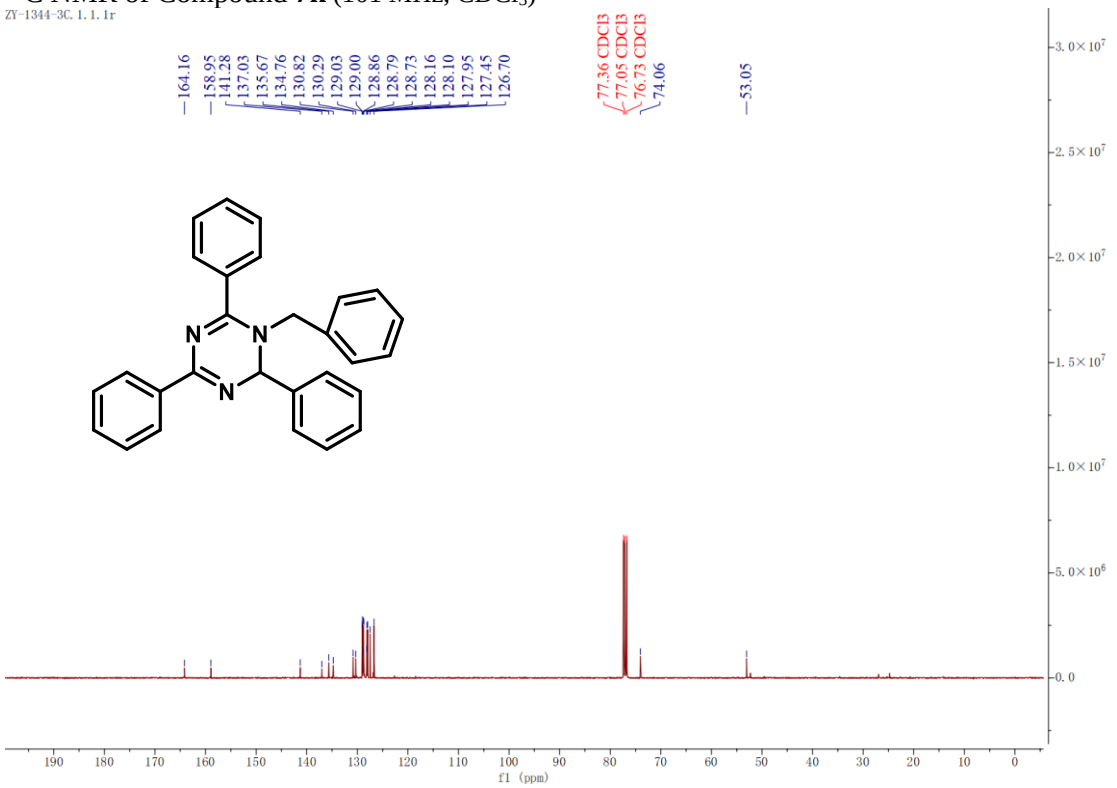
^{13}C NMR of Compound **7j** (101 MHz, $CDCl_3$)



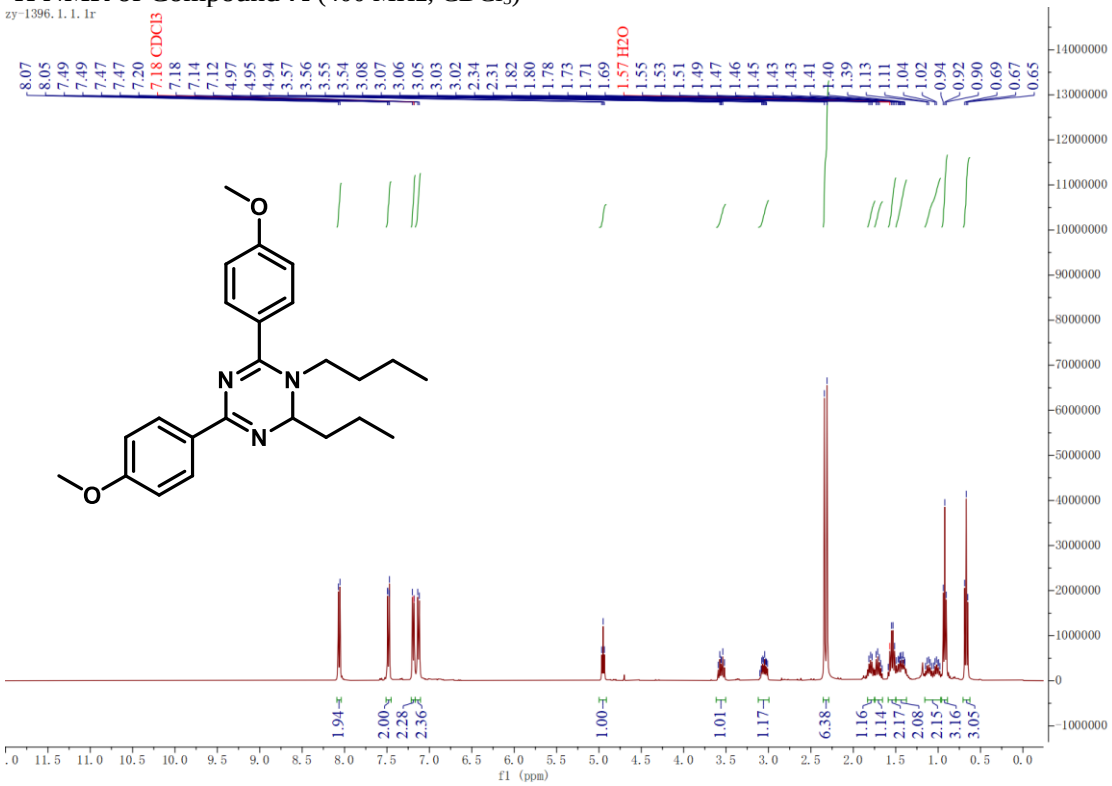
^{1}H NMR of Compound **7k** (400 MHz, $CDCl_3$)



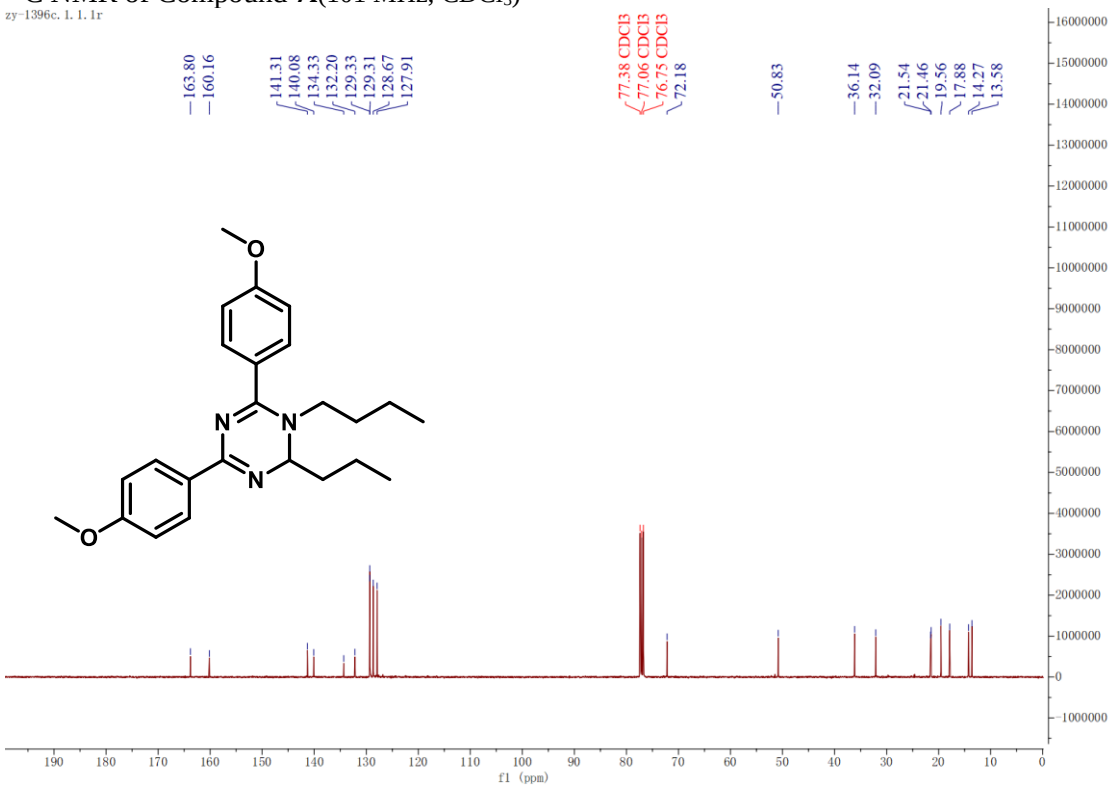
^{13}C NMR of Compound **7k** (101 MHz, $CDCl_3$)



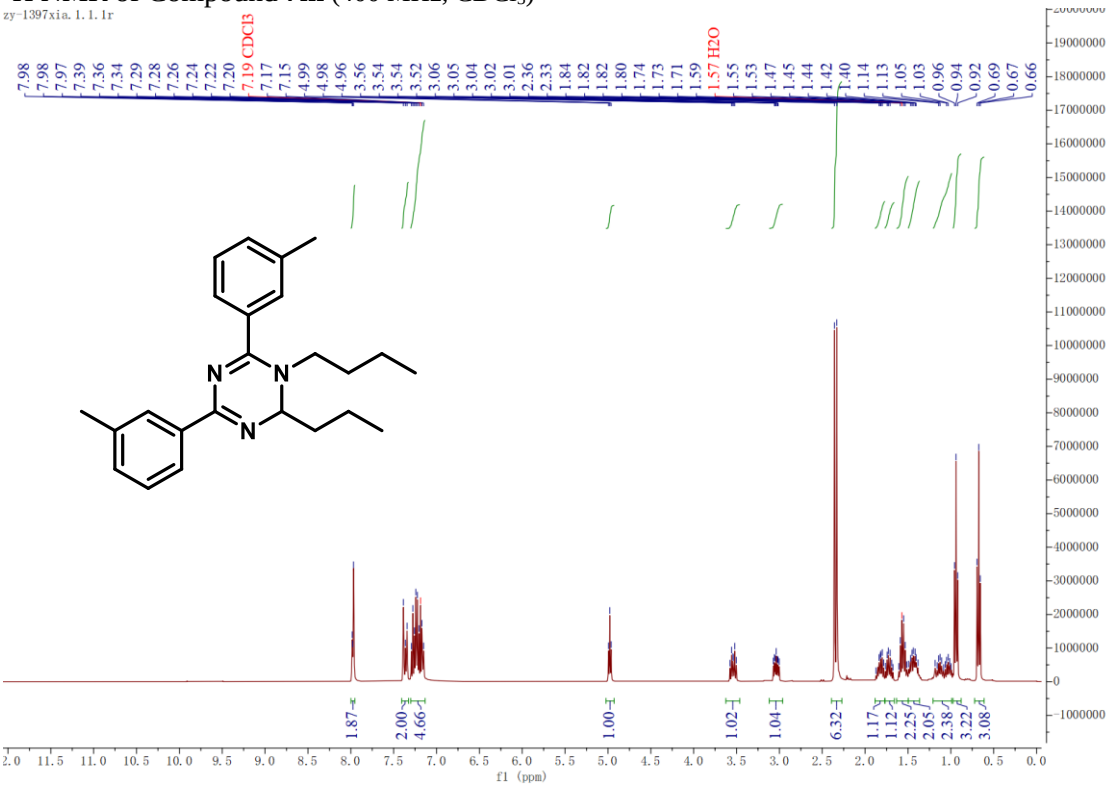
^{1}H NMR of Compound **7l** (400 MHz, $CDCl_3$)



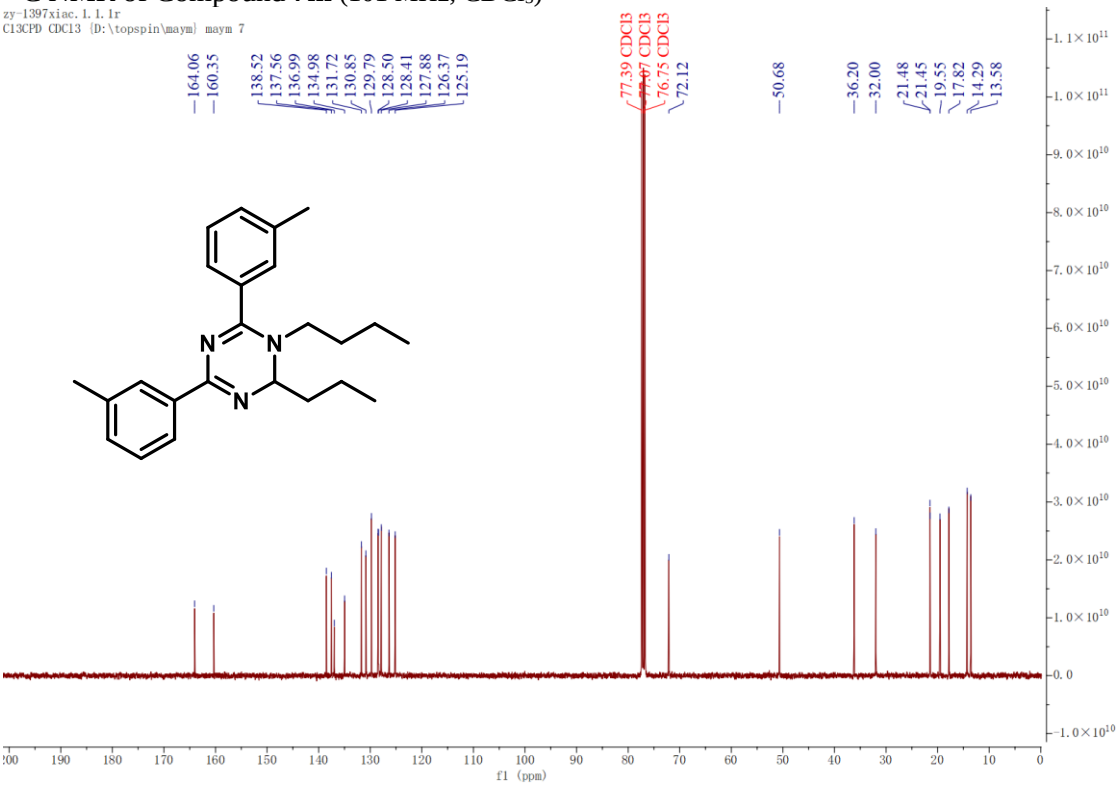
^{13}C NMR of Compound **7l**(101 MHz, $CDCl_3$)



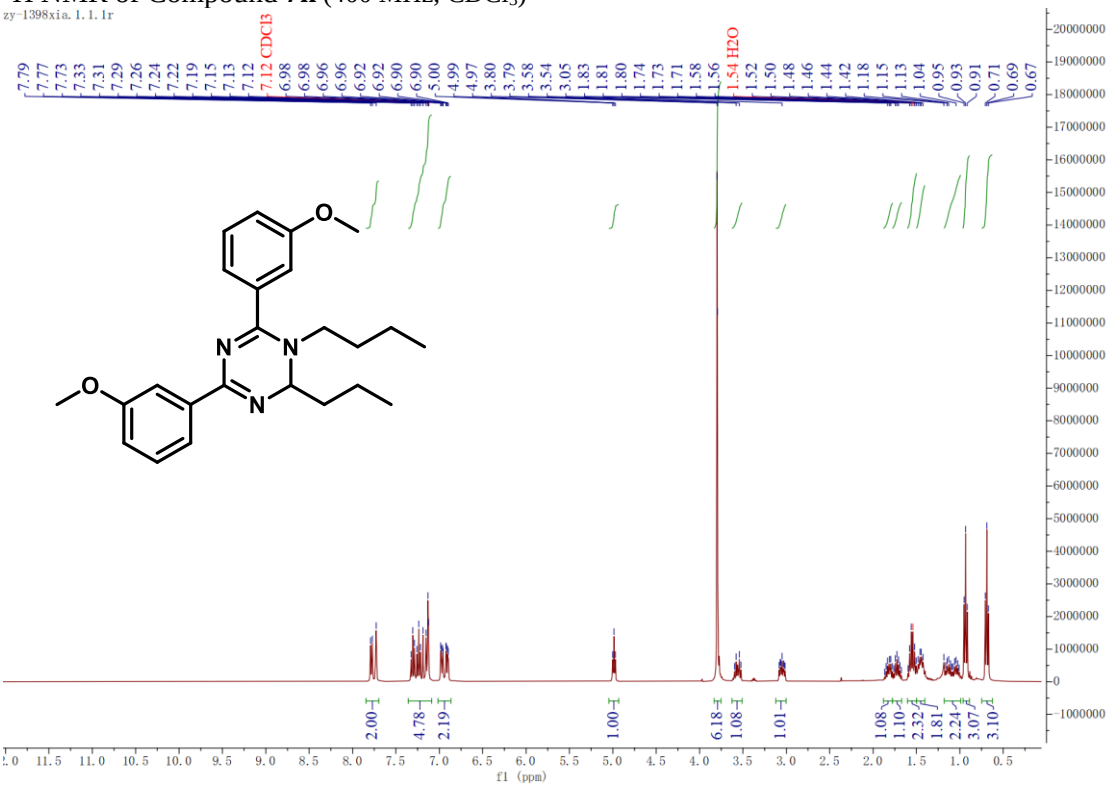
^{1}H NMR of Compound **7m** (400 MHz, $CDCl_3$)



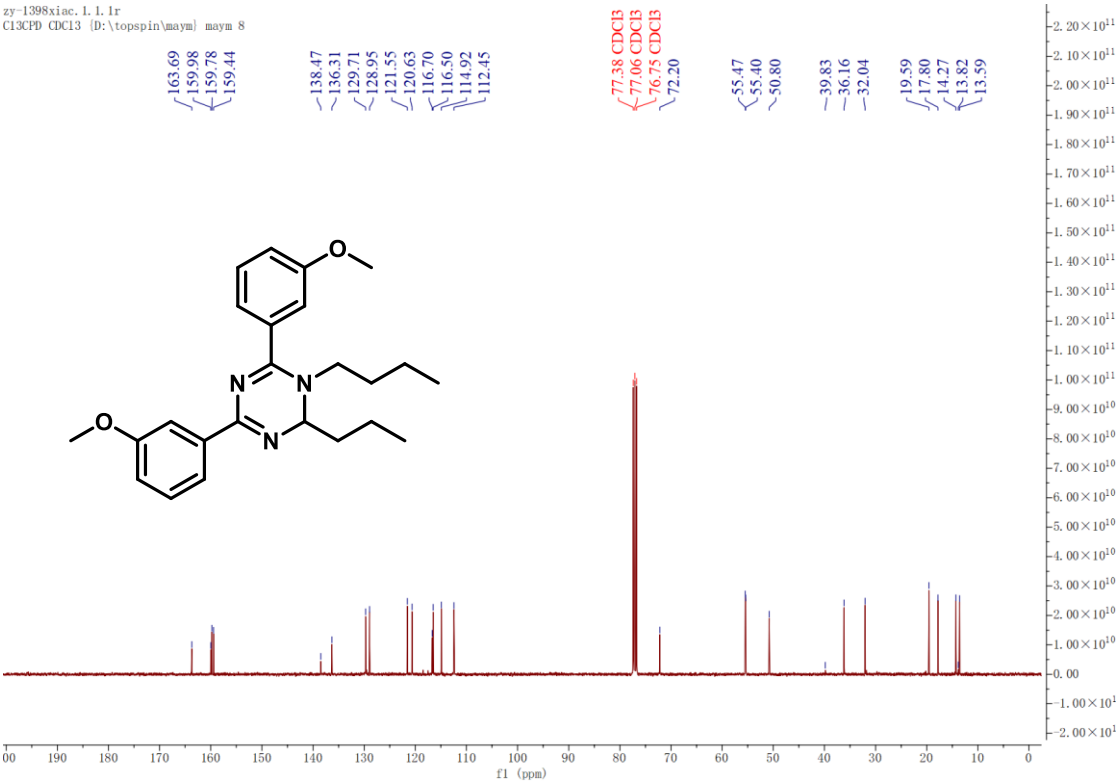
^{13}C NMR of Compound **7m** (101 MHz, $CDCl_3$)



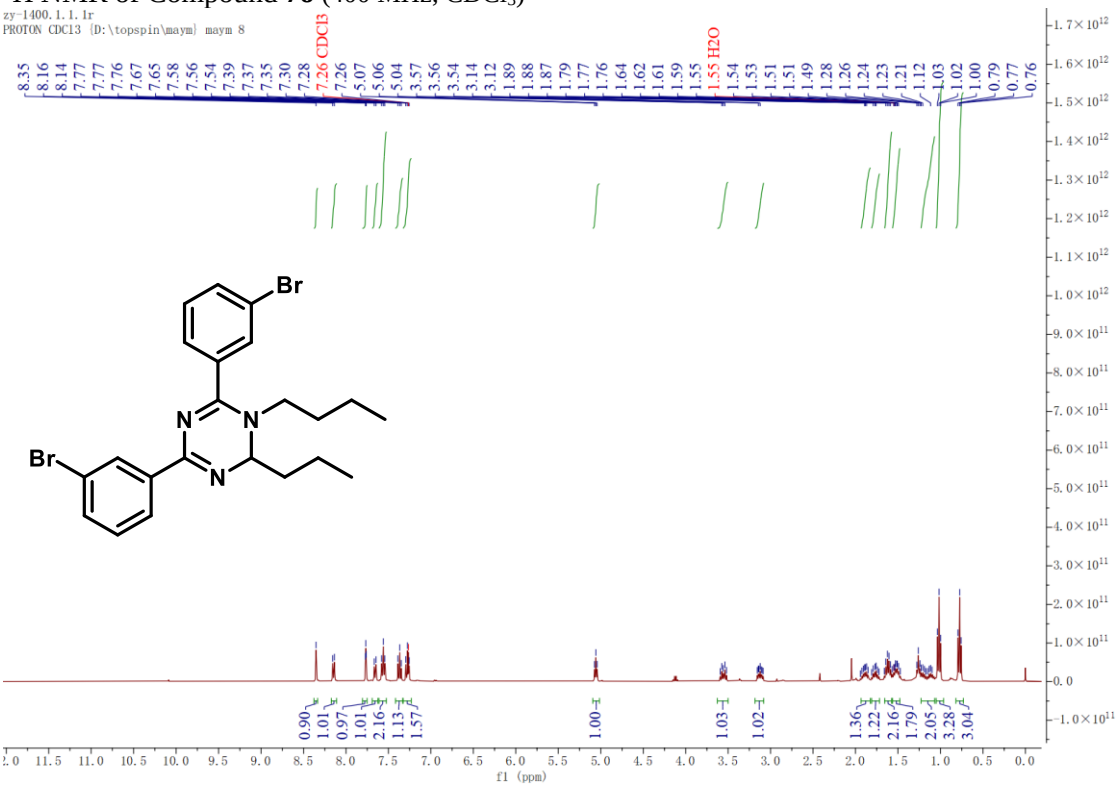
^{1}H NMR of Compound **7n** (400 MHz, $CDCl_3$)



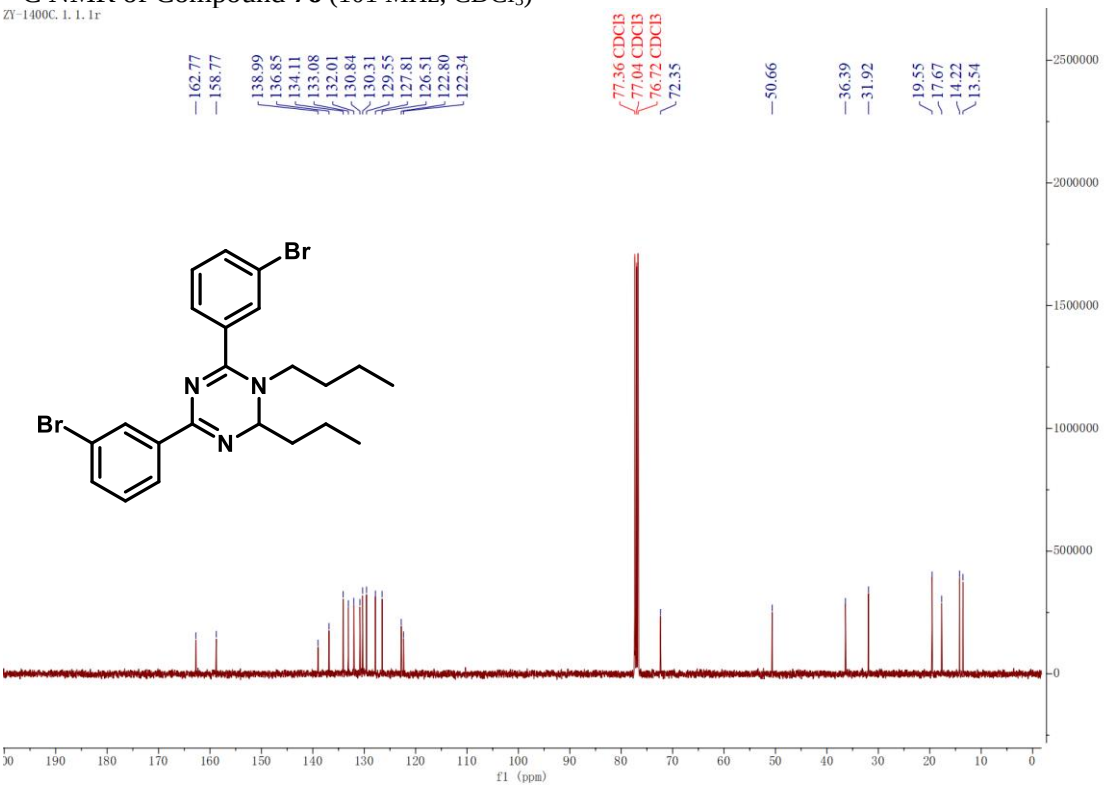
^{13}C NMR of Compound **7n** (101 MHz, $CDCl_3$)



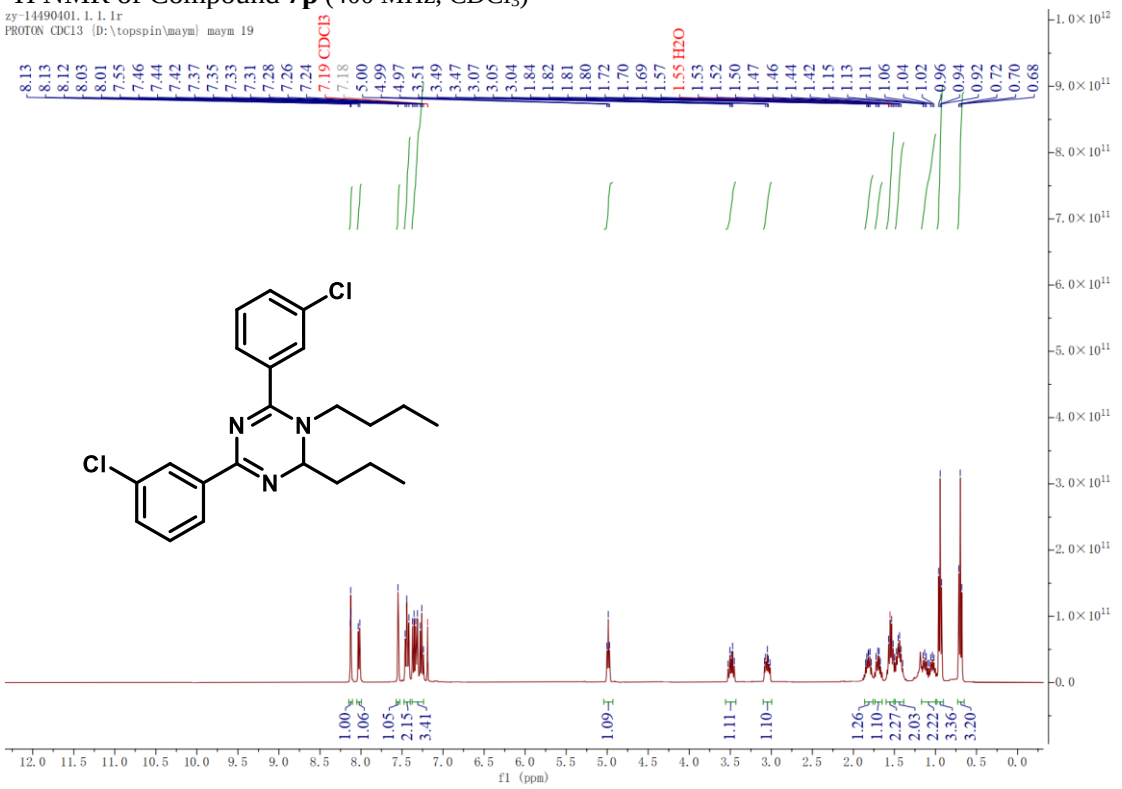
^{1}H NMR of Compound **7o** (400 MHz, $CDCl_3$)



^{13}C NMR of Compound **7o** (101 MHz, $CDCl_3$)



^{1}H NMR of Compound **7p** (400 MHz, $CDCl_3$)



^{13}C NMR of Compound **7p** (101 MHz, $CDCl_3$)