Supporting Information

Ruthenium pincer complex catalyzed efficient synthesis of quinoline, 2-styrylquinoline and quinazoline derivatives *via* acceptorless dehydrogenative coupling reactions

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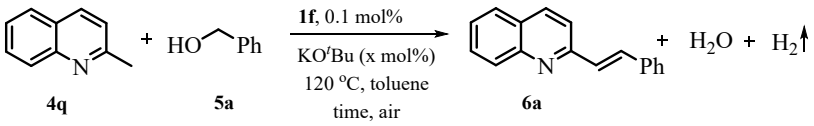
1. General information

All the reagents and chemicals were purchased from common commercial suppliers like Sigma-Aldrich, Alfa Aesar, Merck, Spectrochem, Avra Synthesis Pvt. Ltd., Finar Chemicals and directly used as received without any further purification unless otherwise mentioned. 1-([1,1'-biphenyl]-4-yl)ethan-1-ol,[1,2] 1-(4-(phenylethynyl)phenyl)ethan-1-ol,[3,4] 4-(allyloxy) benzyl alcohol[5] were prepared according to the reported literature.^{1}H, ^{13}C, and ^{19}F NMR spectra of the compounds were measured in $CDCl_3$, DMSO-d_6, CD_3OD as a solvent by using TMS as an internal standard. Chemical shifts, δ (in ppm), are reportedrelative to TMS δ(^{1}H) 0.0 ppm, δ (^{13}C) 0.0 ppm, which was used as the internal reference.Otherwise the solvents residual proton resonance and carbon resonance ($CHCl_3$, δ(^{1}H) 7.26ppm, δ(^{13}C) 77.16 ppm; DMSO-d_6, (^{1}H) 2.50 ppm, δ(^{13}C) 39.52 ppm; CD_3OD, δ(^{1}H) 3.31ppm, δ(^{13}C) 49 ppm) were also used forcalibration. Bruker Avance III 600 and 400 spectrometers were used to record the NMRspectra. Chemical shifts (δ) values were reported in ppm and spin-spin coupling constant (J) were expressed in Hz, and other data were reported as follows: s = singlet, d = doublet, dd = doublet of doublet, dt = doublet of triplet, t = triplet, m = multiplet, q = quartet, sext = sextet, br = broad, and brs = broad singlet. IR spectra were recorded on Perkin Elmer Instrument at normal temperature making KBr pellet grinding the sample with KBr (IR Grade). MS (ESI-HRMS): Mass spectra were recorded on an Agilent Accurate-Mass Q-TOF LC/MS 6520. Merck silica gel 60-120 was used for column chromatography.GC analyses were performed on a Perkinelmer-Clarus 590 GC instrument fitted with Elite-1 column (30 m length, 0.32 mm ID) using the following method: Injection volume: 1 µL, inlet temperature: 280 °C, FID detector temperature: 280 °C, oven temperature: start at 60 °C hold time 1 min, ramp: 12 °C /min, upto 320 °C, Flow rate (carrier): 25 mL/min (N_2).

2. Synthetic scope of ADC reactions

2.1. Optimization studies

Table S1: Screening of reaction conditions for synthesis of 2-styrylquinoline[a,b]

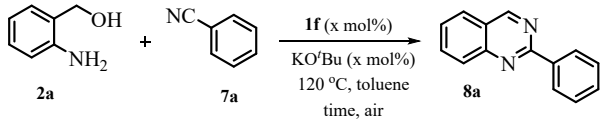


4q **5a** **6a**

entry	mol% **1f**	base (mol%)	time (h)	yield (%)[c]
1	0.1	KO^{t}Bu (1)	6	55
2	0.1	KO^{t}Bu (5)	6	68
3	0.1	KO^{t}Bu (10)	6	81
4	0.1	KO^{t}Bu (10)	12	95
5	-	KO^{t}Bu (10)	12	trace
6	0.1	KO^{t}Bu (0)	12	0

[a]Reaction conditions: 2-methylquinoline (1 mmol), benzylalcohol (1.2 equiv.), **1f** (0.1 mol%), base (x mol%) and toluene (2 mL) were heated for x h at 120 °C in the closed reaction tube. [b]Isolated yield.

Table S2: Screening of reaction conditions for synthesis of quinazoline[a,b]



2a + 7a → 8a

entry	mol% **1f**	base (mol%)	time (h)	conv. (%)[b]	yield (%)[c]	TON	TOF
1	2	KO^{t}Bu (20)	12	> 99	98 (95)	49	4
2	1	KO^{t}Bu (10)	12	> 99	97	97	8
3	0.5	KO^{t}Bu (10)	12	> 99	97	194	16
4	0.2	KO^{t}Bu (10)	12	> 99	97	485	40
5	0.1	KO^{t}Bu (10)	12	> 99	96	960	80
6	0.1	KO^{t}Bu (1)	12	> 99	95 (92)	950	79
7	0.1	KO^{t}Bu (1)	6	> 99	94 (92)	940	156
8	0.05	KO^{t}Bu (1)	6	85	80 (78)	1600	266
9	0.01	KO^{t}Bu (1)	6	70	43 (41)	430	71
10[d]	–	KO^{t}Bu (1)	6	18	n.d.	–	–
11	0.1	–	6	12	n.d.	–	–
12	0.01	KO^{t}Bu (1)	12	84	65	6,500	541
13	0.0001	KO^{t}Bu (1)	10	61	24	2,40,000	24,000
14[e]	0.0001	KO^{t}Bu (1)	12	67	29	2,90,000	24,166

[a]Reaction conditions: 2-aminobenzylalcohol (3 mmol), benzonitrile (3 mmol), **1f** (x mol%), KO^{t}Bu (x mol%) and toluene (2 mL) were heated under air for x h at 120 °C. [b]Conversion of 2-aminobenzylalcohol was determined by GC analysis using benzene as internal standard. [c]Yields were calculated from GC analysis of the reaction mixture using benzene as an internal standard; isolated yields are given within parentheses. [d]With $RuCl_3 \cdot xH_2O$ (0.1 mol%). [e]The same has been repeated three times, average data is given.

2.2. General procedure for the synthesis of *N*-heteroaromatic compounds

2.2.1. General procedure for synthesis of quinoline (GP-1):

The required amount of catalyst **1f** stock solution, synthesized in CH_3OH (0.1 mol%), was added to a reaction tube and the volatiles were removed in high vacuum. To this, 2-aminobenzyl alcohol (3 mmol, 1 equiv), secondary alcohol (3 mmol, 1 equiv), KO^{t}Bu (1 mol%) and toluene (2 mL) were added. The reaction tube was then closed without exclusion of air and placed it in a preheated oil bath (bath temperature 120 °C), kept for 6 hours. The resulting mixture was then passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. Analytically pure product was obtained by column chromatography over silica gel using ethyl acetate / petroleum ether mixture as an eluent.

2.2.2. General procedure for synthesis of 2-styrylquinoline (GP-2):

The required amount of catalyst **1f** stock solution, synthesized in CH_3OH (0.1 mol%), was added to a reaction tube and the volatiles were removed in high vacuum. To this, 2-methylquinoline (1 mmol, 1 equiv), primary alcohol (1.2 equiv), KO^{t}Bu (10 mol%) and toluene (2 mL) was added. The reaction tube was properly closed without exclusion of air and placed it in a preheated oil bath (bath temperature 120 °C), kept for 12 hours. The resulting mixture was then passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. Analytically pure product was obtained by column chromatography over silica gel using ethyl acetate / petroleum ether mixture as an eluent.

2.2.3. General procedure for one-pot synthesis of 4-(benzyloxy)-2-styrylquinoline (GP-3):

The required amount of catalyst **1f** stock solution, synthesized in CH_3OH (0.1 mol%), was added to a reaction tube and the volatiles were removed in high vacuum. To this, 4-chloro-2-methylquinoline (1 mmol, 1 equiv), primary alcohol (2.2 equiv), KO^{t}Bu (10 mol%) and toluene (2 mL) was added. The reaction tube was properly closed without exclusion of air and placed it in a preheated oil bath (bath temperature 120 ^{o}C), kept for 12 hours. The resulting mixture was then passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. Analytically pure product was obtained by column chromatography over silica gel using ethyl acetate / petroleum ether mixture as an eluent.

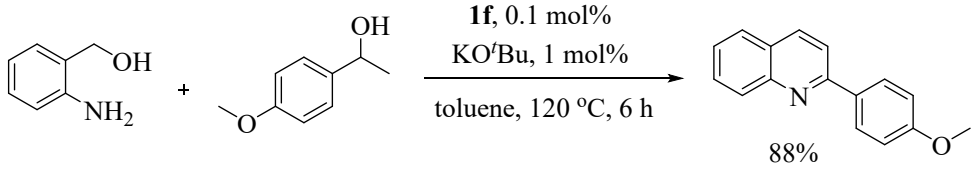
2.2.4. General procedure for one-pot synthesis of 2-styrylquinoline from 2-amino benzylalcohol (GP-4):

The required amount of catalyst **1f** stock solution, synthesized in CH_3OH (0.1 mol%), was added to a reaction tube and the volatiles were removed in high vacuum. To this, 2-aminobenzyl alcohol (1 mmol, 1 equiv), isopropanol (6 mmol, 6 equiv), KO^{t}Bu (10 mol%) and toluene (2 mL) was added. The reaction tube was properly closed without exclusion of air and placed it in a preheated oil bath (bath temperature 120 ^{o}C), kept for 6 hours. The reaction mixture was then cooled down to room temperature and subsequently primary alcohol (1.2 mmol, 1.2 equiv.) was added under air. Then the reaction mixture was stirred at 120 ^{o}C for another 12 hours. After completion of reaction, the resulting solution was then passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. Analytically pure product was obtained by column chromatography over silica gel using ethyl acetate / petroleum ether mixture as an eluent.

2.2.5. General procedure for synthesis of quinazoline (GP-5):

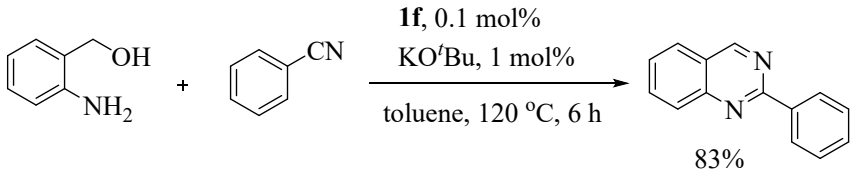
The required amount of catalyst **1f** stock solution, synthesized in CH_3OH (0.1 mol%), was added to a reaction tube and the volatiles were removed in high vacuum. To this, 2-aminobenzyl alcohol (3 mmol, 1 equiv.), aryl nitrile (1 equiv.), KO^{t}Bu (1 mol%) and toluene (2 mL) was added. The reaction tube was properly closed without exclusion of air and placed it in a preheated oil bath at 120 ^{o}C for 6 hours. The resulting mixture was then passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. Analytically pure product was obtained by column chromatography over silica gel using ethyl acetate / petroleum ether mixture as an eluent.

2.3. Experimental procedure for gram-scale reactions

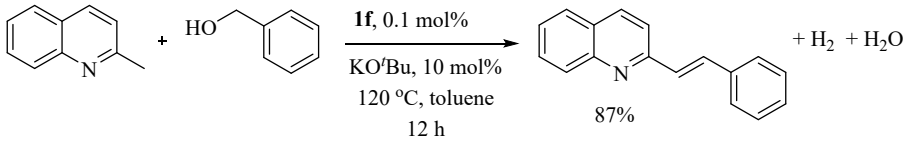


For quinolines: A mixture of 2-aminobenzyl alcohol (1 g, 8.1 mmol, 1 equiv), 1-(4-methoxyphenyl) ethan-1-ol (1.231 g, 8.1 mmol, 1 equiv), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was added into a reaction tube (50 mL) equipped with stirring bar. The reaction tube was properly closed without exclusion of air and kept it in a preheated oil bath at 120 ^{o}C with continuous stirring for 6 hours. The resulting mixture was then passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. The residue was

purified by column chromatography over silica gel (60-120 mesh) with pet-ether/ethyl acetate mixture as eluent to get 88% yield of the product (1.675 g).



For quinazolines: A mixture of 2-aminobenzyl alcohol (1 g, 8.1 mmol, 1 equiv), benzonitrile (0.84 g, 8.1 mmol, 1 equiv), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was added into a reaction tube (50 mL) equipped with stirring bar. The reaction tube was then properly closed without exclusion of air and kept it in a preheated oil bath at 120 ^{o}C with continuous stirring for 6 hours. After completion of the reaction, the resulting mixture was passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. The residue was purified by column chromatography over silica gel (60-120 mesh) with pet-ether/ethyl acetate mixture as eluent to get 83% yield of the product (1.384 g).



For 2-styrylquinolines: A mixture of 2-methylquinoline (1 g, 6.98 mmol, 1 equiv), benzyl alcohol (0.907 g, 8.4 mmol, 1.2 equiv), **1f** (0.1 mol%), KO^{t}Bu (10 mol%) and toluene (2 mL) was added into a reaction tube (50 mL) equipped with stirring bar. The reaction tube was then properly closed without exclusion of air and kept it in a preheated oil bath at 120 ^{o}C with continuous stirring for 12 hours. After completion of the reaction, the resulting mixture was passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. The residue was purified by column chromatography over silica gel (60-120 mesh) with pet-ether/ethyl acetate mixture as eluent to get 87% yield of the product (1.406 g).

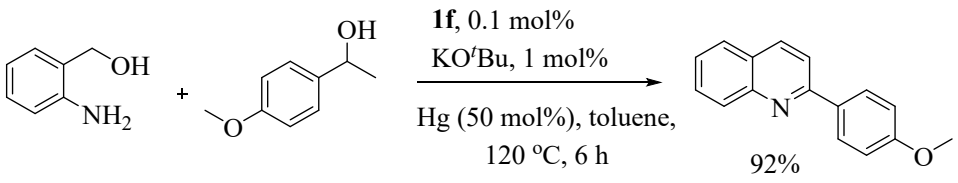
3. Procedure for the calculation of TON and TOF for quinoline and qunazoline

The catalyst stock solution was prepared by dissolving **1f** in CH_3OH. A reaction tube was charged with a required amount of **1f** (0.0001 mol%) stock solution and all the volatiles were removed in vacuum. To this, 2-aminobenzyl alcohol (3 mmol, 1 equiv), secondary alcohol (3 mmol, 1 equiv), and KO^{t}Bu (1 mol%) followed by toluene (2 mL) was added. The reaction tube was closed without exclusion of air and placed it in a preheated oil bath at 120 ^{o}C for 12 hours. After that the reaction mixture was cooled to room temperature and subjected to GC-MS analysis. The average data based on the GC-MS analysis shows the 44% formation of **4a** which provides TON of 4,40,000. Under the same reaction conditions by using benzonitrile (1 equiv), 29% formation of **8a** in GC-MS indicating TON of 2,90,000.

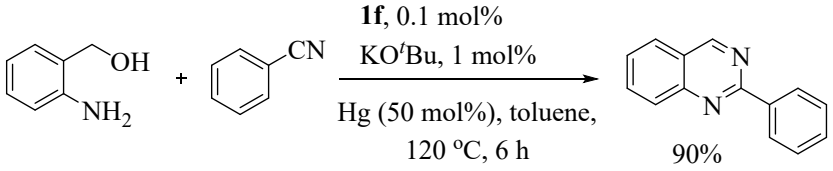
4. Mechanistic studies

4.1. Mercury drop test

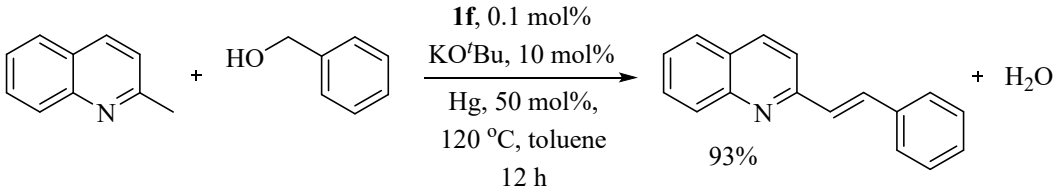
To establish the homogeneity of current catalytic reaction, mercury drop experiment was carried out.



For quinoline: In this test, the reaction tube was charged with 2-aminobenzyl alcohol (3 mmol, 369 mg), 1-(4-methoxyphenyl)ethan-1-ol (3 mmol, 456 mg), mercury (1.5 mmol, 300 mg), KO^{t}Bu (1 mol%) and complex **1f** (0.1 mol%). To this reaction mixture, 2 mL of toluene was added and heated at 120 °C for 6 h. The desired product was obtained in 92% yield, indicating the homogenous behaviour of the reaction.



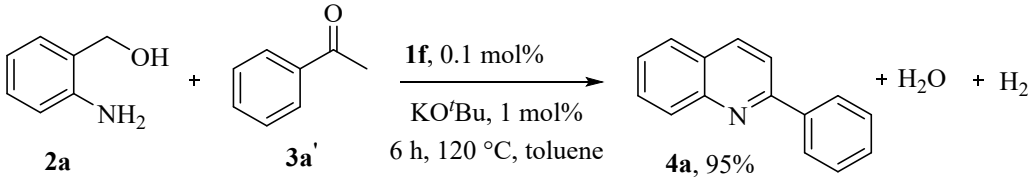
For quinazoline: In this test, the reaction tube was charged with 2-aminobenzyl alcohol (3 mmol, 369 mg), benzonitrile (3 mmol, 309 mg), mercury (1.5 mmol, 300 mg), KO^{t}Bu (1 mol%) and complex **1f** (0.1 mol%). To this reaction mixture, 2 mL of toluene was added and heated at 120 °C for 6 h. The desired product was obtained in 90% yield, suggesting the homogenous behaviour of the catalytic process.



For 2-styrylquinolines: In this test, the reaction tube was charged with 1 mmol (143 mg) of 2-methylquinoline, 1.2 mmol (129 mg) of benzyl alcohol, 0.5 mmol (100 mg) of mercury, 0.1 mmol of KO^{t}Bu and 0.001 mmol of complex **1f**. To this reaction mixture 2 mL of toluene was added and heated at 120 °C for 12 h. The expected product was obtained in 93% of yield, demonstrating the homogenous behavior of the catalytic process.

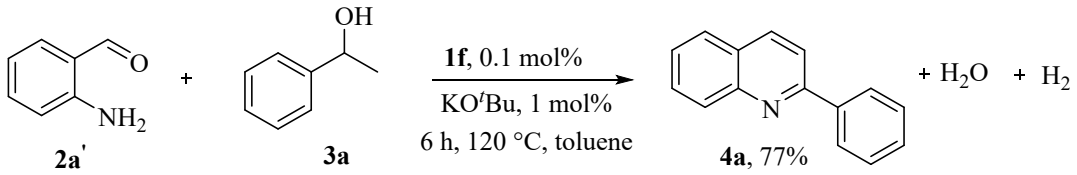
4.2. Proof for the formation of intermediate 2-amino benzaldehyde, ketone in quinoline synthesis:

4.2.1. Reaction of 2-aminobenzyl alcohol and acetophenone



Method: A mixture of **2a** (3 mmol, 1 equiv.), **3a'** (3 mmol, 1 equiv.), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 °C for 6 h. The product **4a** was isolated in 95% of yield.

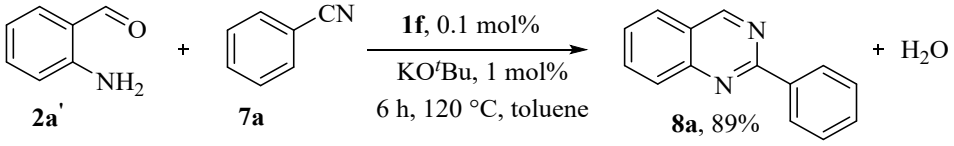
4.2.2. Reaction of 2-aminobenzaldehyde and 1-phenylethanol



Method: A mixture of **2a'** (3 mmol, 1 equiv.), **3a** (3 mmol, 1 equiv.), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 ℃ for 6 h. The product **4a** was isolated in 77% of yield.

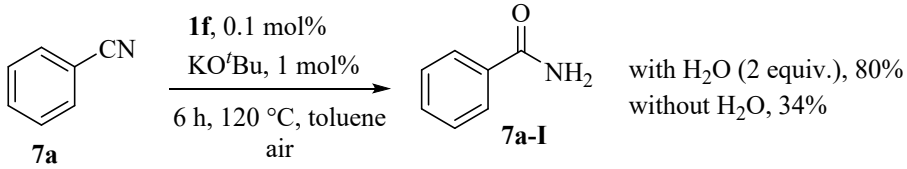
4.3. Proof for the formation of intermediate 2-aminobenzaldehyde and benzamide in quinazoline synthesis:

4.3.1. Reaction of 2-aminobenzaldehyde and benzonitrile



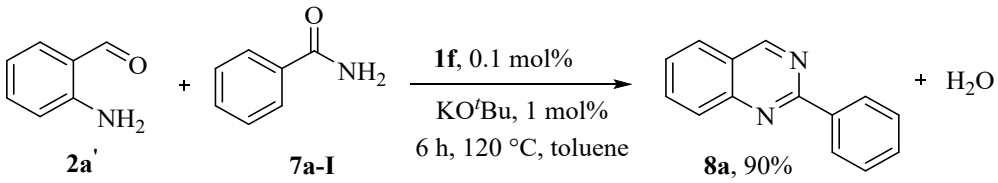
A mixture of **2a'** (3 mmol, 1 equiv.), **7a** (3 mmol, 1 equiv.), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 ℃ for 6 h. The product **8a** was isolated in 89% of yield.

4.3.2. Formation of benzamide under the reaction conditions



A mixture of **7a** (3 mmol, 1 equiv.), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was loaded into the reaction tube under air and heated at 120 ℃ for 6 h. The product **7a-I** was isolated in 34% of yield. In the presence of H_2O (2 equiv.), the yield of **7a-I** was obtained in 80% yield.

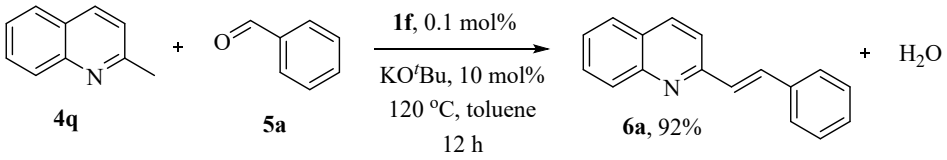
4.3.3. Reaction of 2-aminobenzaldehyde and benzamide



A mixture of **2a'** (3 mmol, 1 equiv.), **7a-I** (3 mmol, 1 equiv.), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 ℃ for 6 h. The product **8a** was isolated in 90% of yield.

4.4. Evidence of intermediate in 2-styrylquinoline and 4-benzyloxy-2-styrylquinoline synthesis:

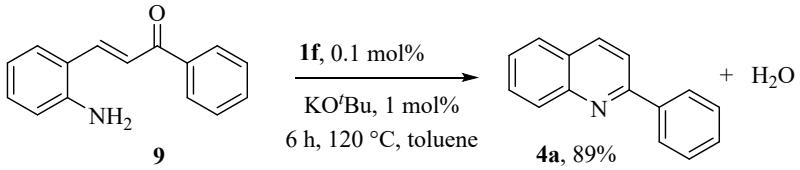
4.4.1. Reaction of 2-methylquinoline and benzaldehyde



4q + **5a** → **6a**, 92%

A mixture of 2-methylquinoline **4q** (1 mmol, 1 equiv.), benzaldehyde **5a** (1.2 mmol, 1.2 equiv.), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 ℃ for 12 h. The product **6a** was isolated in 92% of yield.

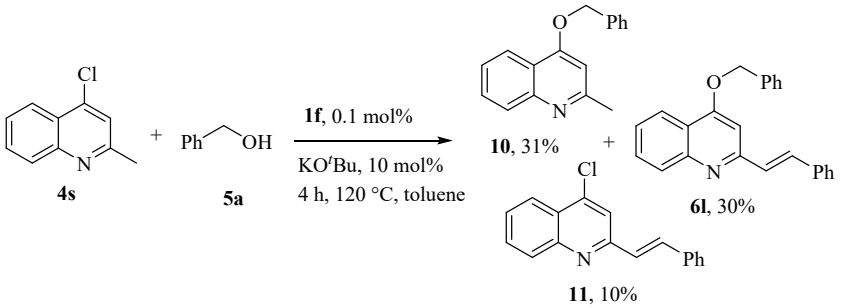
4.4.2. Reaction of 2-aminochalcone under the standard reaction condition



9 → **4a**, 89%

Method: A mixture of **9** (1 mmol, 1 equiv.), **1f** (0.1 mol%), KO^{t}Bu (1 mol%) and toluene (2 mL) was loaded into the reaction tube under air and heated at 120 ℃ for 6 h. The product **4a** was isolated in 89% of yield.

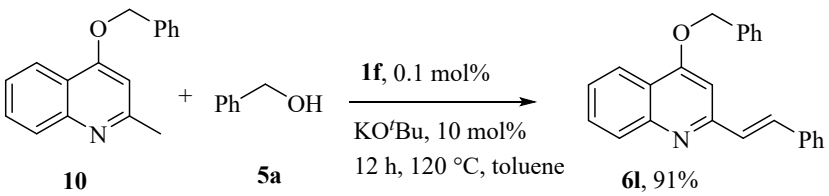
4.4.3. Reaction of 4-chloro-2-methylquinoline and benzylalcohol



4s + **5a** → **10**, 31% + **6l**, 30% + **11**, 10%

A mixture of 4-chloro-2-methylquinoline (1 mmol, 1 equiv.), benzylalcohol (1 mmol, 1 equiv.), KO^{t}Bu (10 mol%), **1f** (0.1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 ℃ for 4 h. The product **6l** (30%), **10** (31%), and **11** (10%) was isolated.

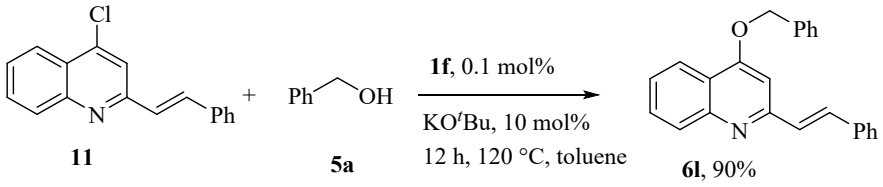
4.4.4. Reaction of 4-benzyloxy-2-methylquinoline and benzylalcohol



10 + **5a** → **6l**, 91%

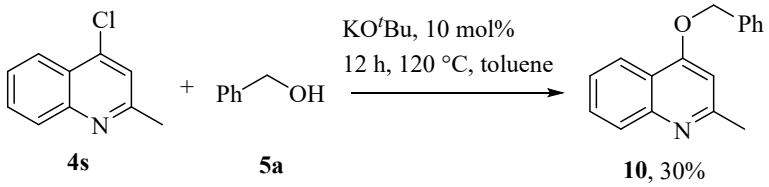
A mixture of 4-benzyloxy-2-methylquinoline **10** (1 mmol, 1 equiv.), benzylalcohol (1 mmol, 1 equiv.), KO^{t}Bu (10 mol%), **1f** (0.1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 ℃ for 12 h. The product **6l** was isolated in 91% of yield.

4.4.4. Reaction of 4-chloro-2-styrylquinoline and benzylalcohol



A mixture of 4-chloro-2-styrylquinoline **11** (1 mmol, 1 equiv.), benzylalcohol (1 mmol, 1 equiv.), KO^{t}Bu (10 mol%), **1f** (0.1 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 °C for 12 h. The product **6l** was isolated in 90% of yield, and in the absence of **1f**, yielded 29% of **6l**.

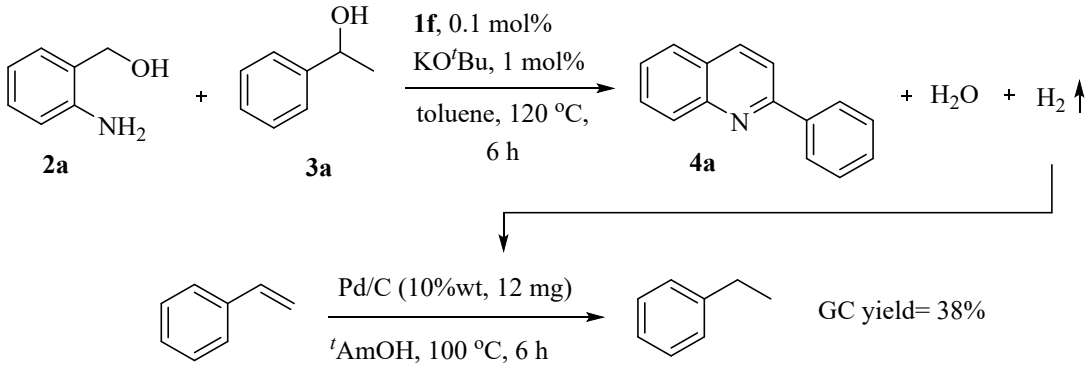
4.4.5. Reaction of 4-chloro-2-methylquinoline and benzylalcohol



A mixture of 4-chloro-2-methylquinoline (1 mmol, 1 equiv.), benzylalcohol (1 mmol, 1 equiv.), KO^{t}Bu (10 mol%) and toluene (2 mL) was loaded into the reaction tube and heated at 120 °C for 12 h. The product **10** was isolated in 30% of yield.

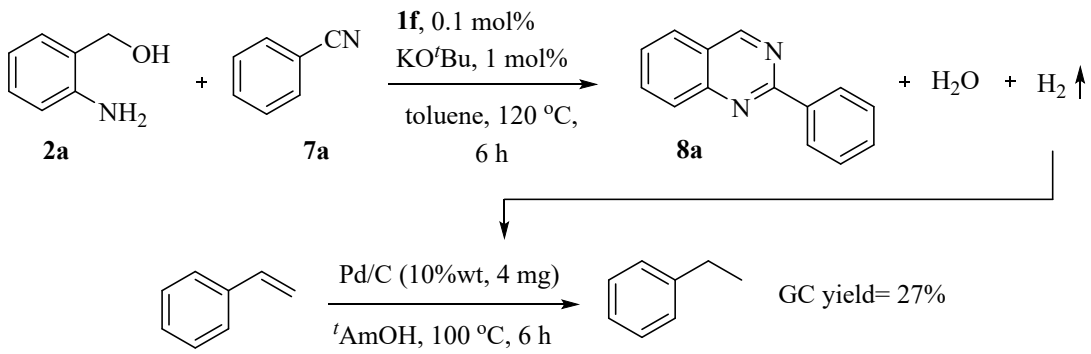
4.5. Hydrogenation of styrene by evolved hydrogen during synthesis of quinoline and quinazoline

For 4a:



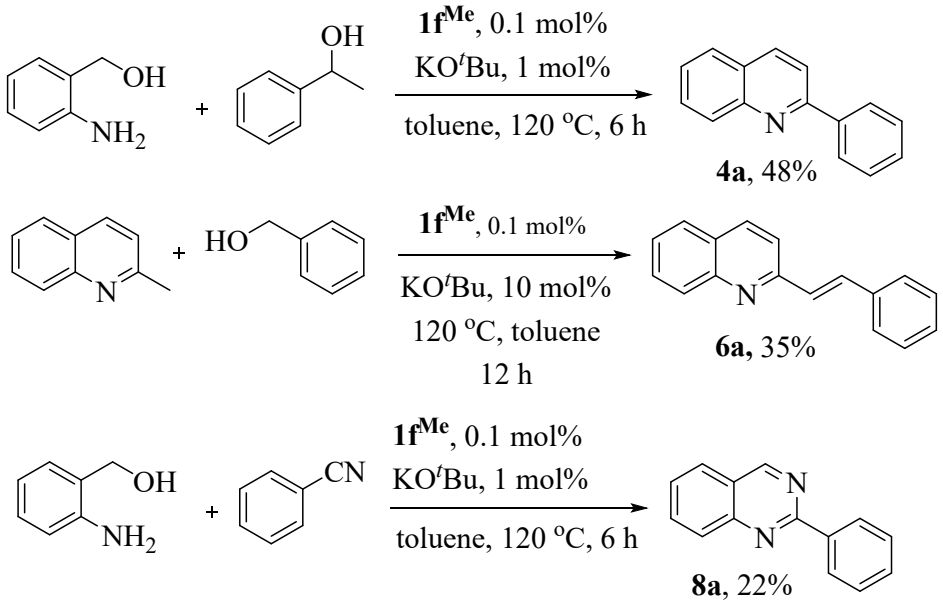
An oven dried H-shaped bridged tube was equipped with a magnetic stir bar. Under Ar atmosphere, chamber one charged with catalyst **1f** (0.1 mol%), 3 mmol of **2a**, 3 mmol of **3a**, KO^{t}Bu (1 mol%), and toluene (2 mL) and chamber two in which styrene (3 mmol), Pd/C (12 mg) were placed in ^{t}AmOH (2 mL). Both chambers were closed with cap. The sealed bridged tube was placed in preheated oil bath at 120 °C for 6 h. After completion of the reaction, small portion of aliquot taken from chamber two for GC analysis, revealed conversion of styrene to ethyl benzene (38%).

For 8a:



Similarly, the following experiment was performed for **8a** using catalyst **1f (**0.1 mol%), KO^{t}Bu (1 mol%), 3 mmol of **2a**, and 3 mmol of **7a** in toluene (2 mL). the conversion of styrene to ethyl benzene was observed in 27%.

4.6. The impact of the NH functionality in ruthenium complex



Scheme S19. The influence of the –NH functionality in catalysis

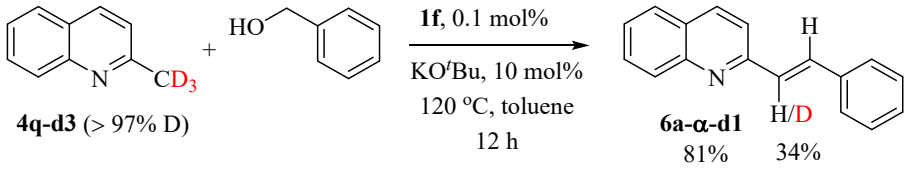
For 4a: Using the *N*-methylated catalyst **1f^{Me}** instead of **1f** and the following the general procedure **GP-1** the title compound **4a** was obtained in 48% yield.

For 6a: Using the *N*-methylated catalyst **1f^{Me}** instead of **1f** and the following the general procedure **GP-2** the title compound **6a** was obtained in 35% yield.

For 8a: Using the *N*-methylated catalyst **1f^{Me}** instead of **1f** and the following the general procedure **GP-5** the title compound **8a** was obtained in 22% yield.

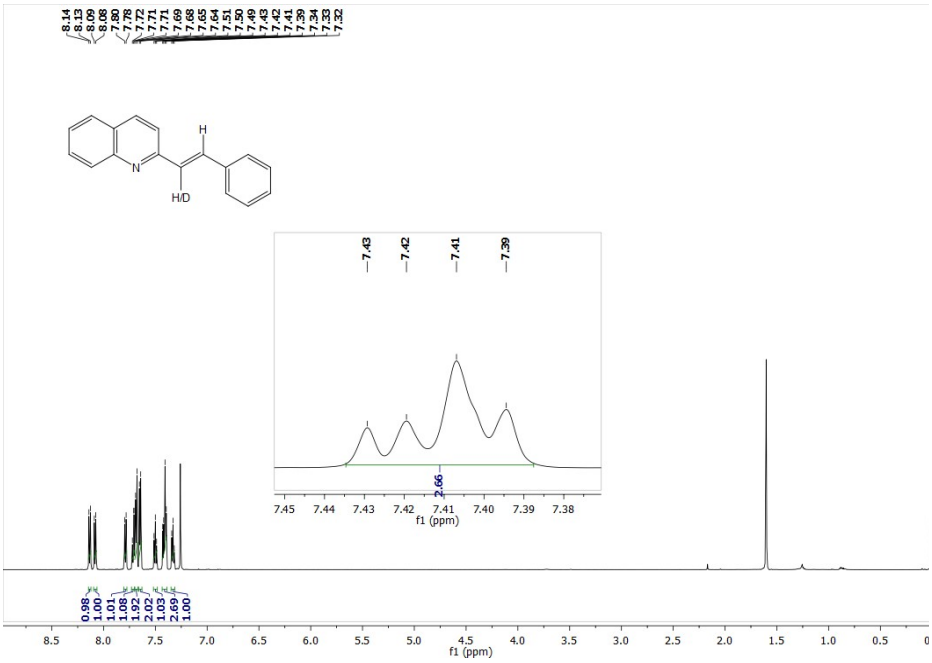
5. Deuterium incorporation experiments:

(a) Deuterium incorporation at the α-position of 6a:



Scheme S20. Deuterium incorporation at the α-position of **6a**

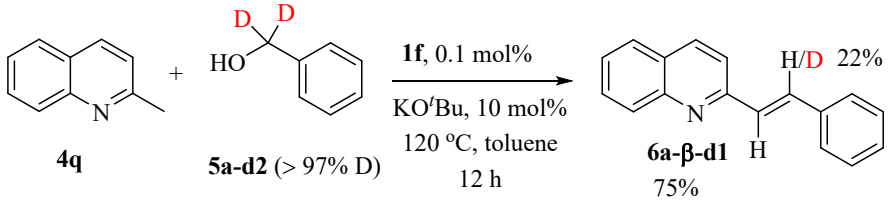
Procedure for 6a-α-d1: A mixture of deuterated quinaldine **4q-d3** (146 mg, 1 mmol, 1 equiv), benzyl alcohol (130 mg, 1.2 mmol, 1.2 equiv), **1f** (0.1 mol%), KO^{t}Bu (10 mol%) and toluene (2 mL) was added into a reaction tube (50 mL) equipped with stirring bar. The reaction tube was then properly closed without exclusion of air and kept it in a preheated oil bath at 120 °C with continuous stirring for 12 hours. After completion of the reaction, the resulting mixture was passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. The residue was purified by column chromatography over silica gel (60-120 mesh) with pet-ether/ethyl acetate mixture as eluent to get 81% yield of the product.



Based on nOe, HSQC, and ^{1}H-^{1}H COSY NMR, α-H in **6a-α-d1** is assigned at 7.42 ppm.

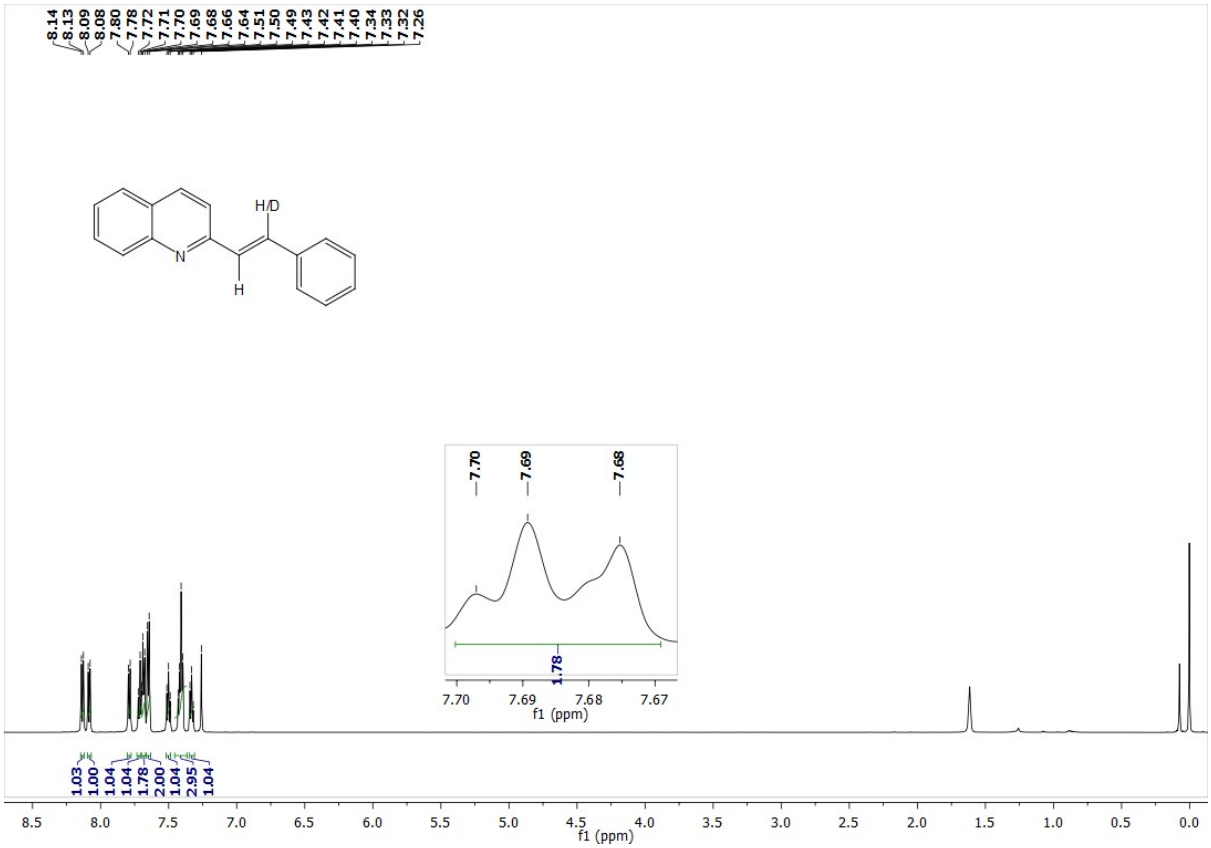
Deuterium incorporation in the α-position of **6a-α-d1:** 34%

(b) Deuterium incorporation at the β-position of 6a:



Scheme S20. Deuterium incorporation at the β-position of **6a**

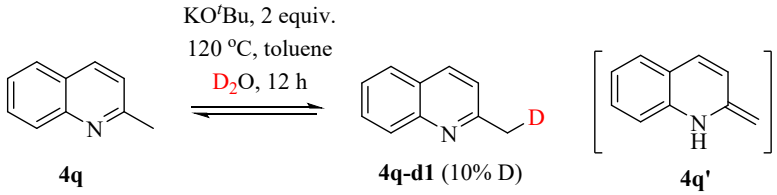
Procedure for 6a-β-d1: A mixture of 2-methylquinoline (146 mg, 1 mmol, 1 equiv), deuterated benzyl alcohol **5a-d2** (130 mg, 1.2 mmol, 1.2 equiv), **1f** (0.1 mol%), KO^{t}Bu (10 mol%) and toluene (2 mL) was added into a reaction tube (50 mL) equipped with stirring bar. The reaction tube was then properly closed without exclusion of air and kept it in a preheated oil bath at 120 °C with continuous stirring for 12 hours. After completion of the reaction, the resulting mixture was passed through a bed of celite, the filtrate was collected and concentrated under reduced pressure. The residue was purified by column chromatography over silica gel (60-120 mesh) with pet-ether/ethyl acetate mixture as eluent to get 75% yield of the product.



Based on nOe, HSQC, and ^{1}H-^{1}H COSY NMR, β-H in **6a-β-d1** is assigned at 7.67 ppm.

Deuterium incorporation in the α-position of **6a- β-d1:** 22%

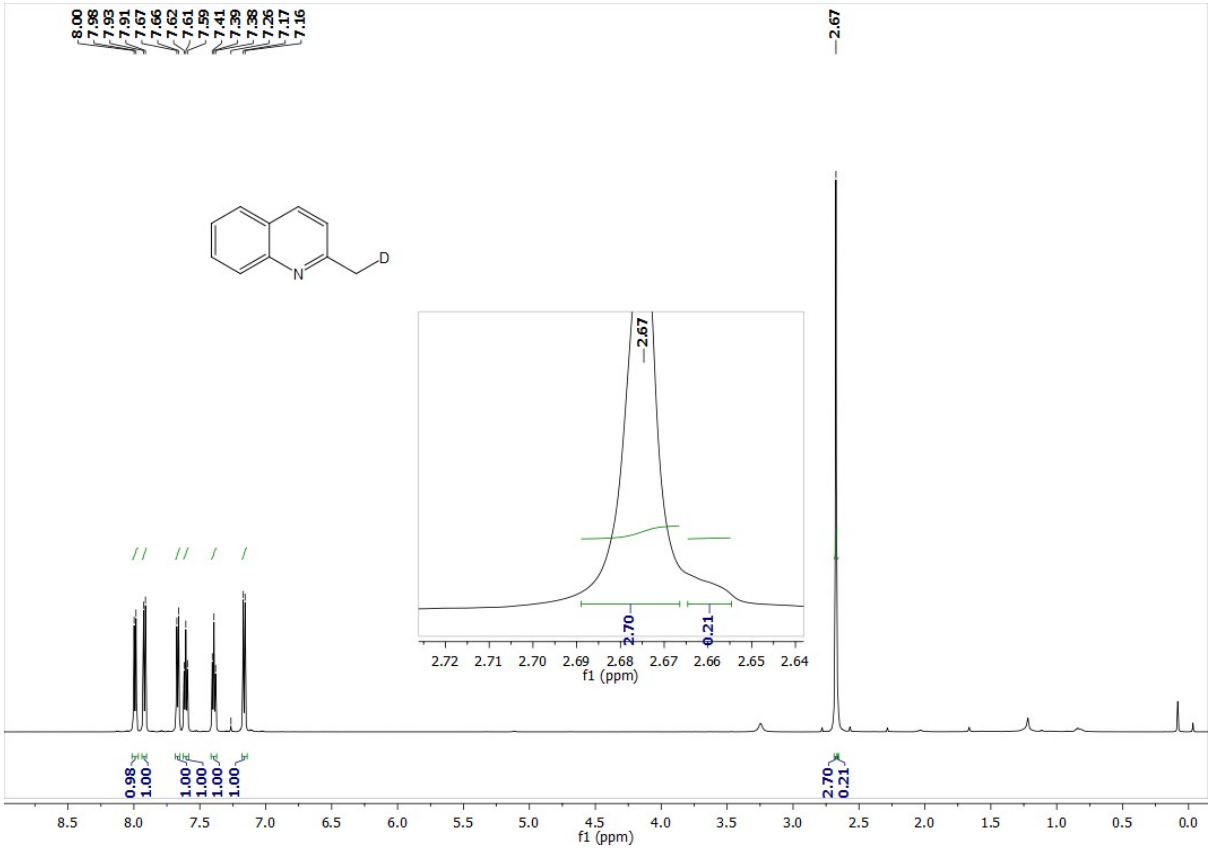
(c) Evidence for the enamine intermediate 4q'



Scheme S21. Evidence for the enamine intermediate **4q'**

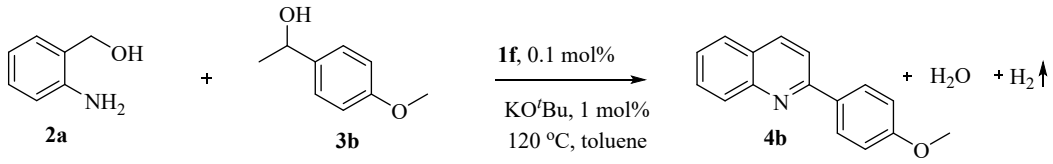
Procedure: 2-methylquinoline **4q** (0.25 mmol), D_2O (0.2 mL), *t*-BuOK (0.5 mmol) and toluene (1.0 mL) were added in the reaction tube. The reaction mixture was heated at 120 °C oil bath for 12 h. The resulting mixture was then cooled to room temperature and removed the

volatiles. Check the ^{1}H NMR spectra of crude compound in $CDCl_3$. The result suggests that 10% D in **4q-d1**.



6. Calculation of green metrics for quinoline synthesis:

For quinoline synthesis:



2a

2-aminobenzyl alcohol
Chemical Formula:C_7H_9NO
Molecular Weight: 123.16

3b

1-(4-methoxyphenyl)ethan-1-ol
Chemical Formula: $C_9H_{12}O_2$
Molecular Weight: 152.19

4b

2-(4-methoxyphenyl)quinoline
Chemical Formula: $C_{16}H_{13}NO$
Molecular Weight: 235.29

Total: 123.16 + 152.19 = 275.35

Product yield = 88% (1.68 g)

Reactant 1	2-aminobenzyl alcohol	1 g	F.W 123.16
Reactant 2	1-(4-methoxyphenyl)ethan-1-ol	1.23 g	F.W 152.19
Base	Potassium *tert*-butoxide	9.1 mg	F.W 112.21
Solvent	Toluene	1.73 g	F.W 92.14
Auxillary	-	-	-
Product	2-(4-methoxyphenyl)quinoline	1.68 g	F.W 235.29
Byproduct 1	Water	257.4 mg	F.W 18.01
Byproduct 2	Hydrogen	28.8 mg	F.W 2.02

Product yield = 88%

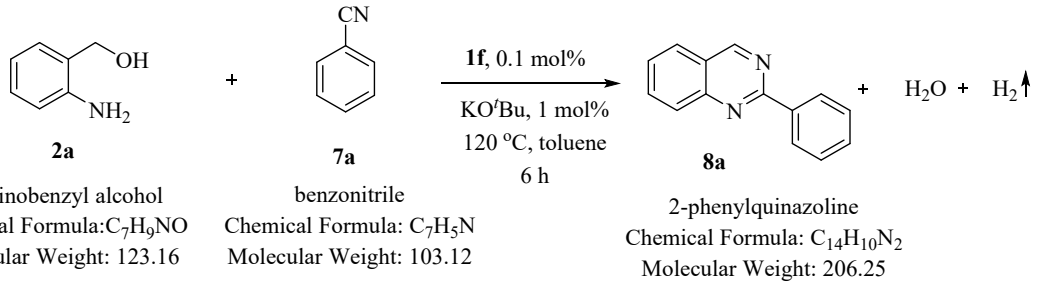
Atom economy: 235.29/275.35 = 85.4%

Atom efficiency: 88 × (85.4/100) = 75.2%

Carbon efficiency: (16/16) × 100 = 100%

Reaction mass efficiency: [1.68 g / (1 g + 1.23 g)] × 100 = 75.3%

For quinazoline synthesis:



2a

2-aminobenzyl alcohol
Chemical Formula:C_7H_9NO
Molecular Weight: 123.16

7a

benzonitrile
Chemical Formula: C_7H_5N
Molecular Weight: 103.12

Total: 123.16 + 103.12 = 226.28

8a

2-phenylquinazoline
Chemical Formula: $C_{14}H_{10}N_2$
Molecular Weight: 206.25

Product yield = 83% (1.38 g)

Reactant 1	2-aminobenzyl alcohol	1 g	F.W 123.16
Reactant 2	Benzonitrile	1 g	F.W 103.12
Base	Potassium *tert*-butoxide	9.1 mg	F.W 112.21
Solvent	Toluene	1.73 g	F.W 92.14
Auxillary	-	-	-
Product	2-phenylquinazoline	1.38 g	F.W 206.25
Byproduct 1	Water	257.4 mg	F.W 18.01
Byproduct 2	Hydrogen	28.8 mg	F.W 2.02

Product yield = 83%

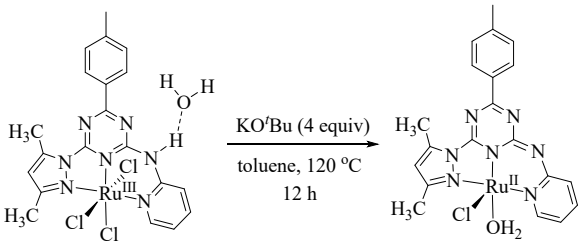
Atom economy: 206.25/226.28 = 91.1%

Atom efficiency: 83 × (91.1/100) = 75.6%

Carbon efficiency: (14/14) × 100 = 100%

Reaction mass efficiency: [1.38 g / (1 g + 1 g)] × 100 = 69%

7. Spectroscopic characterization of ruthenium complex



1f
(d^5, LS)

I
(d^6, LS)

Spectroscopic characterization for active catalyst I

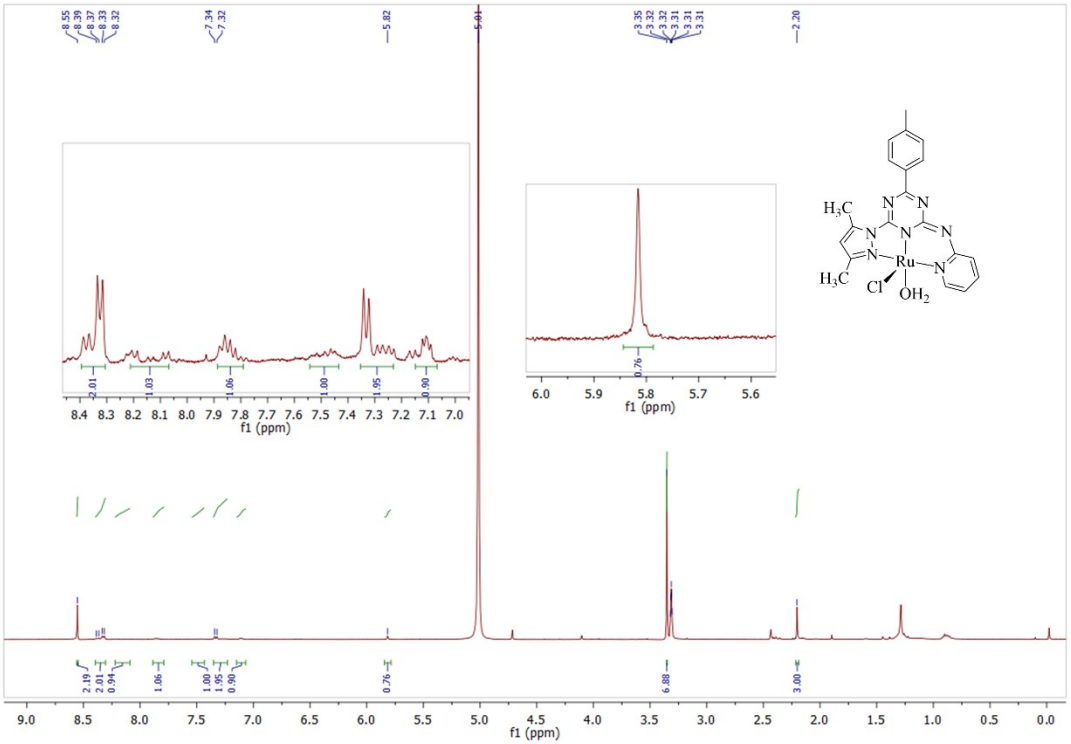


Figure S1. ^{1}H NMR spectrum of active species **I** (CD_3OD, 400 MHz, 298 K)

Procedure: The reaction tube was equipped with a stir bar, complex **1f** (30 mg, 0.05 mmol, 1 equiv) KO^{t}Bu (4 equiv), and toluene (1.5 mL). The reaction mixture was stirred at 120 ^{o}C for 12 h. The resulting solution was then cooled to room temperature; all the volatile was removed under reduced pressure. The obtained residue was dissolved in methanol-d_4 and subjected for NMR analysis at room temperature. The above brown residue was dissolved in equimolar ratio of acetonitrile and water, and analyze the ESI-HRMS.

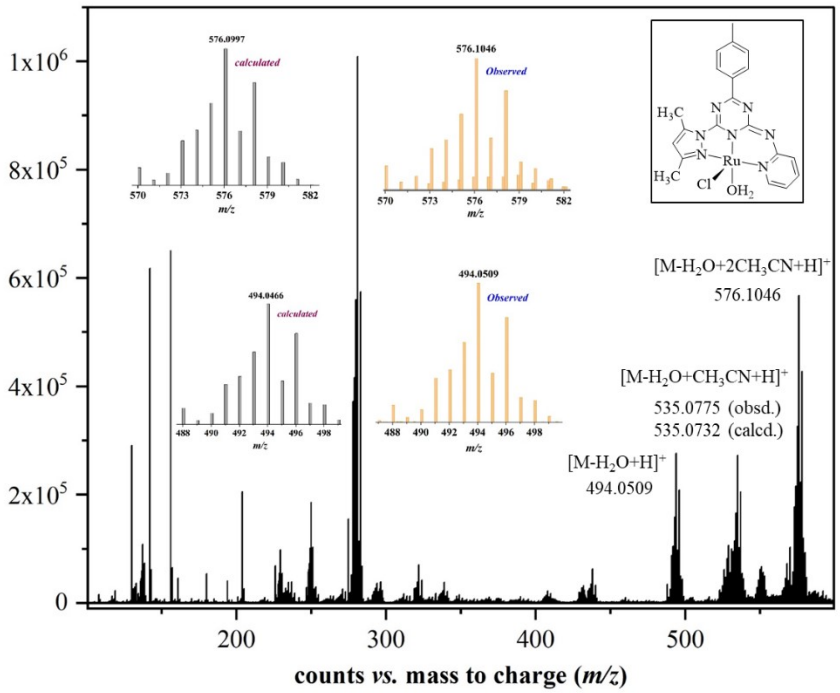
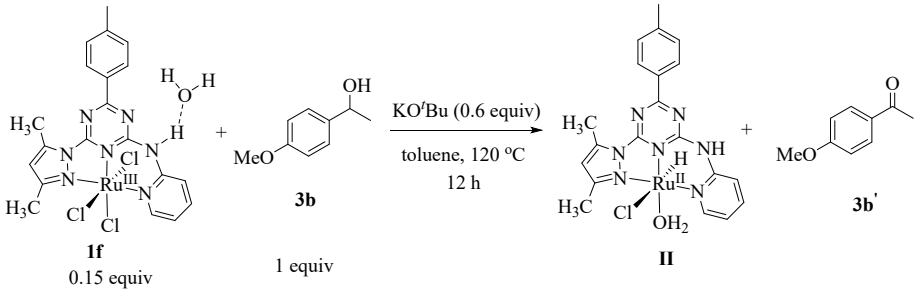


Figure S2. HRMS (ESI) spectra of active species **I**.

HRMS spectra for ruthenium hydride species (II):



Procedure: The reaction tube was equipped with a stir bar, complex **1f** (30 mg, 0.05 mmol, 0.15 equiv), **3b** (50 mg, 0.33 mmol, 1 equiv), and KO^{t}Bu (23 mg, 0.20 mmol, 0.6 equiv). To the reaction mixture, 1.5 mL of toluene was added and stirred at 120 °C for 12 h. The resulting solution was cooled to room temperature, then 0.2 ml of solution was taken out by using syringe and mixed in equimolar ratio of HPLC grade acetonitrile and water (1 mL) mixture and analyzed the mass spectrometry.

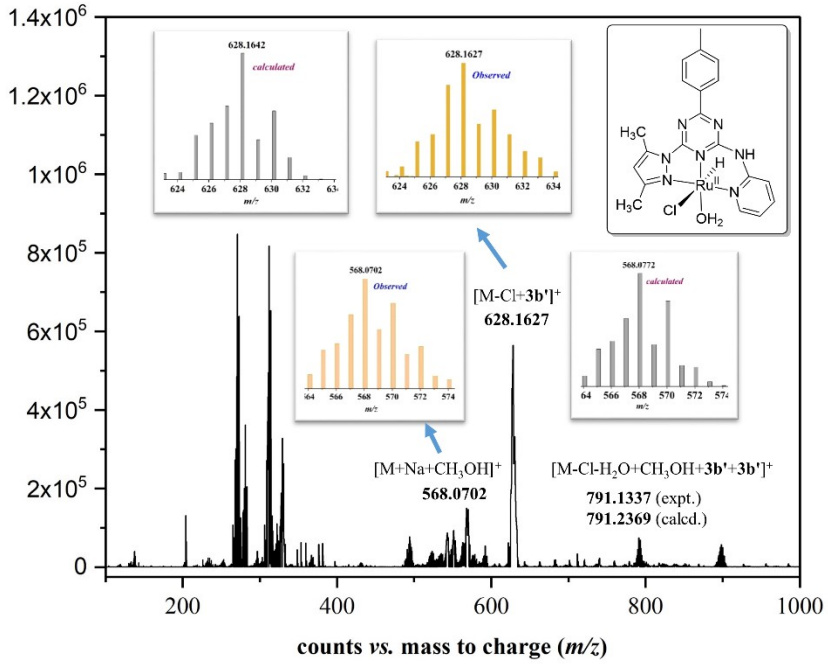
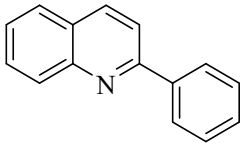


Figure S3. HRMS (ESI) spectra for intermediate **II** species.

8. Analytical data of the products:

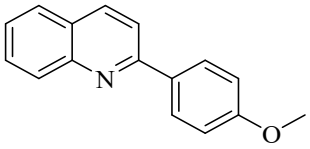
2-phenylquinoline (4a)[6]



Following the general procedure **GP-1** the title compound **4a** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 92% yield (0.565 g). ^{1}H NMR (600 MHz, Chloroform-*d*): δ 8.23 – 8.17 (m, 4H), 7.88 (d, J = 8.0 Hz, 1H), 7.83 (d, J = 8.0 Hz, 1H), 7.76 – 7.73 (m, 1H), 7.56 – 7.52 (m, 3H), 7.49 – 7.47

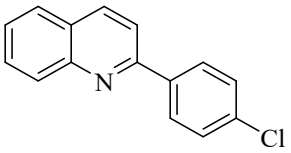
(m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 157.5, 148.4, 139.8, 136.9, 129.8, 129.8, 129.4, 129.0, 127.7, 127.6, 127.3, 126.4, 119.1. Spectral data is in accordance to the reported literature.

2-(4-methoxyphenyl)quinoline (4b)[6]



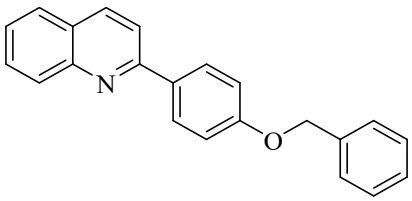
Following the general procedure **GP-1** the title compound **4b** was isolated as light yellow solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 50/1, R_f = 0.5) in 96% yield (0.675 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.19 (d, J = 6 Hz, 1H), 8.16 – 8.12 (m, 3H), 7.84 (d, J = 6 Hz, 1H), 7.82 – 7.80 (m, 1H), 7.72 – 7.70 (m, 1H), 7.51 – 7.49 (m, 1H), 7.07 – 7.04 (m, 2H), 3.89 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 160.9, 157.1, 148.4, 136.8, 132.4, 129.7, 129.6, 129.0, 127.6, 127, 126.1, 118.7, 114.4, 55.6. Spectral data is in accordance to the reported literature.

2-(4-chlorophenyl)quinoline (4c)[7]



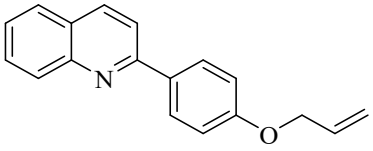
Following the general procedure **GP-1** the title compound **4c** was isolated as yellow solid using silica gel column chromatography with pet-ether/ ethylacetate (v/v = 50/1, R_f = 0.5) in 85% yield (0.61 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.19 (d, J = 6.0 Hz, 1H), 8.16 (d, J = 6.0 Hz, 1H), 8.11 (d, J = 6.0 Hz, 2H), 7.82 – 7.80 (m, 2H), 7.75 – 7.72 (m, 1H), 7.53 (t, J = 6.0 Hz, 1H), 7.50 – 7.48 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 156.1, 148.3, 138.1, 137.0, 135.6, 129.9, 129.8, 129.1, 128.9, 127.6, 127.3, 126.6, 118.6.

2-(4-(benzyloxy)phenyl)quinoline (4d)



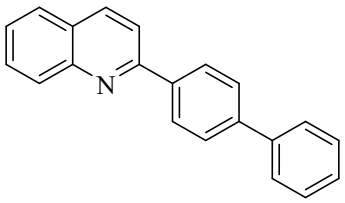
Following the general procedure **GP-1** the title compound **4d** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 20/1, R_f = 0.5) in 96% yield (0.89 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.18 (d, J = 8.6 Hz, 1H), 8.15 – 8.13 (m, 3H), 7.83 (d, J = 6.0 Hz, 1H), 7.81 (d, J = 6.0 Hz, 1H), 7.72 – 7.70 (m, 1H), 7.51 – 7.47 (m, 3H), 7.41 (t, J = 6.0 Hz, 2H), 7.36 – 7.33 (m, 1H), 7.14 – 7.12 (m, 2H), 5.16 (s, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 160.1, 157.0, 148.4, 136.9, 136.8, 132.6, 129.72, 129.7, 129.0, 128.8, 128.2, 127.6, 127.6, 127.1, 126.1, 118.7, 115.3, 70.2. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{22}H_{17}NO$ 312.1383; found: 312.1386.

2-(4-(allyloxy)phenylquinoline (4e)



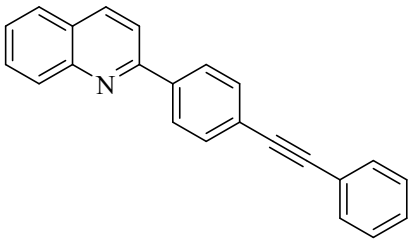
Following the general procedure **GP-1** the title compound **4e** was isolated as colourless oil using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 84% yield (0.66 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.18 (d, J = 8.6 Hz, 1H), 8.15 – 8.11 (m, 3H), 7.83 (d, J = 8.6 Hz, 1H), 7.80 (d, J = 8.0 Hz, 1H), 7.71 (t, J = 7.4 Hz, 1H), 7.50 (t, J = 7.4 Hz, 1H), 7.06 (d, J = 8.6 Hz, 2H), 6.12 – 6.07 (m, 1H), 5.46 (dd, J = 0.8, 16.4, Hz, 1H), 5.33 (d, J = 10.4 Hz, 1H), 4.62 (d, J = 5.1 Hz, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ159.9, 157.0, 148.4, 136.8, 133.2, 132.52, 129.7, 129.6, 129.0, 127.6, 127.0, 126.1, 118.7, 118.0, 115.1, 69.0. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{18}H_{15}NO$ 262.1227; found: 262.1220.

2-([1,1'-biphenyl]-4-yl)quinoline (4f)[8]



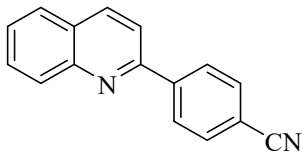
Following the general procedure **GP-1** the title compound **4f** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethylacetate (v/v = 50/1, R_f = 0.5) in 92% yield (0.77 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.28 (d, J = 8.2 Hz, 2H), 8.22 (d, J = 8.4 Hz, 2H), 7.92 (d, J = 8.4 Hz, 1H), 7.84 (d, J = 8.4 Hz, 1H), 7.79 – 7.74 (m, 3H), 7.70 (d, J = 7.8 Hz, 2H), 7.57 – 7.53 (m, 1H), 7.49 (t, J = 7.8 Hz, 2H), 7.42 – 7.39 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 157.0, 148.5, 142.2, 140.7, 138.6, 136.9, 129.9, 129.8, 129.0, 128.1, 127.7, 127.7, 127.6, 127.3, 127.3, 126.4, 119.0.

2-(4-(phenylethynyl)phenyl)quinoline (4g)[9]



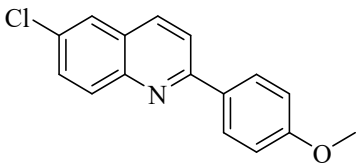
Following the general procedure **GP-1** the title compound **4g** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 20/1, R_f = 0.5) in 80% yield (0.73 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.24 (d, J = 8.4 Hz, 1H), 8.20 – 8.17 (m, 3H), 7.91 (d, J = 8.5 Hz, 1H), 7.84 (d, J = 8.0 Hz, 1H), 7.75 (t, J = 7.5 Hz, 1H), 7.70 (d, J = 8.1 Hz, 2H), 7.58 – 7.55 (m, 3H), 7.38 – 7.36 (m, 3H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 156.5, 148.4, 139.4, 137.0, 132.2, 131.8, 130.0, 129.9, 128.5, 127.6, 127.6, 127.4, 126.6, 124.4, 123.3, 118.9, 91.0, 89.5.

4-(quinolin-2-yl)benzonitrile (4h)[10]



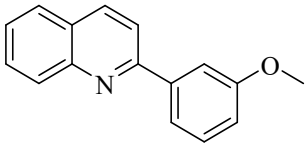
Following the general procedure **GP-1** the title compound **4h** was isolated as off white solid using silica gel column chromatography with pet-ether/ethylacetate (v/v = 50/1, R_f = 0.5) in 86% yield (0.59 g).^{1}H NMR (600 MHz, $CDCl_3$): δ 8.31 – 8.28 (m, 3H), 8.18 (d, J = 8.5 Hz, 1H), 7.90 (d, J = 8.5 Hz, 1H), 7.87 (d, J = 8.1 Hz, 1H), 7.82 (d, J = 7.4 Hz, 2H), 7.79 – 7.76 (m, 1H), 7.60 – 7.58 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 155.1, 148.4, 143.9, 137.4, 132.8, 130.3, 130.1, 128.2, 127.7, 127.7, 127.3, 119.0, 118.8, 112.9.

6-chloro-2-(4-methoxyphenyl)quinoline (4i)[11]



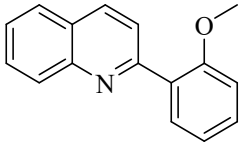
Following the general procedure **GP-1** the title compound **4i** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 20/1, R_f = 0.5) in 86% yield (0.66 g). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.14 – 8.05 (m, 4H), 7.86 (d, J = 8.0 Hz, 1H), 7.78 (d, J = 3.5 Hz, 1H), 7.64 (dd, J = 13.4, 3.5 Hz, 1H), 7.06 – 7.04 (m, 2H), 3.93 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.1, 157.3, 146.8, 135.9, 131.9, 131.6, 131.2, 130.6, 129.0, 127.6, 126.3, 119.5, 114.4, 55.6.

2-(3-methoxyphenyl)quinoline (4j)[12]



Following the general procedure **GP-1** the title compound **4j** was isolated as yellow solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 100/1, R_f = 0.5) in 89% yield (0.63 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.21 – 8.18 (m, 2H), 7.86 – 7.79 (m, 3H), 7.75 – 7.71 (m, 2H), 7.53 (t, J = 7.7 Hz, 1H), 7.44 (t, J = 8.0 Hz, 1H), 7.03 (dd, J = 2, 8.2 Hz, 1H), 3.96 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$): δ 160.2, 157.2, 148.3, 141.2, 136.9, 129.9, 129.8, 129.8, 127.6, 127.3, 126.4, 120.1, 119.2, 115.5, 112.8, 55.5.

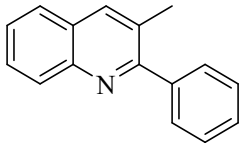
2-(2-methoxyphenyl)quinoline (4k)[6]



Following the general procedure **GP-1** the title compound **4k** was isolated as light yellow liquid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 100/1, R_f = 0.5) in 84% yield (0.59 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.18 – 8.14 (m, 2H), 7.89 (d, J = 8.4 Hz, 1H), 7.84 (t, J = 8.2 Hz, 2H), 7.71 (t, J = 7.4 Hz, 1H), 7.53 (t, J = 7.4 Hz, 1H), 7.43 (t, J = 7.4

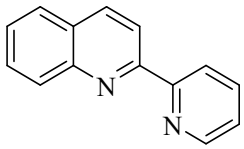
Hz, 1H), 7.14 (t, J = 7.4 Hz, 1H), 7.04 (d, J = 8.2 Hz, 1H), 3.87 (s, 3H).^{13}C NMR (151 MHz, $CDCl_3$): δ 157.3, 157.3, 148.4, 135.2, 131.6, 130.4, 129.9, 129.8, 129.3, 127.5, 127.2, 126.3, 123.6, 121.4, 111.5, 55.8.

3-methyl-2-phenylquinoline (4l)[6]



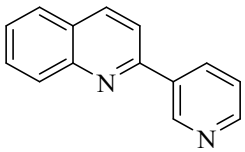
Following the general procedure **GP-1** the title compound **4l** was isolated as light yellow liquid using pet-ether/ ethyl acetate (v/v = 50/1, R_f = 0.5) in 90% yield (0.60 g). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.14 (d, J = 8.4 Hz, 1H), 8.02 (s, 1H), 7.78 (d, J = 8.0 Hz, 1H), 7.70 – 7.64 (m, 1H), 7.61 – 7.59 (m, 2H), 7.55 – 7.42 (m, 4H), 2.47 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 160.5, 146.6, 140.9, 136.8, 129.3, 129.2, 128.9, 128.8, 128.3, 128.3, 128.2, 127.6, 126.7, 126.4, 20.6. Spectral data is in accordance to the reported literature.

2-(pyridin-2-yl)quinoline (4m)[13]



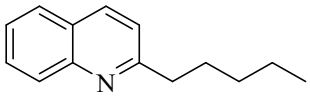
Following the general procedure **GP-1** the title compound **4m** was isolated as yellow solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 20/1, R_f = 0.5) in 91% yield (0.56 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.74 – 8.73 (m, 1H), 8.65 (d, J = 7.9 Hz, 1H), 8.56 (d, J = 8.6 Hz, 1H), 8.28 (d, J = 8.6 Hz, 1H), 8.18 (d, J = 8.6 Hz, 1H), 7.88 – 7.84 (m, 2H), 7.75 – 7.72 (m, 1H), 7.56 – 7.53 (m, 1H), 7.36 – 7.34 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 156.4, 156.3, 149.3, 148.0, 137.1, 136.9, 129.9, 129.7, 128.3, 127.7, 126.9, 124.1, 121.9, 119.1.

2-(pyridin-3-yl)quinoline (4n)[6]



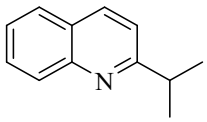
Following the general procedure **GP-1** the title compound **4n** was isolated as off yellow solid using silica gel column chromatography with pet-ether/ethyl acetate (v/v= 20/1, R_f = 0.5) in 92% yield (0.57 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 9.35 (d, J = 1.8 Hz, 1H), 8.70 (dd, J = 1.6, 4.8 Hz, 1H), 8.52 (dt, J = 2, 8 Hz, 1H), 8.29 (d, J = 8.0 Hz, 1H), 8.18 (d, 8.4 Hz, 1H), 7.90 (d, J = 8.4 Hz, 1H), 7.87 (d, J = 8.0 Hz, 1H), 7.78 – 7.75 (m, 1H), 7.59 – 7.56 (m, 1H), 7.48 – 7.46 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 154.8, 150.4, 149.0, 148.5, 137.4, 135.3, 135.1, 130.2, 129.9, 127.7, 127.5, 127.0, 123.9, 118.7.

2-pentylquinoline (4o)[14]



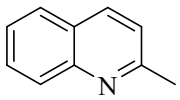
Following the general procedure **GP-1** the title compound **4o** was isolated as oily colourless liquid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 100/1, R_f = 0.5) in 76% yield (0.45 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.05 (t, J = 8.4 Hz, 2H), 7.77 (d, J = 8.0 Hz, 1H), 7.69 – 7.66 (m, 1H), 7.48 (t, J = 7.8 Hz, 1H), 7.30 (d, J = 8.4 Hz, 1H), 2.99 – 2.95 (m, 2H), 1.83 – 1.78 (m, 2H), 1.41 – 1.35 (m, 4H), 0.90 (t, J = 7.0 Hz, 3H).^{13}C NMR (151 MHz, $CDCl_3$): δ 163.3, 148.0, 136.3, 129.5, 128.9, 127.6, 126.8, 125.8, 121.5, 39.5, 31.9, 29.9, 22.7, 14.2.

2-isopropylquinoline (4p)[15]



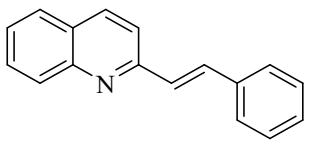
Following the general procedure **GP-1** the title compound **4p** was isolated as light yellow liquid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 100/1, R_f = 0.5) in 78% yield (0.4 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.07 (d, J = 8.4 Hz, 1H), 8.04 (d, J = 8.6 Hz, 1H), 7.73 (d, J = 8.1 Hz, 1H), 7.67–7.64 (m, 1H), 7.45 (t, J = 7.0 Hz, 1H), 7.30 (d, J = 8.6 Hz, 1H), 3.27 (hept, J = 7.0 Hz, 1H), 1.40 (d, J = 7.0 Hz, 6H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 167.7, 147.8, 136.4, 129.3, 129.0, 127.5, 127.0, 125.7, 119.2, 37.3, 22.6.

2-methylquinoline (4q)[16]



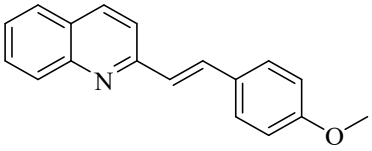
Following the general procedure **GP-1** the title compound **4q** was isolated as light yellow oil using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 95/5, R_f = 0.5) in 62% yield (0.57 g). ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.99 (d, J = 8.2 Hz, 1H), 7.92 (d, J = 8.4 Hz, 1H), 7.67 (d, J = 8.0 Hz, 1H), 7.61 (t, J = 8.4 Hz, 1H), 7.43 – 7.37 (m, 1H), 7.16 (d, J = 8.4 Hz, 1H), 2.67 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 158.9, 158.9, 147.8, 136.1, 129.3, 128.5, 127.4, 126.4, 125.6, 121.9, 25.3.

(E)-2-styrylquinoline (6a)[17]



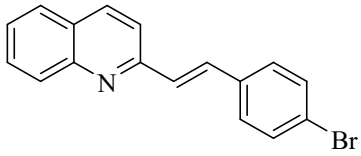
Following the general procedure **GP-2** the title compound **6a** was isolated as off-white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 50/1, R_f = 0.5) in 95% yield (0.219 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.13 (d, J = 8.5 Hz, 1H), 8.09 (d, J = 8.5 Hz, 1H), 7.79 (d, J = 7.6 Hz, 1H), 7.73 – 7.67 (m, 3H), 7.65 (d, J = 7.3 Hz, 2H), 7.51 – 7.49 (m, 1H), 7.45 – 7.38 (m, 3H), 7.33 (t, J = 7.3 Hz, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 156.1, 148.4, 136.7, 136.5, 134.6, 129.9, 129.3, 129.2, 128.9, 128.8, 127.6, 127.5, 127.4, 126.3, 119.4.

(*E*)-2-(4-methoxystyryl)quinoline (6b)[17]



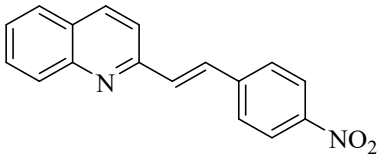
Following the general procedure **GP-2** the title compound **6b** was isolated as off-white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 50/1, R_f = 0.5) in 96% yield (0.250 g). ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.10 (d, J = 8.5 Hz, 1H), 8.07 (d, J = 8.5 Hz, 1H), 7.77 (d, J = 8.0 Hz, 1H), 7.71 – 7.68 (m, 1H), 7.66 – 7.62 (m, 2H), 7.59 (d, J = 8.6 Hz, 2H), 7.49 – 7.47 (m, 1H), 7.29 (d, J = 16.2 Hz, 1H), 6.94 (d, J = 8.7 Hz, 2H), 3.85 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 160.3, 156.5, 148.4, 136.4, 134.2, 129.8, 129.4, 129.2, 128.8, 127.6, 127.4, 127.0, 126.1, 119.3, 114.4, 55.5.

(*E*)-2-(4-bromostyryl)quinoline (6c)[17]



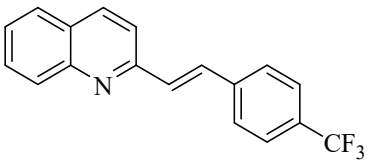
Following the general procedure **GP-2** the title compound **6c** was isolated as off-white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 50/1, R_f = 0.5) in 93% yield (0.288 g). ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.14 (d, J = 8.5 Hz, 1H), 8.08 (d, J = 8.5 Hz, 1H), 7.79 (d, J = 8.0 Hz, 1H), 7.74 – 7.70 (m, 1H), 7.67 – 7.62 (m, 2H), 7.55 – 7.48 (m, 5H), 7.39 (d, J = 16.3 Hz, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 155.7, 148.4, 136.6, 135.6, 133.2, 132.1, 130.0, 129.8, 129.4, 128.8, 127.7, 127.6, 126.5, 122.7, 119.5.

(*E*)-2-(4-nitrostyryl)quinoline (6d)[18]



Following the general procedure **GP-2** the title compound **6d** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 25/1, R_f = 0.5) in 67% yield (0.185 g). ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.26 (d, J = 8.7 Hz, 2H), 8.18 (d, J = 8.5 Hz, 1H), 8.10 (d, J = 8.5 Hz, 1H), 7.81 (d, J = 8.0 Hz, 1H), 7.78 – 7.72 (m, 4H), 7.66 (d, J = 8.5 Hz, 1H), 7.56 – 7.50 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 154.8, 148.4, 147.5, 143.1, 136.9, 133.3, 131.8, 130.2, 129.5, 127.8, 127.7, 126.9, 124.3, 119.9.

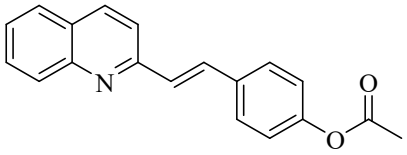
(*E*)-2-(4-(trifluoromethyl)styryl)quinoline (6e)[17]



Following the general procedure **GP-2** the title compound **6e** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 25/1, R_f = 0.5) in 83% yield (0.248 g). ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.17 (d, J = 8.5 Hz, 1H), 8.11 – 8.07 (m,

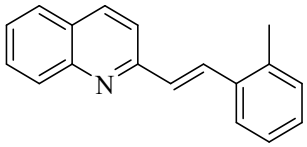
1H), 7.83 – 7.80 (m, 1H), 7.75 – 7.71 (m, 4H), 7.69 – 7.64 (m, 3H), 7.55 – 7.51 (m, 1H), 7.49 – 7.46 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 155.4, 148.4, 140.1, 136.7, 132.8, 131.5, 130.1, 129.5, 127.7, 127.7, 127.5, 126.7, 125.9 (q, J = 2.6 Hz, CF_3), 119.7.

(*E*)-4-(2-(quinolin-2-yl)vinyl)phenyl acetate (6f)[19]



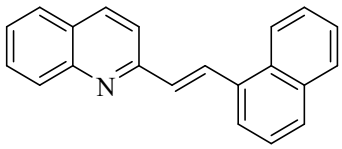
Following the general procedure **GP-2** the title compound **6f** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 92% yield (0.265 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.13 (d, J = 8.5 Hz, 1H), 8.08 (d, J = 8.5 Hz, 1H), 7.79 (d, J = 8 Hz, 1H), 7.72 – 7.61 (m, 5H), 7.50 (t, J = 7.5 Hz, 1H), 7.36 (d, J = 16.2 Hz, 1H), 7.14 (d, J = 8.4 Hz, 2H), 2.32 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 169.5, 155.9, 151.0, 148.4, 136.6, 134.5, 133.5, 129.9, 129.3, 128.4, 128.4, 127.6, 127.5, 126.4, 122.1, 119.4, 21.3. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{19}H_{15}NO$ 290.1176; found: 290.1188

(*E*)-2-(2-methylstyryl)quinoline (6g)[18]



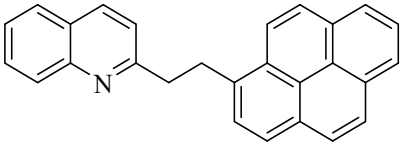
Following the general procedure **GP-2** the title compound **6g** was isolated as colourless liquid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 100/1, R_f = 0.5) in 71% yield (0.174 g). ^{1}H NMR (600 MHz, Chloroform-*d*): δ 8.13 (d, J = 8.4 Hz, 1H), 8.09 (d, J = 8.4 Hz, 1H), 7.94 (d, J = 16.2 Hz, 1H), 7.79 (d, J = 8.0 Hz, 1H), 7.76 – 7.67 (m, 3H), 7.53 – 7.47 (m, 1H), 7.32 (d, J = 16.2 Hz, 1H), 7.28 – 7.20 (m, 3H), 2.52 (s, 3H).^{13}C NMR (151 MHz, $CDCl_3$): δ 156.4, 148.4, 136.7, 136.5, 135.7, 132.3, 130.7, 130.3, 129.9, 129.4, 128.6, 127.6, 127.5, 126.5, 126.3, 126.0, 119.5, 20.2.

(*E*)-2-(2-(naphthalen-1-yl)vinyl)quinoline (6h)[18]



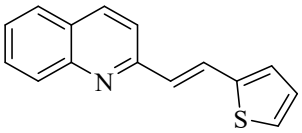
Following the general procedure **GP-2** the title compound **6h** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 90% yield (0.253 g). ^{1}H NMR (600 MHz, Chloroform-*d*): δ 8.16 (d, J = 8.4 Hz, 1H), 8.10 (d, J = 8.4 Hz, 1H), 8.01 (brs, 1H), 7.88 – 7.83 (m, 5H), 7.80 (d, J = 8.0 Hz, 1H), 7.75 – 7.70 (m, 2H), 7.57 – 7.47 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 156.2, 148.5, 136.5, 134.7, 134.2, 133.8, 133.7, 129.9, 129.5, 129.4, 128.7, 128.4, 128.3, 127.9, 127.7, 127.5, 126.6, 126.6, 126.3, 123.8, 119.5.

2-(2-(pyren-1-yl)ethyl)quinoline (6i)



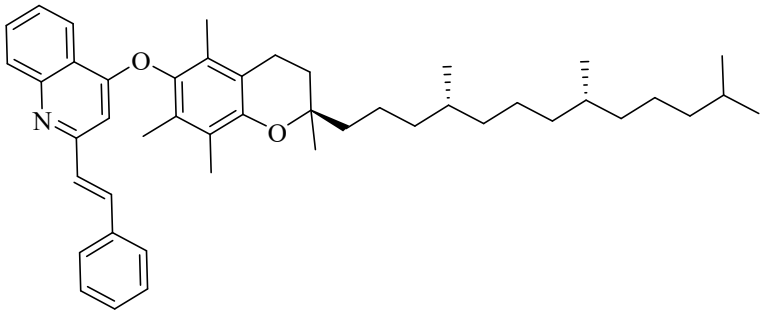
Following the general procedure **GP-2** the title compound **6i** was isolated as fluorescent yellow solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 50/1, R_f = 0.5) in 85% yield (0.305 g). ^{1}H NMR (500 MHz, Chloroform-*d*): δ 8.40 (d, J = 9.2 Hz, 1H), 8.20 – 8.14 (m, 3H), 8.13 – 8.07 (m, 2H), 8.05 – 7.97 (m, 4H), 7.88 (d, J = 7.7 Hz, 1H), 7.81 – 7.72 (m, 2H), 7.55 – 7.50 (m, 1H), 7.16 (d, J = 8.3 Hz, 1H), 3.96 – 3.88 (m, 2H), 3.58 – 3.51 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$): δ 161.9, 148.3, 136.3, 135.9, 131.6, 131.1, 130.1, 129.6, 129.2, 128.9, 127.7, 127.7, 127.5, 127.5, 127.0, 126.8, 126.0, 125.3, 125.2, 125.1, 125.0, 124.9, 123.5, 121.8, 41.2, 33.6. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{27}H_{20}N$ 358.1591; found: 358.1589.

(*E*)-2-(2-(thiophen-2-yl)vinyl)quinoline (6j)[20]



Following the general procedure **GP-2** the title compound **6j** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 89% yield (0.211 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.11 – 8.04 (m, 2H), 7.84 (d, J = 16.0 Hz, 1H), 7.76 (d, J = 8.0 Hz, 1H), 7.71 – 7.68 (m, 1H), 7.57 (d, J = 8.5 Hz, 1H), 7.48 (t, J = 7.7 Hz, 1H), 7.29 (d, J = 5.0 Hz, 1H), 7.25 – 7.19 (m, 2H), 7.07 – 7.03 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 155.7, 148.4, 142.2, 136.5, 129.9, 129.3, 128.3, 128.2, 128.0, 127.6, 127.4, 126.2, 126.1, 119.5.

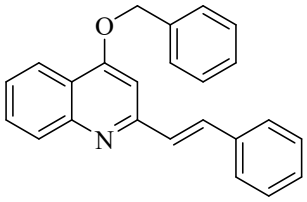
2-((E)-styryl)-4-(((R)-2,5,7,8-tetramethyl-2-((4R,8R)-4,8,12-trimethyltridecyl)chroman-6-yl)oxy)quinoline (6k)



Following the general procedure **GP-2** the title compound **6k** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 82% yield (0.540 g). ^{1}H NMR (600 MHz, Chloroform-*d*): δ 8.42 (d, J = 8.2 Hz, 1H), 8.08 (d, J = 8.5 Hz, 1H), 7.78 – 7.73 (m, 1H), 7.62 – 7.49 (m, 4H), 7.35 (t, J = 7.2 Hz, 2H), 7.30 – 7.27 (m, 1H), 7.18 (d, J = 16.1 Hz, 1H), 6.43 (d, J = 8.5 Hz, 1H), 2.69 – 2.67 (m, 1H), 2.19 (s, 3H), 2.04 (s, 3H), 1.99 (s, 3H), 1.94 – 1.83 (m, 2H), 1.65 (brs, 2H), 1.53 – 1.49 (m, 2H), 1.44 – 1.35 (m, 4H), 1.35 – 1.17 (m, 10H), 1.17 – 0.95 (m, 6H), 0.94 – 0.81 (m, 12H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 161.8, 157.2, 149.8, 149.5, 142.8, 136.6, 134.1, 130.3, 129.3, 129.0, 128.8, 128.6,

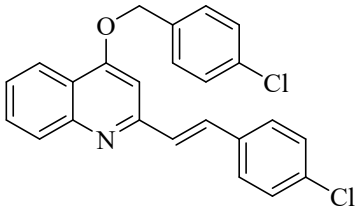
127.8, 127.4, 126.0, 125.6, 123.9, 121.9, 120.4, 118.4, 101.1, 101.0, 75.4, 41.1, 39.5, 39.1, 37.6, 37.6, 37.5, 37.4, 33.0, 32.9, 28.1, 25.0, 24.8, 24.6, 23.2, 22.9, 22.8, 21.2, 20.8, 19.9, 19.8, 12.9, 12.1. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{46}H_{61}NO_2$ 660.4776; found: 660.4751.

(*E*)-4-(benzyloxy)-2-styrylquinoline (6l)[21]



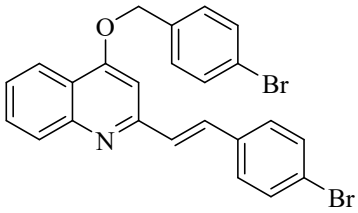
Following the general procedure **GP-3** the title compound **6l** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 91% yield (0.306 g). ^{1}H NMR (600 MHz, Chloroform-*d*): δ 8.25 – 8.21 (m, 1H), 8.04 – 8.02 (m, 1H), 7.72 – 7.67 (m, 1H), 7.66 – 7.62 (m, 3H), 7.56 (d, *J* = 7.4 Hz, 2H), 7.46 (t, *J* = 7.6 Hz, 3H), 7.40 (t, *J* = 7.6 Hz, 3H), 7.37 – 7.31 (m, 2H), 7.08 (s, 1H), 5.37 (s, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 161.7, 157.2, 149.4, 136.7, 136.0, 134.2, 130.3, 129.7, 129.0, 128.9, 128.7, 128.6, 127.7, 127.4, 125.5, 122.0, 121.0, 99.2, 70.4.

(*E*)-4-((4-chlorobenzyl)oxy)-2-(4-chlorostyryl)quinoline (6m)



Following the general procedure **GP-3** the title compound **6m** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 20/1, R_f = 0.5) in 88% yield (0.357 g). ^{1}H NMR (500 MHz, Chloroform-*d*): δ 8.23 (d, *J* = 8.2 Hz, 1H), 8.03 (d, *J* = 8.4 Hz, 1H), 7.73 – 7.68 (m, 1H), 7.67 – 7.61 (m, 3H), 7.55 (d, *J* = 7.0 Hz, 2H), 7.48 – 7.46 (m, 1H), 7.46 – 7.45 (m, 1H), 7.42 – 7.36 (m, 3H), 7.34 – 7.32 (m, 1H), 7.07 (s, 1H), 5.37 (s, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 161.7, 157.2, 149.4, 136.7, 136.0, 134.2, 130.3, 129.7, 129.0, 128.9, 128.9, 128.7, 128.6, 127.7, 127.4, 125.5, 122.0, 121.0, 99.2, 70.4. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{24}H_{17}Cl_2NO$ 406.0760; found: 406.0762

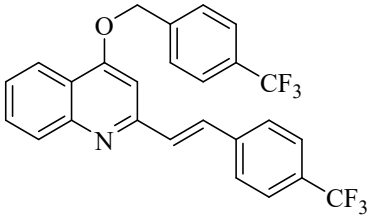
(E)-4-((4-bromobenzyl)oxy)-2-(4-bromostyryl)quinoline (6n)



Following the general procedure **GP-3** the title compound **6n** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 20/1, R_f = 0.5) in 82% yield (0.403 g). ^{1}H NMR (500 MHz, Chloroform-*d*): δ 8.23 – 8.16 (m, 1H), 8.02 (d, *J* = 8.4 Hz, 1H), 7.73 – 7.69 (m, 1H), 7.61 – 7.56 (m, 3H), 7.54 – 7.46 (m, 5H), 7.42 (d, *J* = 8.1 Hz, 2H), 7.31 (d, *J* = 16.3 Hz, 1H), 7.00 (s, 1H), 5.31 (s, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ

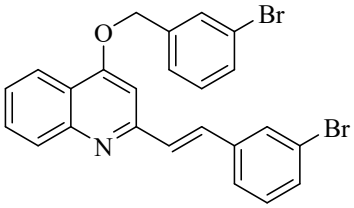
161.5, 156.7, 149.4, 135.5, 134.9, 133.0, 132.2, 132.1, 130.5, 130.1, 129.3, 128.9, 128.8, 125.8, 122.7, 122.6, 121.9, 120.8, 99.3, 69.7. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{24}H_{17}Br_2NO$ 495.9730; found: 495.9737.

(*E*)-4-((4-(trifluoromethyl)benzyl)oxy)-2-(4-(trifluoromethyl)styryl)quinoline (6o)



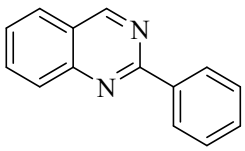
Following the general procedure **GP-3** the title compound **6o** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 20/1, R_f = 0.5) in 84% yield (0.397 g). ^{1}H NMR (600 MHz, Chloroform-*d*): δ 8.24 – 8.23 (m, 1H), 8.05 (d, J = 8.4 Hz, 1H), 7.79 – 7.62 (m, 10H), 7.54 – 7.49 (m, 1H), 7.40 (d, J = 16.2 Hz, 1H), 7.03 (s, 1H), 5.43 (s, 2H).^{13}C NMR (151 MHz, $CDCl_3$): δ 161.5, 156.3, 149.4, 139.9 (d, J = 27.0 Hz), 132.7, 130.9 (J = 32.4 Hz), 130.6, 130.4 (J = 32.4 Hz), 129.1, 127.6 (J = 27.7 Hz), 126.1-125.9 (m), 125.0 (d, J = 18.4 Hz), 123.2 (J = 20.2 Hz), 121.9, 120.9, 99.5, 69.5. ^{19}F NMR (471 MHz, Chloroform-*d*): δ -62.60, -62.63. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{26}H_{17}F_6NO$ 474.1288; found: .474.1285

(*E*)-4-((3-bromobenzyl)oxy)-2-(3-bromostyryl)quinoline (6p)



Following the general procedure **GP-3** the title compound **6p** was isolated as off white solid using silica gel column chromatography with pet-ether/ethyl acetate (v/v = 25/1, R_f = 0.5) in 81% yield (0.402 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 8.21 (d, J = 9.0 Hz, 1H), 8.03 (d, J = 8.4 Hz, 1H), 7.79 (s, 1H), 7.73 – 7.70 (m, 2H), 7.60 – 7.52 (m, 3H), 7.51 – 7.43 (m, 3H), 7.34 – 7.29 (m, 2H), 7.28 – 7.25 (m, 1H), 6.98 (s, 1H), 5.31 (s, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 161.5, 156.5, 149.4, 138.8, 138.2, 132.7, 131.7, 131.5, 130.8, 130.6, 130.6, 130.5, 130.4, 130.2, 129.0, 128.9, 126.1, 126.0, 125.9, 123.1, 123.0, 121.9, 120.9, 99.4, 69.5. HRMS (ESI) *m/z*: $[M+H]^+$ calculated for $C_{24}H_{17}Br_2NO$ 495.9730; found: 495.9739.

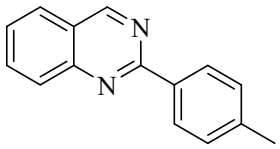
2-phenylquinazoline (8a)[22]



Following the general procedure **GP-4** the title compound **8a** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethylacetate (v/v= 100/1, R_f = 0.5) in 92% yield (0.57 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 9.48 (s, 1H), 8.62 – 8.61 (m, 2H), 8.10 (d,

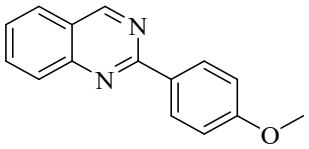
J = 8.2 Hz, 1H), 7.94 – 7.90 (m, 2H), 7.64 – 7.61 (m, 1H), 7.56 – 7.51 (m, 3H).^{13}C NMR (151 MHz, $CDCl_3$): δ 161.2, 160.7, 150.9, 138.2, 134.3, 130.8, 128.8, 128.7, 127.4, 127.3, 123.8.

2-(4-methylphenyl)quinazoline (8b)[22]



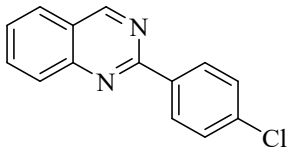
Following the general procedure **GP-4** the title compound **8b** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethylacetate (v/v= 100/1, R_f = 0.5) in 92% yield (0.61 g). ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.44 (s, 1H), 8.52 (d, *J* = 9.6 Hz, 2H), 8.07 (d, *J* = 9.6 Hz, 1H), 7.90 – 7.87 (m, 2H), 7.58 (t, *J* = 8.8 Hz, 1H), 7.35 (d, *J* = 9.6 Hz, 2H), 2.45 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 161.3, 160.6, 150.9, 141.0, 135.4, 134.2, 129.6, 128.7, 128.6, 127.3, 127.2, 123.6, 21.7.

2-(4-methoxyphenyl)quinazoline (8c)[23]



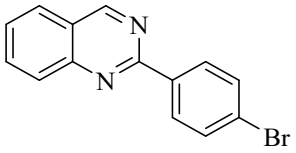
Following the general procedure **GP-4** the title compound **8c** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 100/1, R_f = 0.5) in 96% yield (0.68 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 9.42 (s, 1H), 8.58 (d, *J* = 8.8 Hz, 2H), 8.04 (d, *J* = 7.8 Hz, 1H), 7.90 – 7.87 (m, 2H), 7.57 (t, *J* = 7.2 Hz, 1H), 7.05 (d, *J* = 8.8 Hz, 2H), 3.90 (s, 3H).^{13}C NMR (151 MHz, $CDCl_3$): δ 162.0, 161.0, 160.5, 151.0, 134.2, 130.9, 130.3, 128.6, 127.3, 126.9, 123.5, 114.1, 55.5.

2-(4-chlorophenyl)quinazoline (8d)[23]



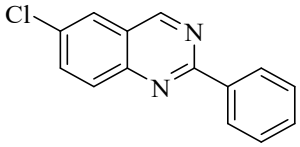
Following the general procedure **GP-4** the title compound **8d** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 50/1, R_f = 0.5) in 82% yield (0.59 g). ^{1}H NMR (400 MHz, $CDCl_3$): δ 9.44 (s, 1H), 8.58 – 8.55 (m, 2H), 8.08 – 8.06 (m, 1H), 7.93 – 7.89 (m, 2H), 7.64 – 7.60 (m, 1H), 7.51 – 7.48 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 160.7, 160.2, 150.8, 137.0, 136.7, 134.4, 130.0, 129.0, 128.7, 127.6, 127.3, 123.8.

2-(4-bromophenyl)quinazoline (8e)[23]



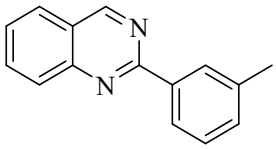
Following the general procedure **GP-4** the title compound **8e** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethylacetate (v/v= 50/1, R_f = 0.5) in 86% yield (0.73 g). ^{1}H NMR (400 MHz, $CDCl_3$): δ 9.45 (s, 1H), 8.51 – 8.49 (m, 2H), 8.09 – 8.07 (m, 1H), 7.94 – 7.92 (m, 2H), 7.67– 7.63 (m, 3H). ^{13}C NMR (101 MHz, $CDCl_3$): δ 160.7, 160.3, 150.8, 137.1, 134.4, 131.9, 130.3, 128.7, 127.7, 127.3, 125.6, 123.8.

6-chloro-2-phenylquinazoline (8f)[23]



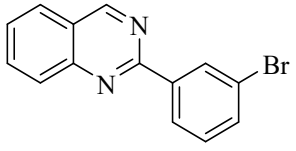
Following the general procedure **GP-4** the title compound **xx** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 95/5, R_f = 0.5) in 81% yield (0.57 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 9.41 (s, 1H), 8.61 (dd, J = 1.8, 7.8 Hz, 2H), 8.04 (d, J = 8.9 Hz, 1H), 7.92 (d, J = 1.8 Hz, 1H), 7.84 (dd, J = 2.2, 8.9 Hz, 1H), 7.56 – 7.51 (m, 3H).^{13}C NMR (151 MHz, $CDCl_3$): δ 161.4, 159.7, 149.4, 137.7, 135.3, 132.9, 131.0, 130.5, 128.9, 128.7, 126.0, 124.1.

2-(m-tolyl)quinazoline (8g)[23]



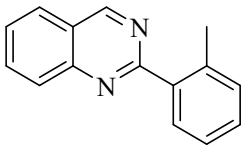
Following the general procedure **GP-4** the title compound **8g** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethylacetate (v/v= 100/1, R_f = 0.5) in 85% yield (0.56 g). ^{1}H NMR (400 MHz, $CDCl_3$): δ 9.45 (s, 1H), 8.43 – 8.41 (m, 2H), 8.10 – 8.07 (m, 1H), 7.91 – 7.86 (m, 2H), 7.60 – 7.56 (m, 1H), 7.44 (t, J = 8.0 Hz, 1H), 7.33 (d, J = 8.0 Hz, 1H), 2.49 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$): δ 161.3, 160.5, 150.8, 138.4, 138.1, 134.2, 131.5, 129.2, 128.7, 127.3, 127.2, 125.9, 123.7, 21.6.

2-(3-bromophenyl)quinazoline (8h)[23]



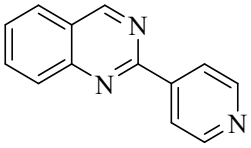
Following the general procedure **GP-4** the title compound **8h** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v = 95/5, R_f = 0.5) in 92% yield (0.57 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 9.46 (s, 1H), 8.79 (t, J = 1.8 Hz, 1H), 8.56 (dt, J = 1.2, 7.8 Hz, 1H), 8.09 (d, J = 6.0 Hz, 1H), 7.94 – 7.91 (m, 2H), 7.65 – 7.62 (m, 2H), 7.40 (t, J = 7.8 Hz, 1H).^{13}C NMR (151 MHz, $CDCl_3$): δ 160.7, 159.7, 150.8, 140.2, 134.5, 133.6, 131.7, 130.3, 128.8, 127.8, 127.3, 127.2, 123.9, 123.1.

2-(o-tolyl)quinazoline (8i)[24]



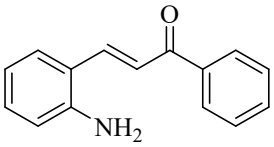
Following the general procedure **GP-4** the title compound **8i** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethyl acetate (v/v= 100/1, R_f = 0.5) in 92% yield (0.53 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 9.51 (s, 1H), 8.10 (d, J = 8.4 Hz, 1H), 7.97 (d, J = 8.0 Hz, 1H), 7.95 – 7.93 (m, 1H), 7.90 (d, J = 7.0 Hz, 1H), 7.66 (t, J = 7.0 Hz, 1H), 7.37 – 7.33 (m, 3H), 2.61 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$): δ 164.2, 160.2, 150.5, 138.7, 137.5, 134.3, 131.4, 130.8, 129.4, 128.7, 127.7, 127.2, 126.1, 123.1, 21.2.

2-(pyridin-4-yl)quinazoline (8j)[25]



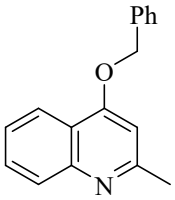
Following the general procedure **GP-4** the title compound **8j** was isolated as off white solid using silica gel column chromatography with pet-ether/ ethylacetate (v/v = 95/5, R_f = 0.5) in 92% yield (0.57 g). ^{1}H NMR (600 MHz, $CDCl_3$): δ 9.52 (s, 1H), 8.82 – 8.81 (m, 2H), 8.47–8.46 (m, 2H), 8.14 (d, J = 8.4 Hz, 1H), 8.00 – 7.96 (m, 2H), 7.72– 7.69 (m, 1H).^{13}C NMR (151 MHz, $CDCl_3$): δ 160.9, 159.1, 150.7, 150.7, 145.4, 134.7, 129.0, 128.5, 127.4, 124.3, 122.5.

***(E)*-3-(2-Aminophenyl)-1-phenylprop-2-en-1-one (9)**[26]



^{1}H NMR (500 MHz, $CDCl_3$): δ 8.03 (d, J = 7.7 Hz, 2H), 7.99 (d, J = 15.6 Hz, 1H), 7.61 – 7.56 (m, 1H), 7.54 – 7.47 (m, 4H), 7.22 – 7.19 (m, 1H), 6.80 (t, J = 7.5 Hz, 1H), 6.74 – 6.72 (m, 1H), 4.05 (s, 2H).^{13}C NMR (126 MHz, $CDCl_3$): δ 190.4, 146.4, 140.3, 138.5, 132.8, 131.8, 128.7, 128.6, 128.3, 121.9, 120.4, 119.0, 117.0.

4-(benzyloxy)-2-methylquinoline (10)[27]



^{1}H NMR (500 MHz, $CDCl_3$): δ 8.21 (dd, J = 8.4, 1.5 Hz, 1H), 7.96 (d, J = 8.4 Hz, 1H), 7.68-7.65 (m, 1H), 7.53 – 7.49 (m, 2H), 7.44 (dd, J = 8.3, 6.6 Hz, 3H), 7.41 – 7.37 (m, 1H), 6.71 (s,

1H), 5.27 (s, 2H), 2.70 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$): δ 161.5, 160.2, 149.0, 136.0, 129.9, 128.8, 128.5, 128.2, 127.6, 124.9, 121.9, 120.0, 101.7, 70.2, 26.1.

9. ^{1}H, ^{13}C, and ^{19}F NMR spectra of the products:

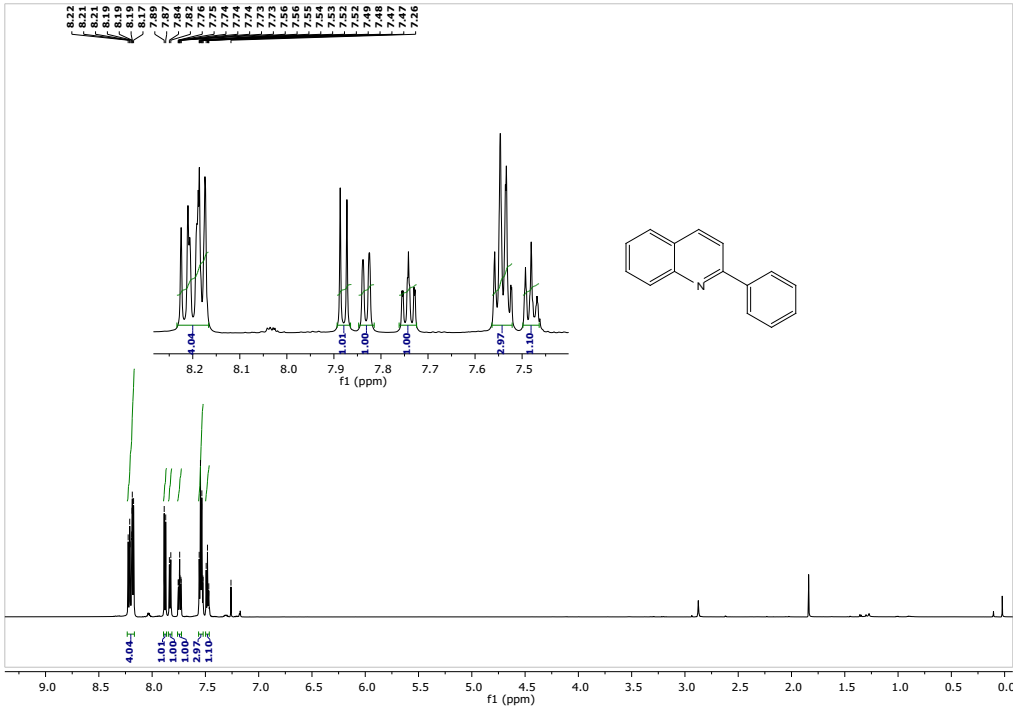


Figure S4: ^{1}H NMR Spectrum of **4a** ($CDCl_3$, 600 MHz, 298 K)

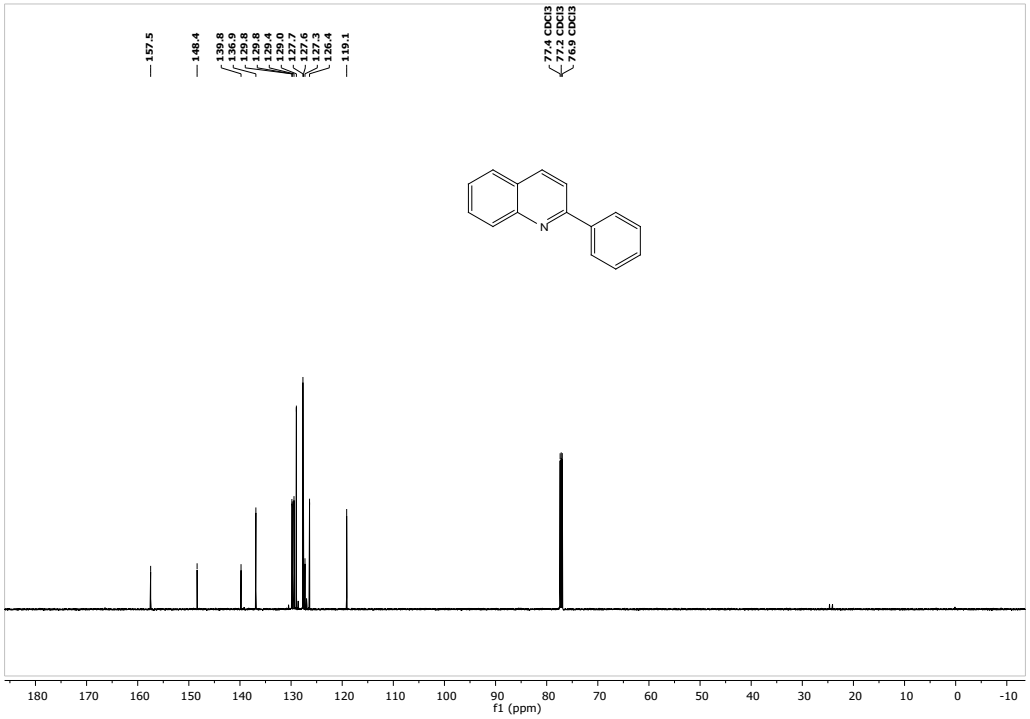


Figure S5: ^{13}C NMR Spectrum of **4a** ($CDCl_3$, 151 MHz, 298 K)

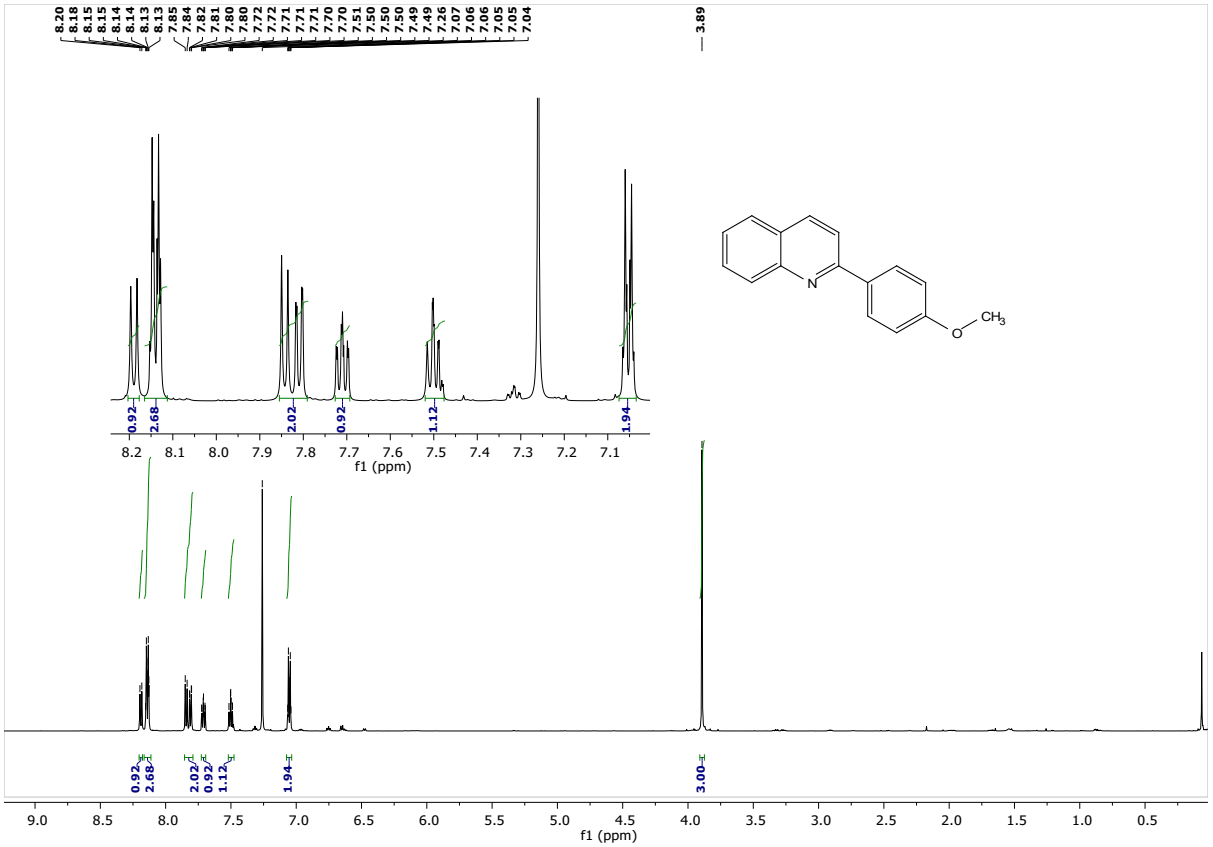


Figure S6: ^{1}H NMR Spectrum of **4b** ($CDCl_3$, 600 MHz, 298 K)

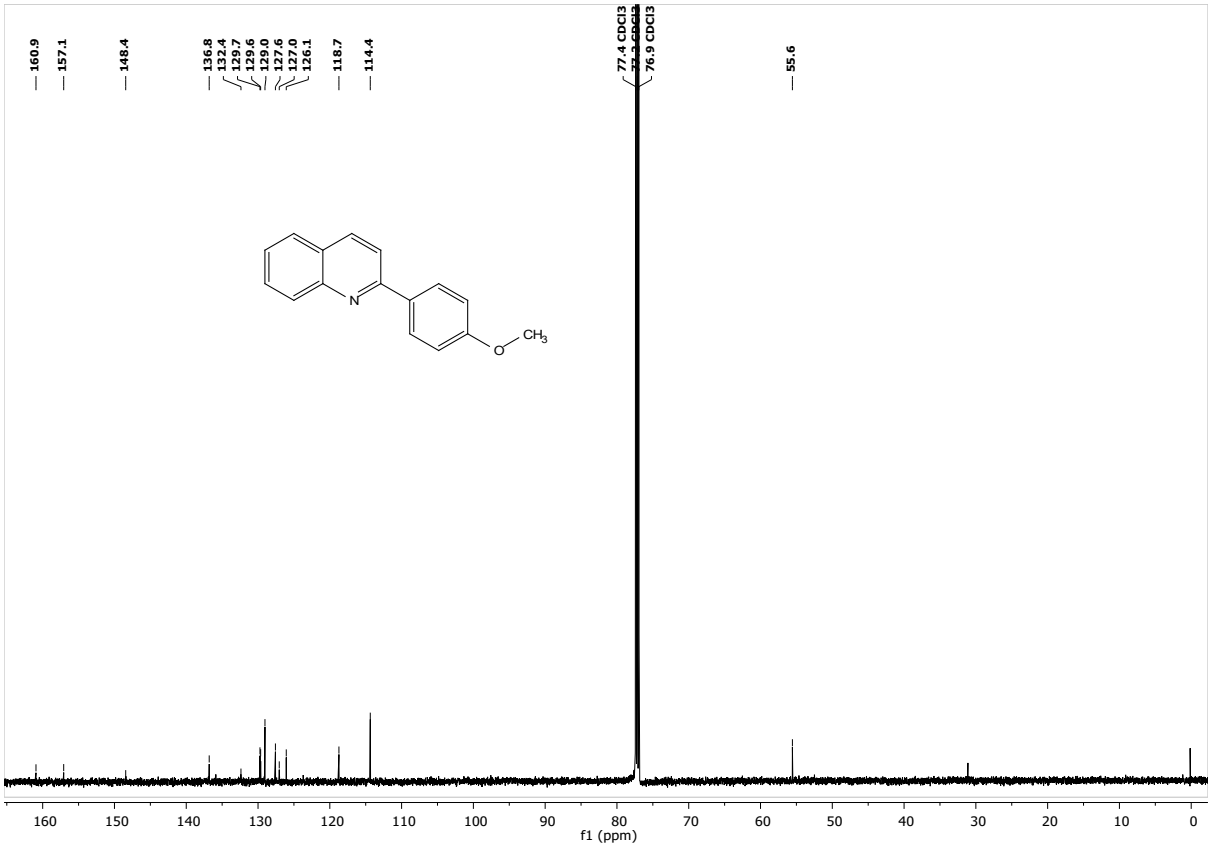


Figure S7: ^{13}C NMR Spectrum of **4b** ($CDCl_3$, 151 MHz, 298 K)

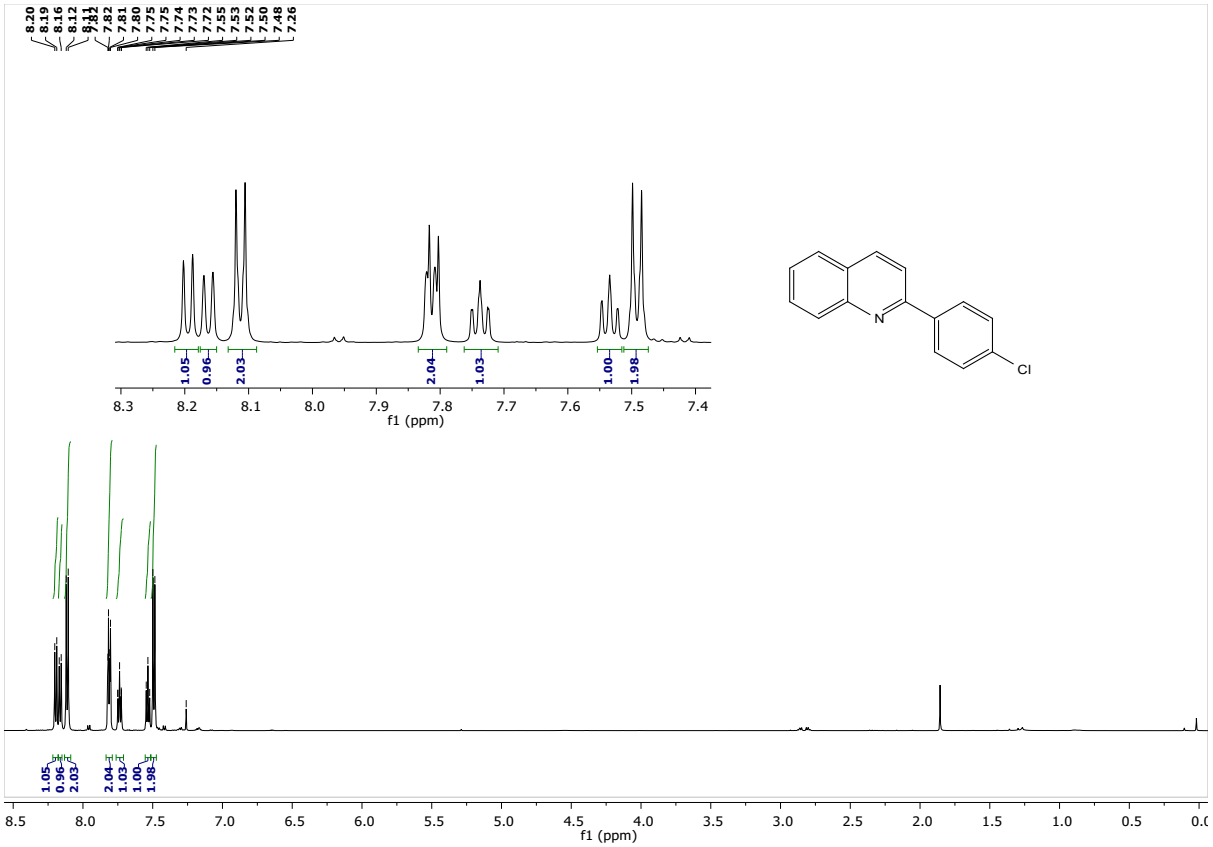


Figure S8: ^{1}H NMR Spectrum of **4c** ($CDCl_3$, 600 MHz, 298 K)

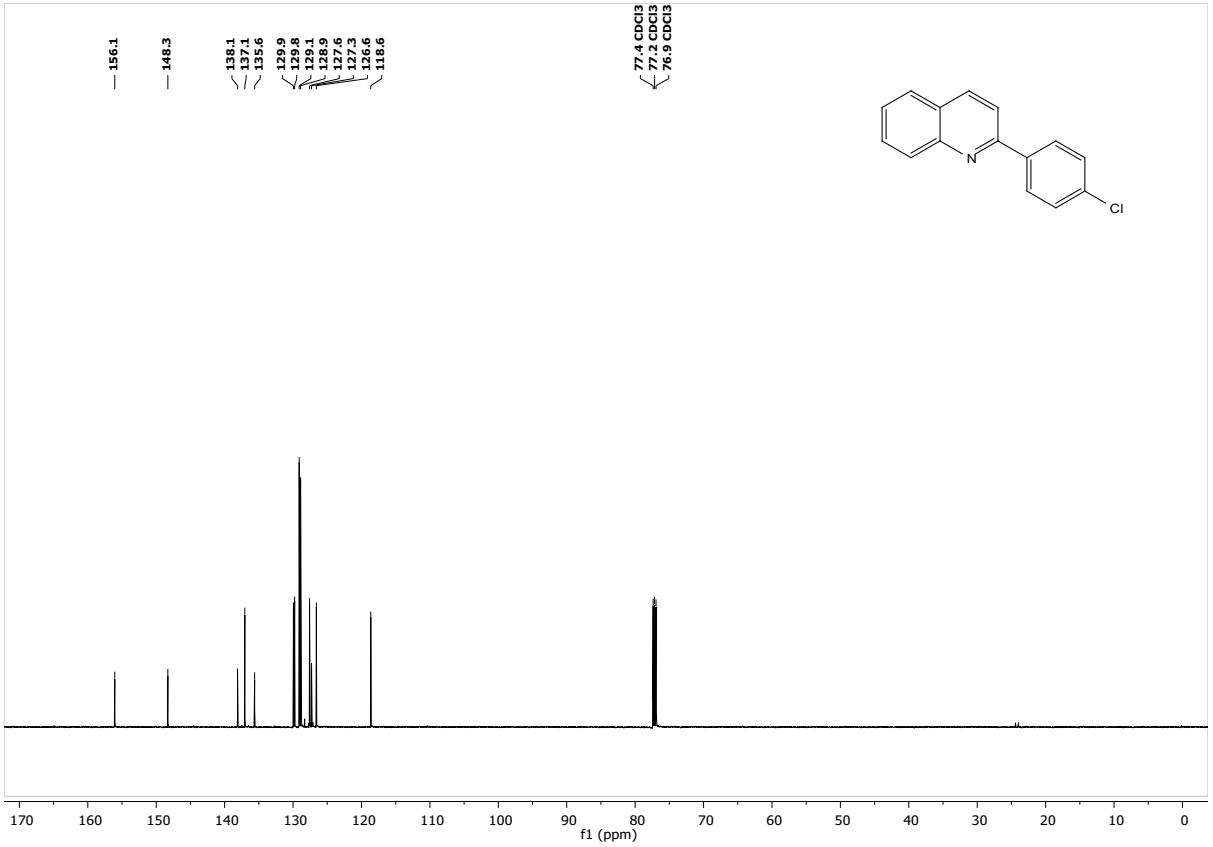


Figure S9: ^{13}C NMR Spectrum of **4c** ($CDCl_3$, 151 MHz, 298 K)

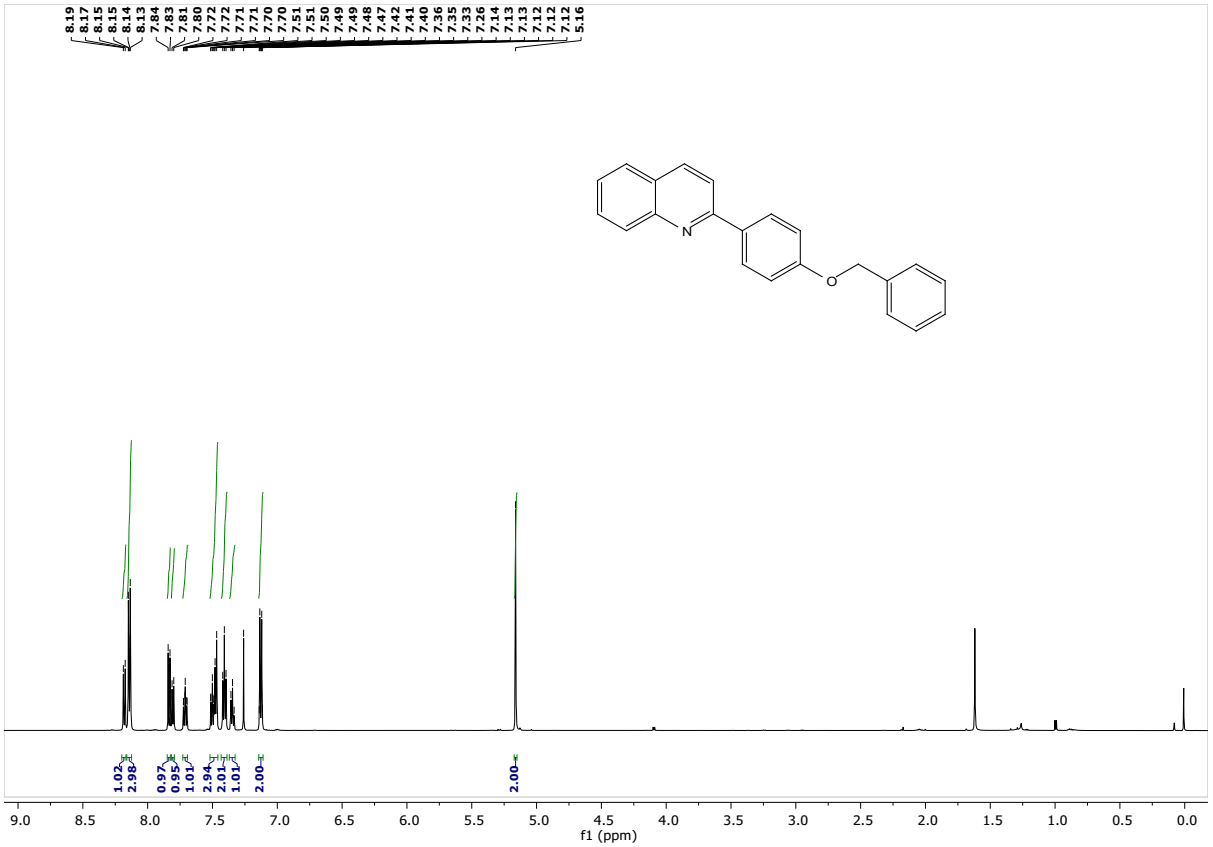


Figure S10: ^{1}H NMR Spectrum of **4d** ($CDCl_3$, 600 MHz, 298 K)

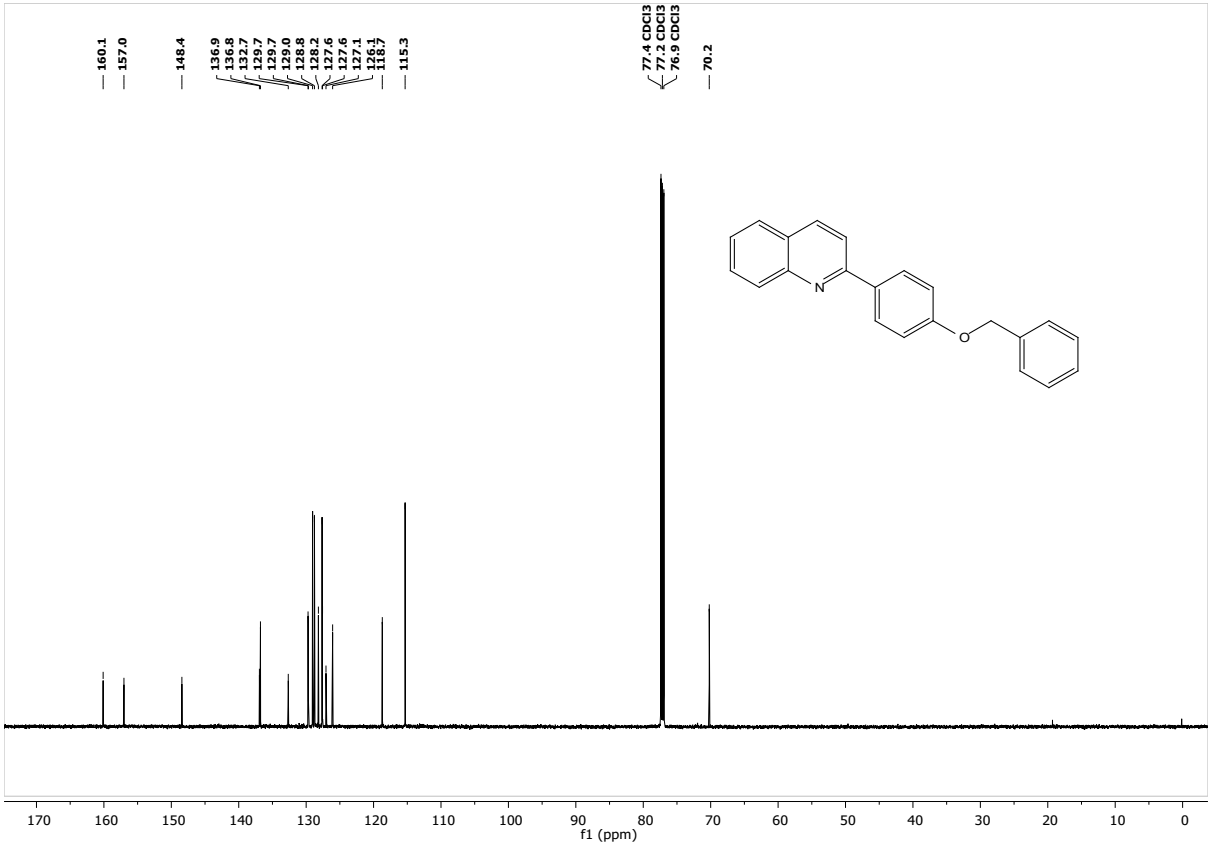


Figure S11: ^{13}C NMR Spectrum of **4d** ($CDCl_3$, 151 MHz, 298 K)

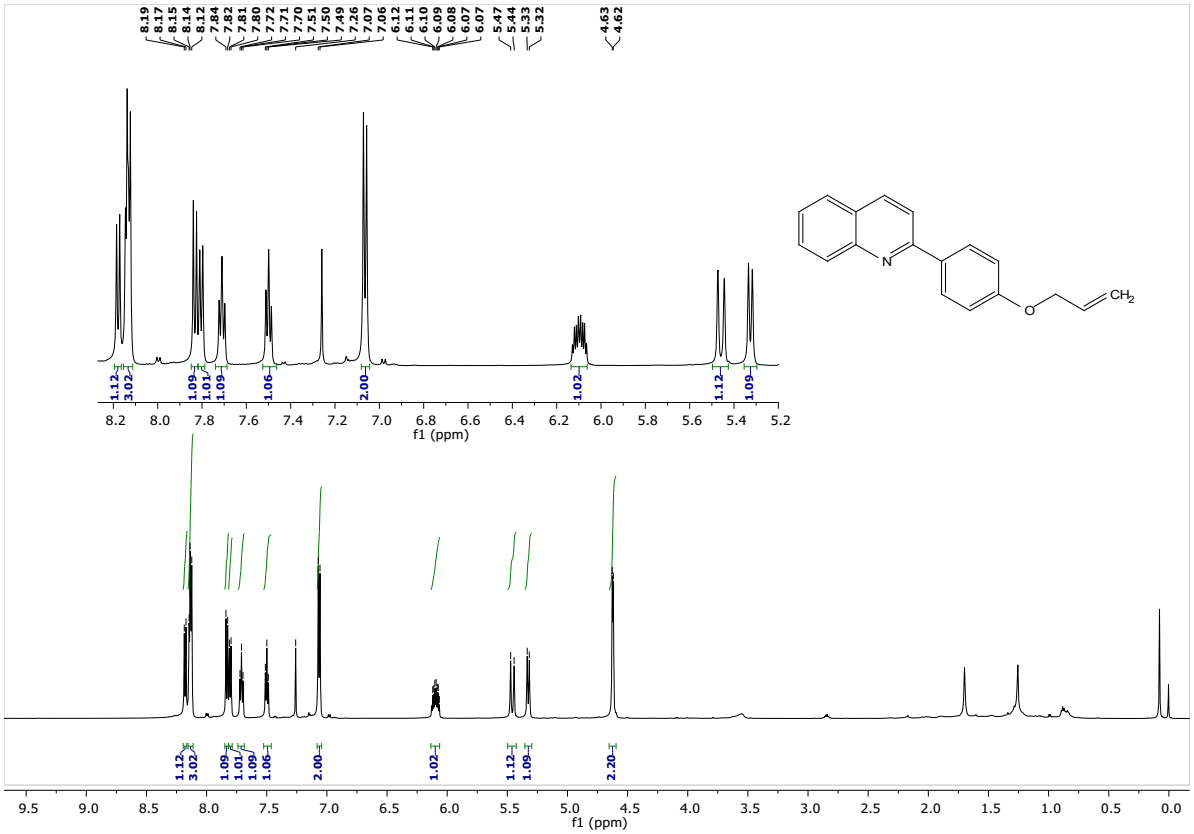


Figure S12: ^{1}H NMR Spectrum of **4e** ($CDCl_3$, 600 MHz, 298 K)

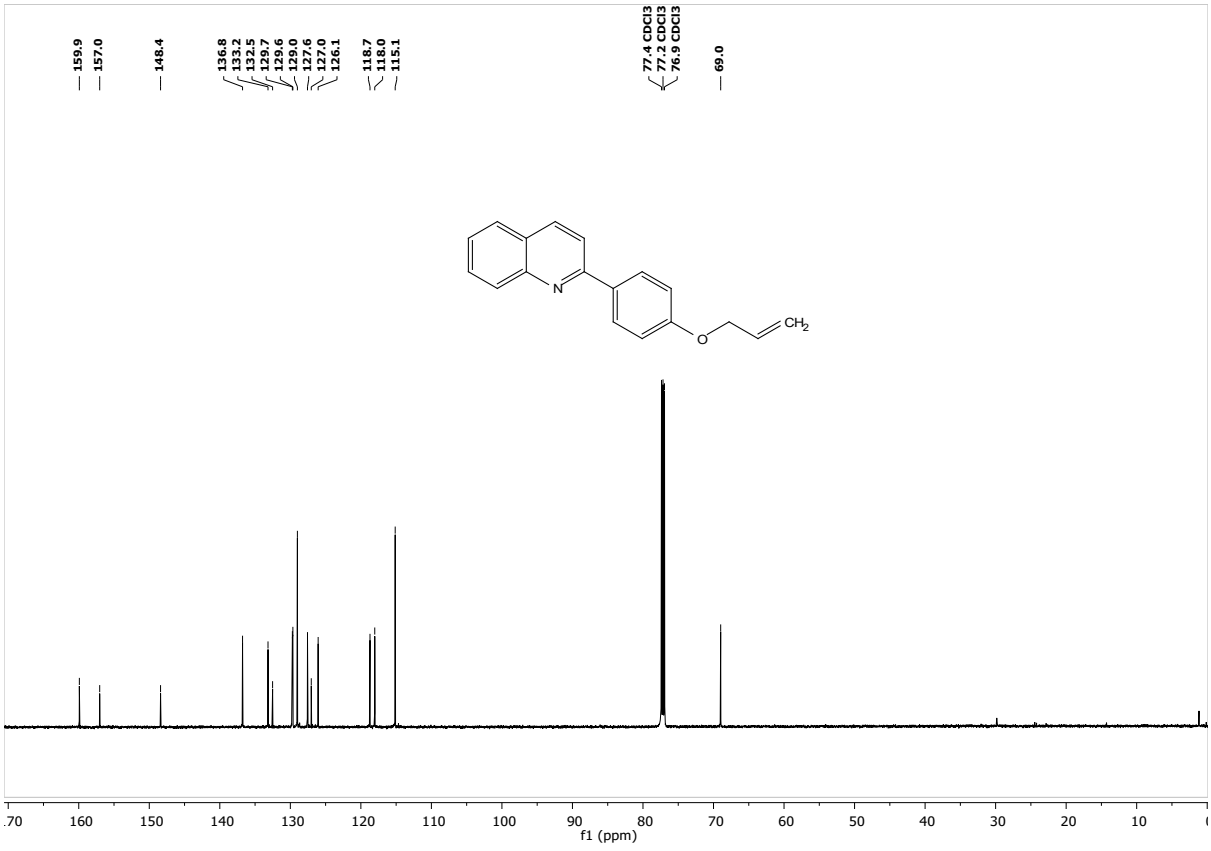


Figure S13: ^{13}C NMR Spectrum of **4e** ($CDCl_3$, 151 MHz, 298 K)

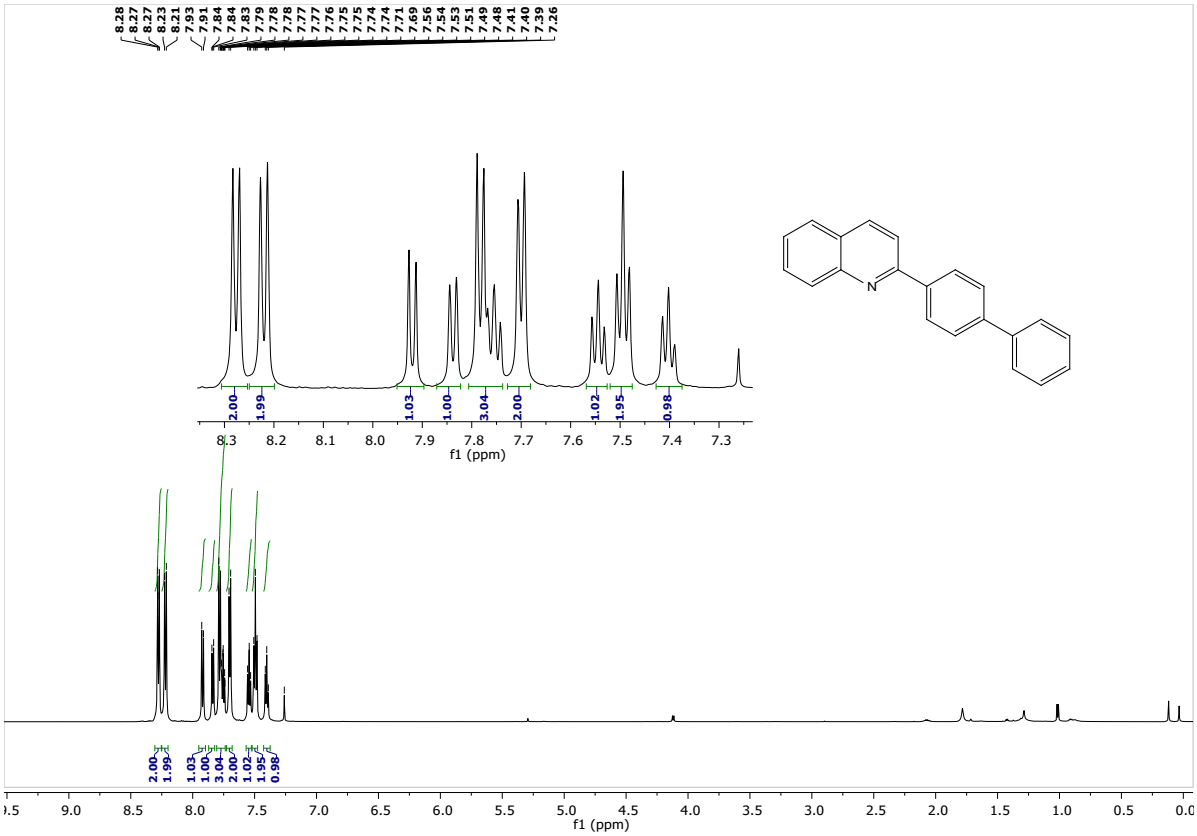


Figure S14: ^{1}H NMR Spectrum of **4f** ($CDCl_3$, 600 MHz, 298 K)

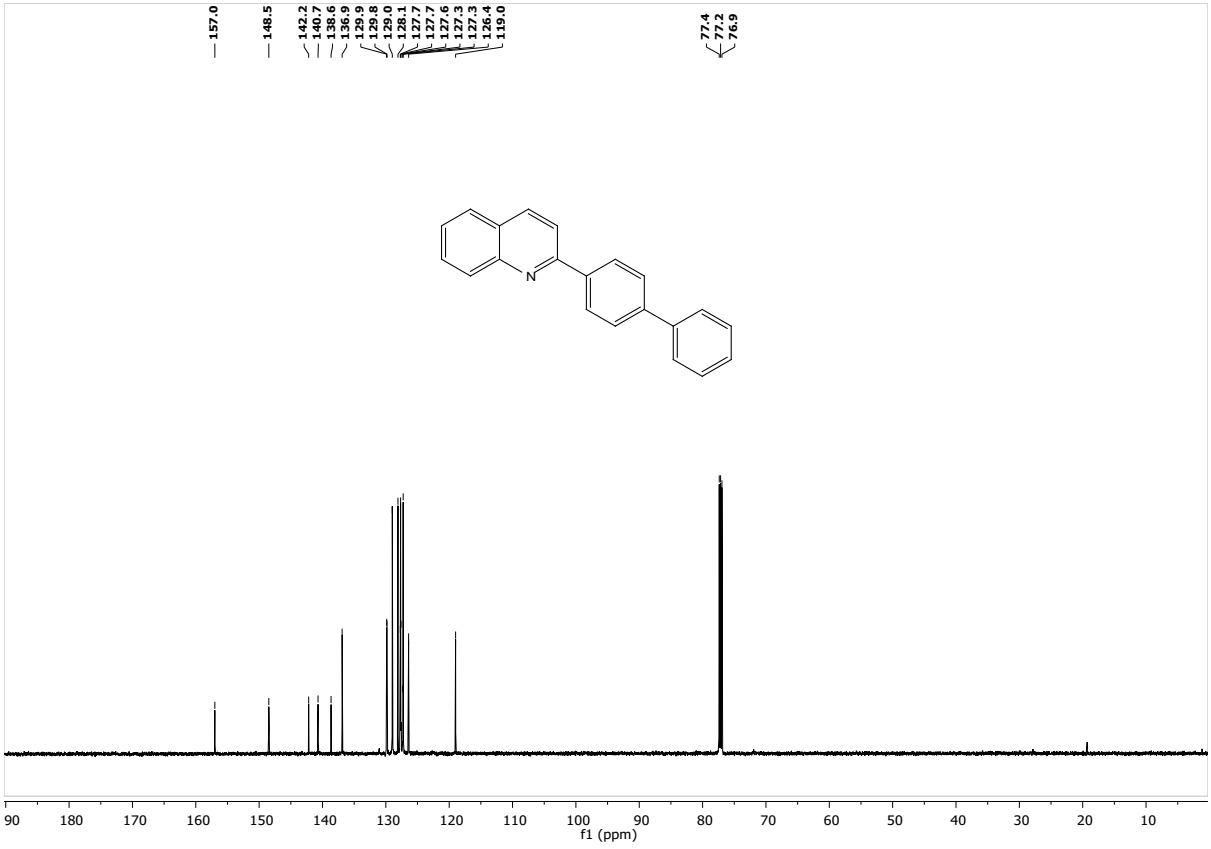


Figure S15: ^{13}C NMR Spectrum of **4f** ($CDCl_3$, 151 MHz, 298 K)

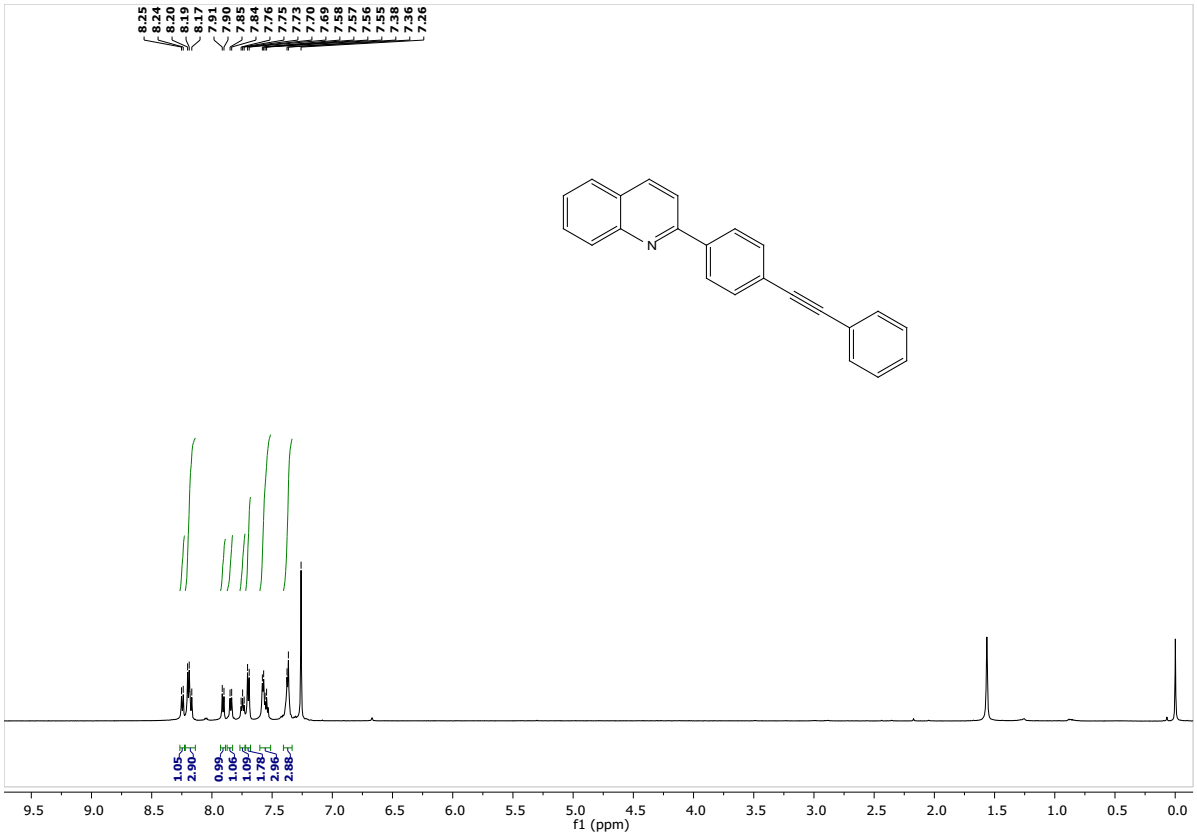


Figure S16: ^{1}H NMR Spectrum of **4g** ($CDCl_3$, 600 MHz, 298 K)

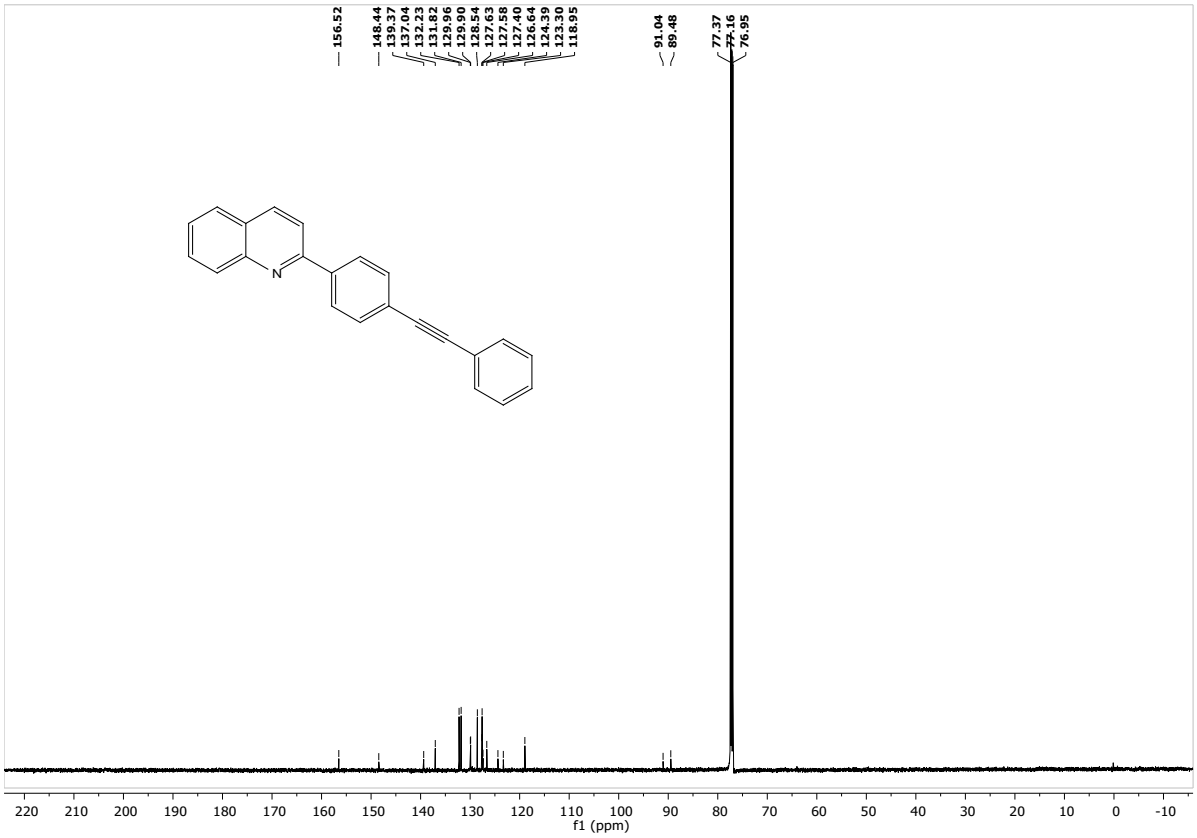


Figure S17: ^{13}C NMR Spectrum of **4g** ($CDCl_3$, 151 MHz, 298 K)

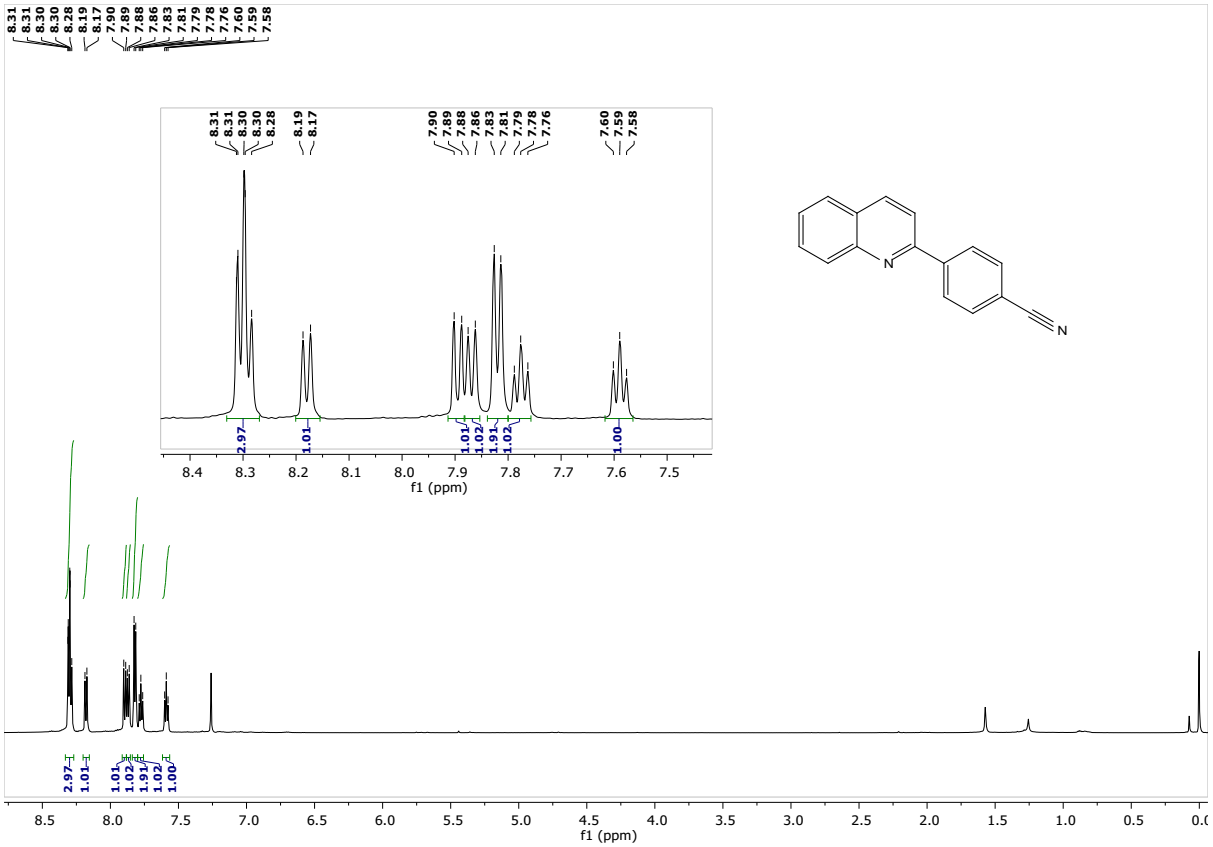


Figure S18: ^{1}H NMR Spectrum of **4h** ($CDCl_3$, 600 MHz, 298 K)

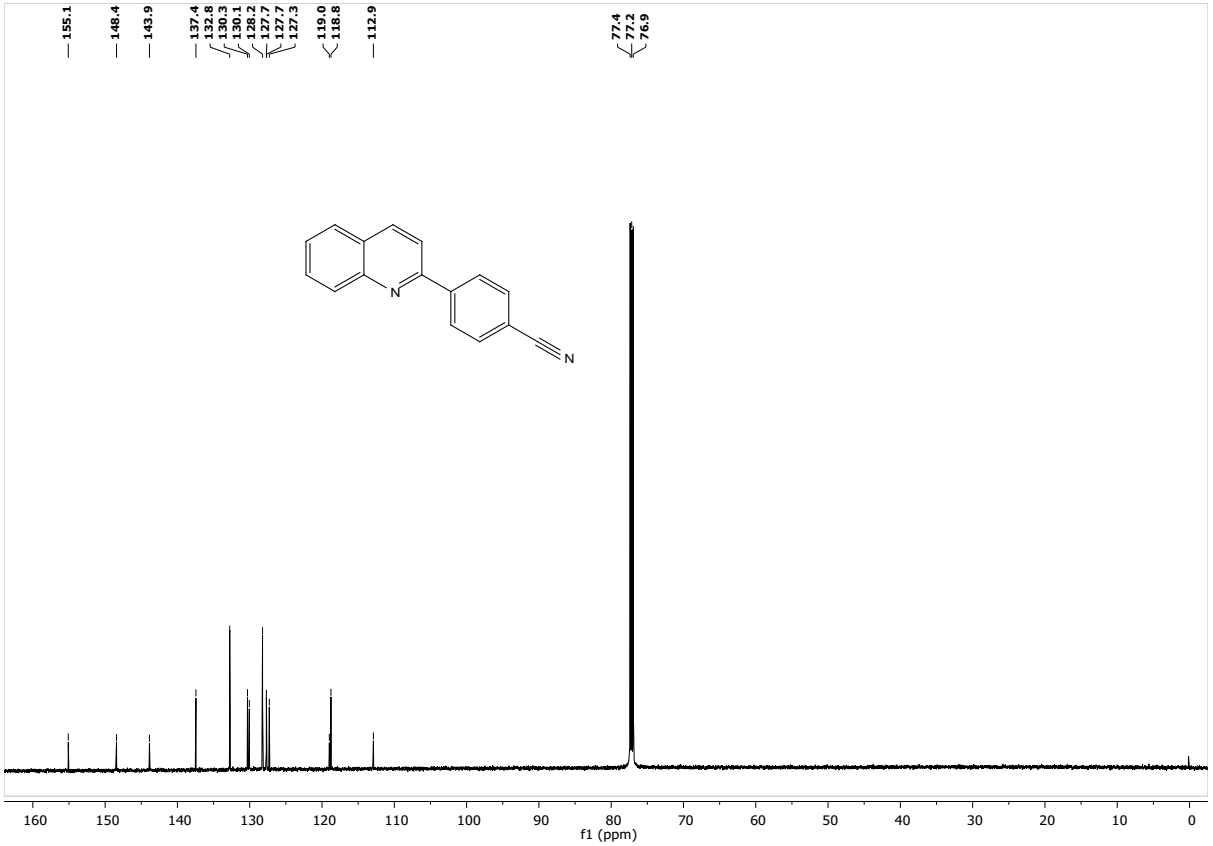


Figure S19: ^{13}C NMR Spectrum of **4h** ($CDCl_3$, 151 MHz, 298 K)

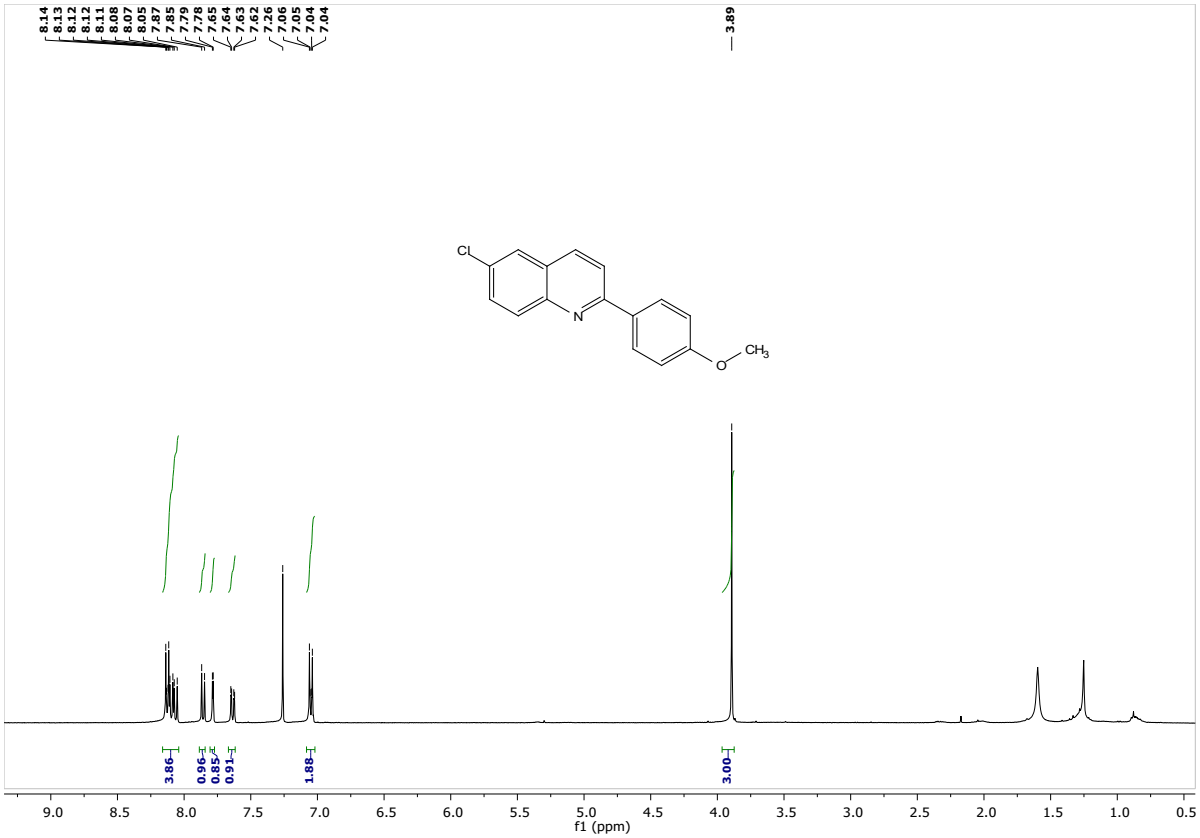


Figure S20: ^{1}H NMR Spectrum of **4i** ($CDCl_3$, 400 MHz, 298 K)

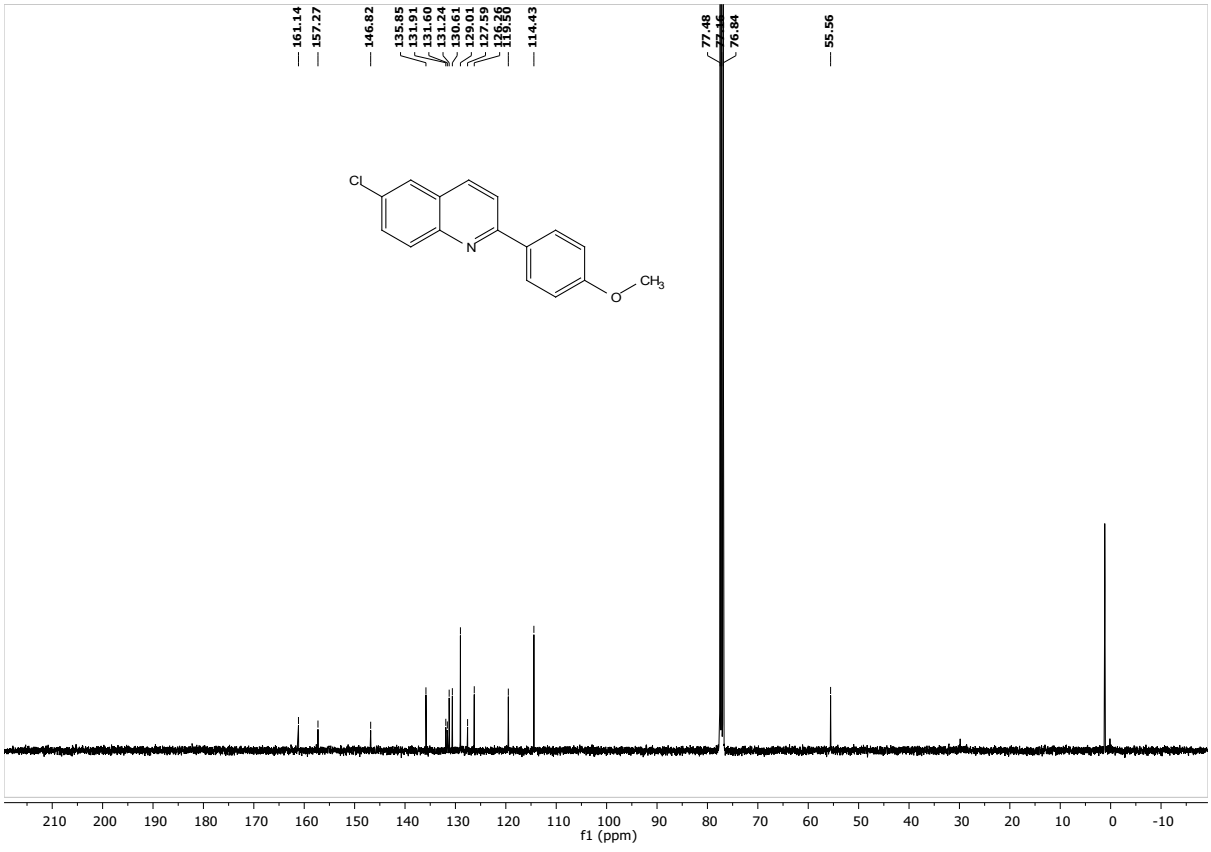


Figure S21: ^{13}C NMR Spectrum of **4i** ($CDCl_3$, 101 MHz, 298 K)

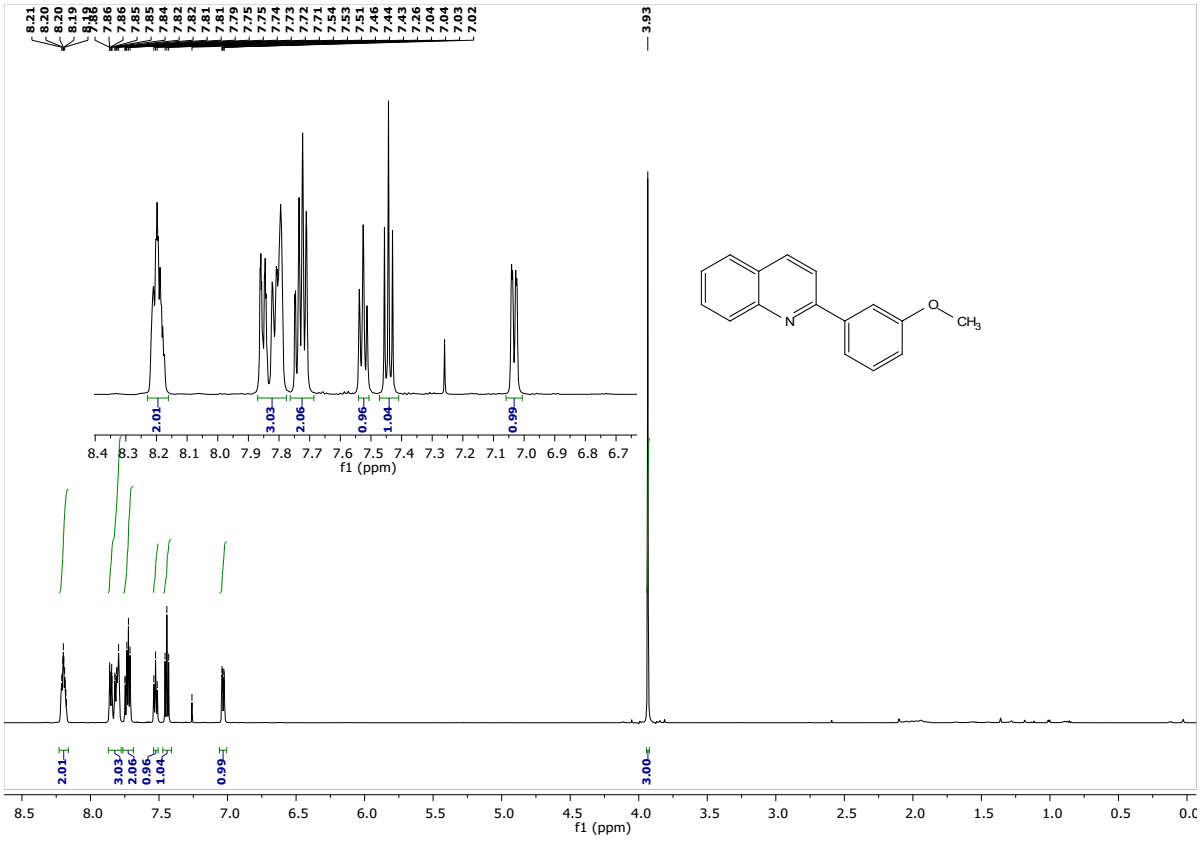


Figure S22: ^{1}H NMR Spectrum of **4j** ($CDCl_3$, 600 MHz, 298 K)

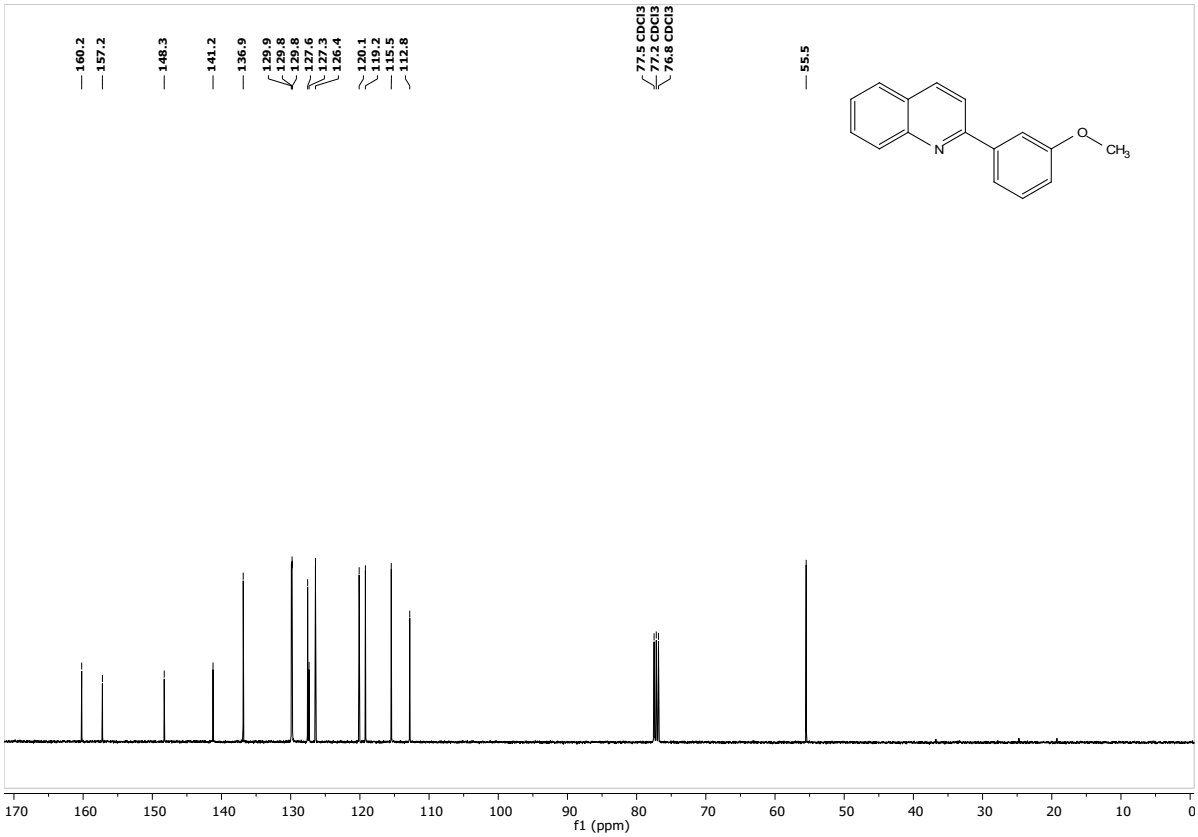


Figure S23: ^{13}C NMR Spectrum of **4j** ($CDCl_3$, 101 MHz, 298 K)

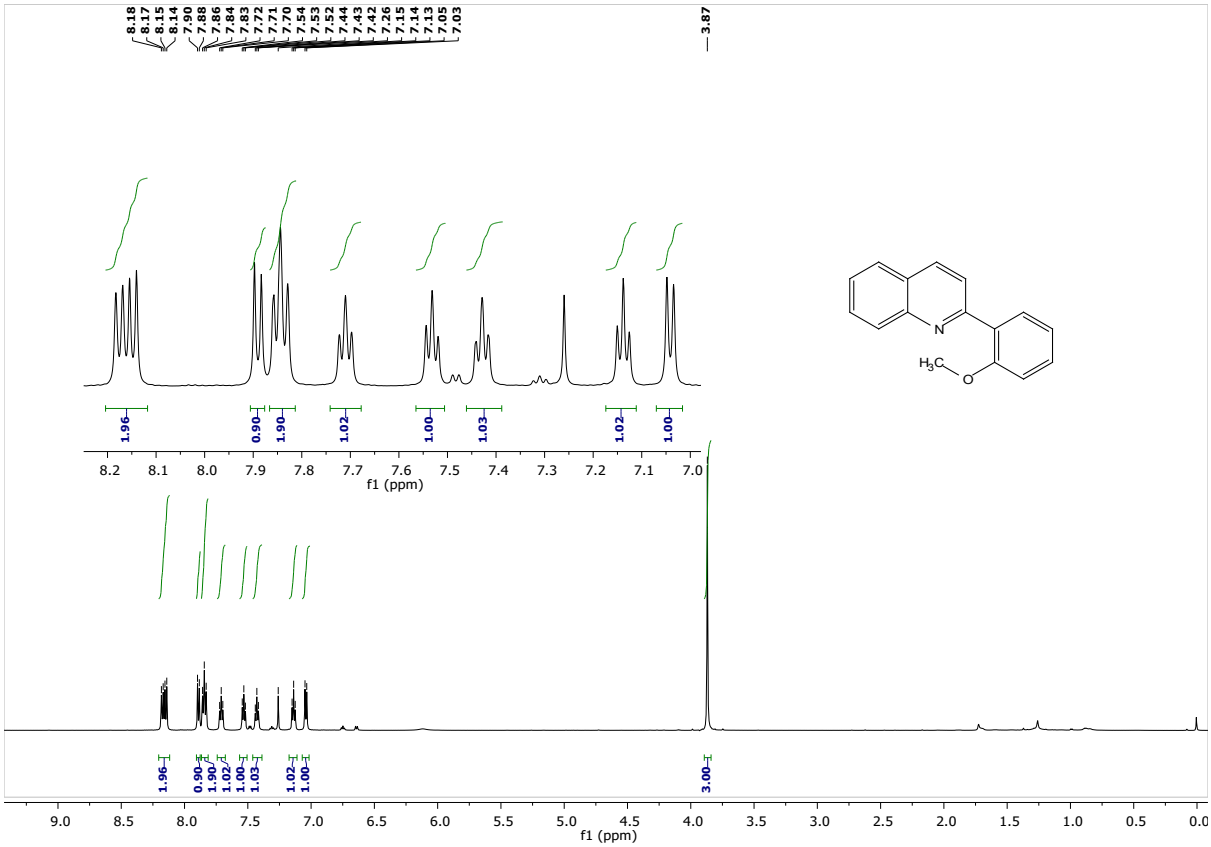


Figure S24: ^{1}H NMR Spectrum of **4k** ($CDCl_3$, 600 MHz, 298 K)

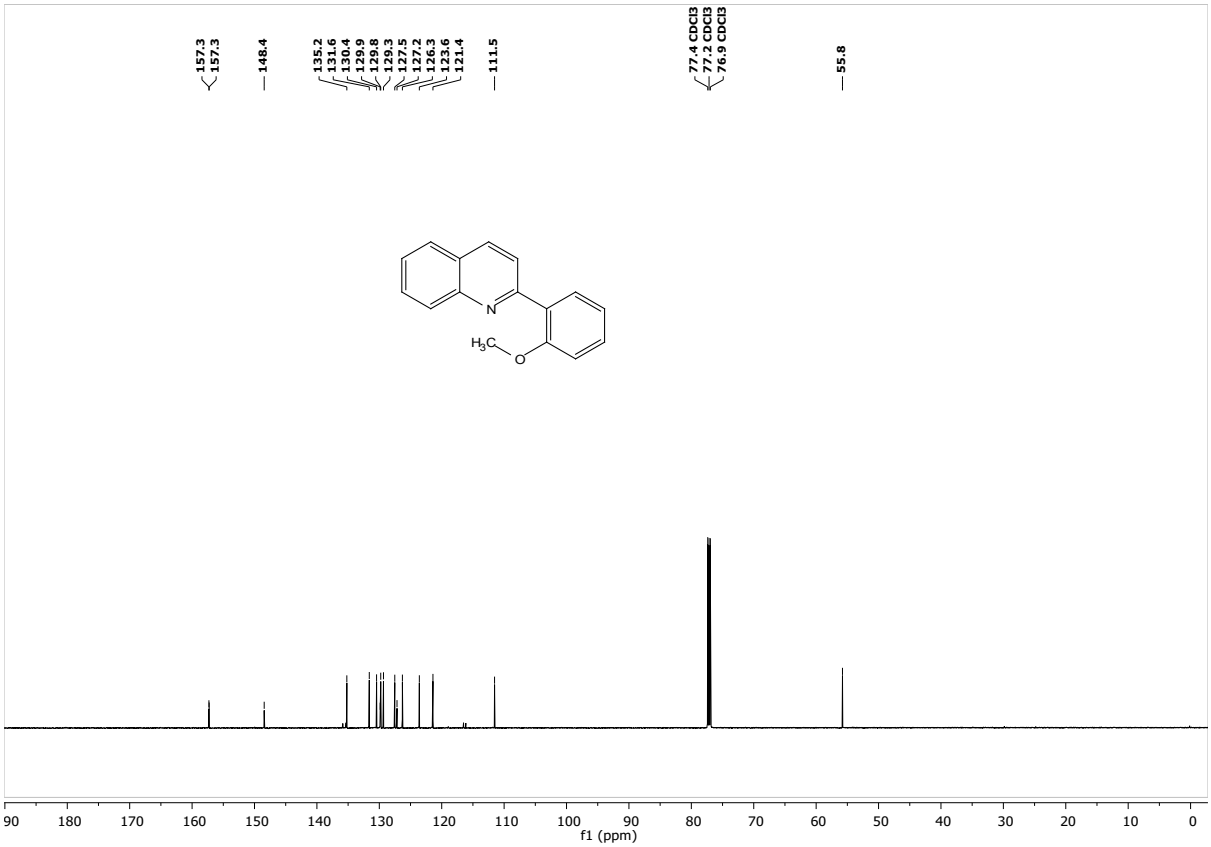


Figure S25: ^{13}C NMR Spectrum of **4k** ($CDCl_3$, 151 MHz, 298 K)

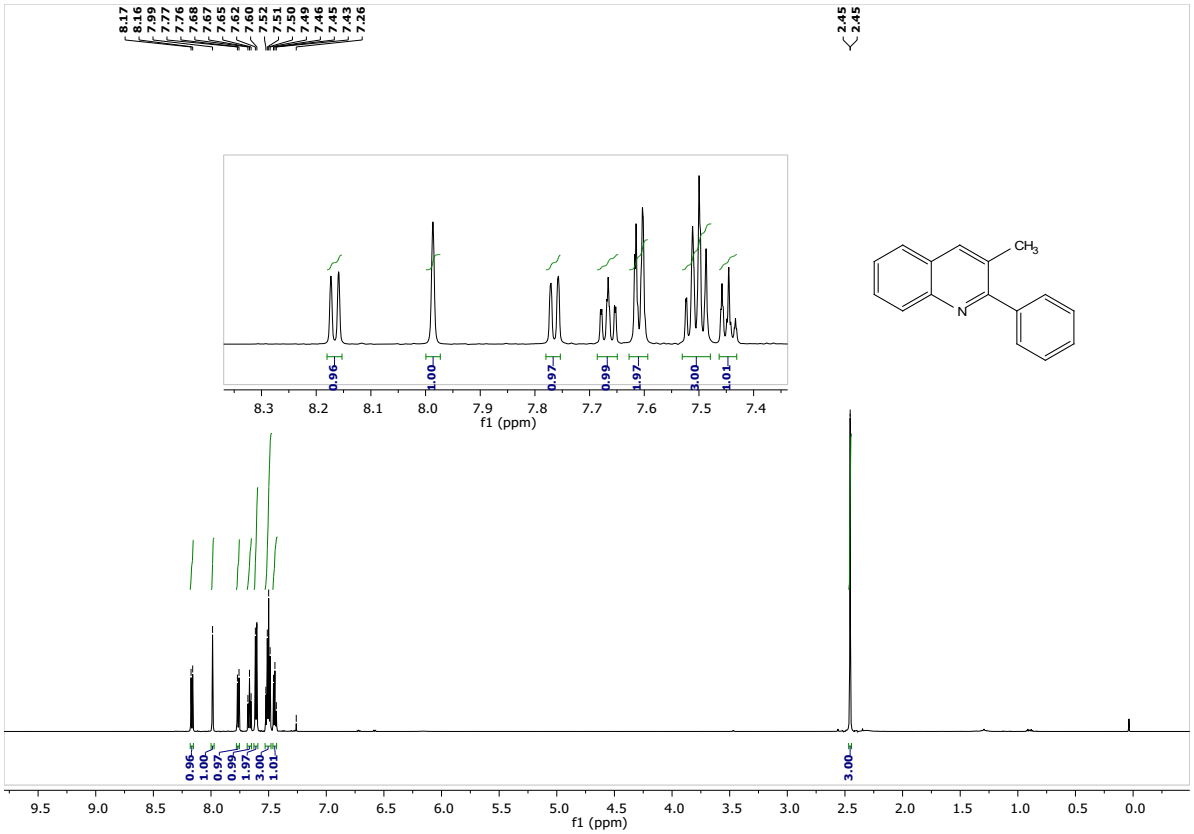


Figure S26: ^{1}H NMR Spectrum of **4l** ($CDCl_3$, 400 MHz, 298 K)

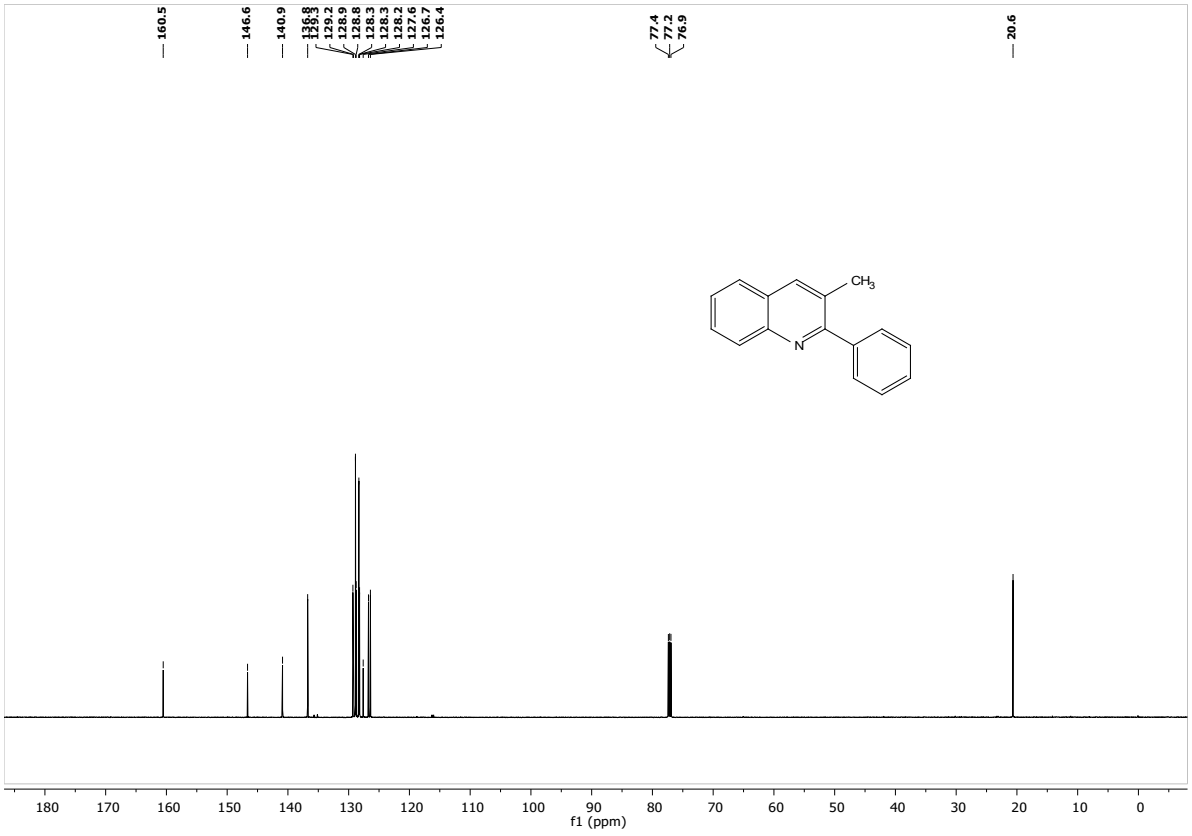


Figure S27: ^{13}C NMR Spectrum of **4l** ($CDCl_3$, 151 MHz, 298 K)

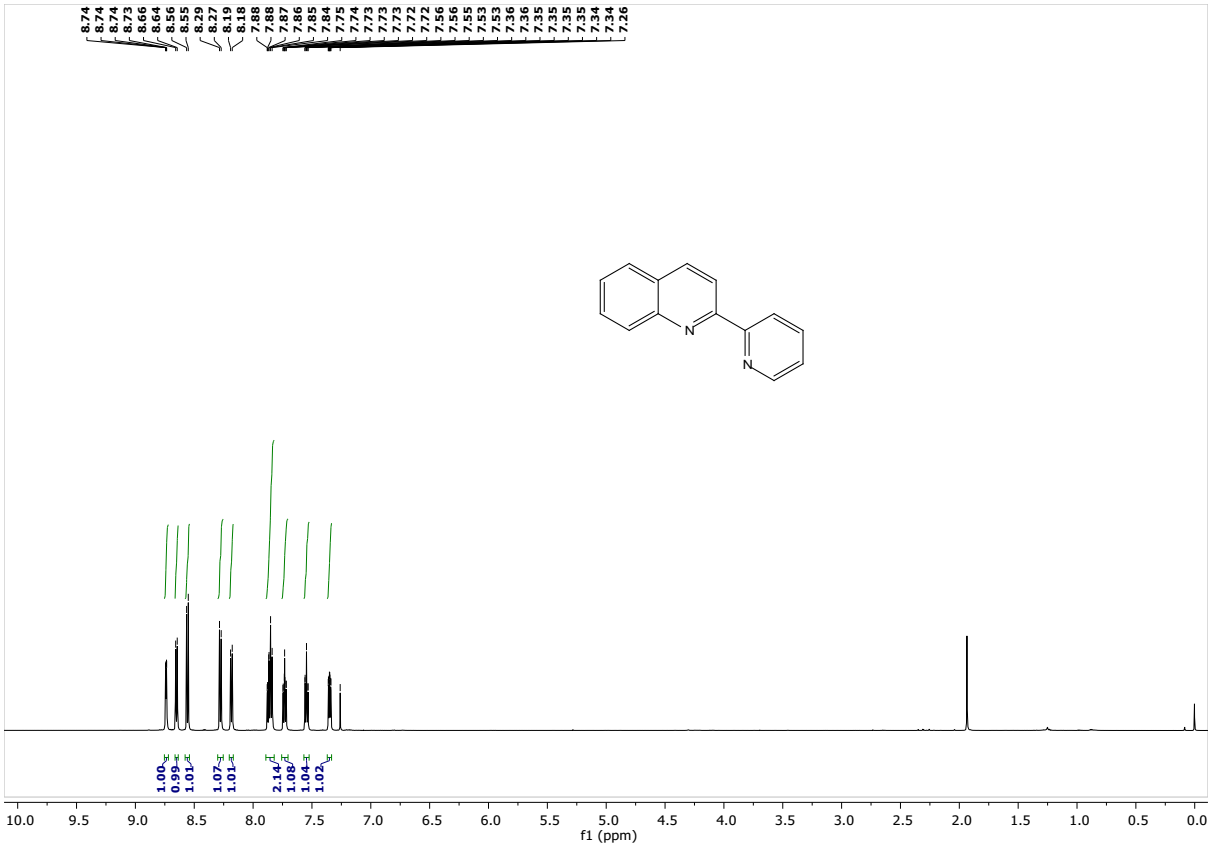


Figure S28: ^{1}H NMR Spectrum of **4m** ($CDCl_3$, 600 MHz, 298 K)

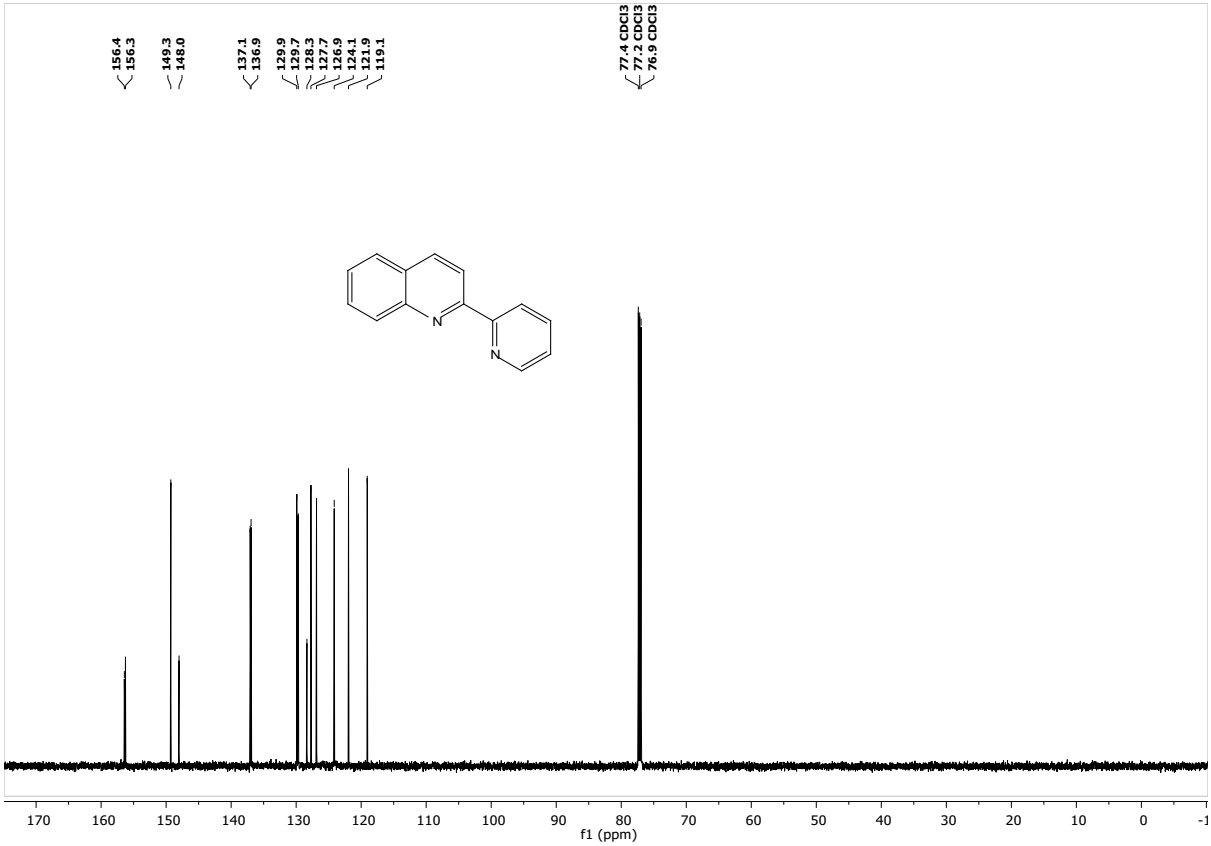


Figure S29: ^{13}C NMR Spectrum of **4m** ($CDCl_3$, 151 MHz, 298 K)

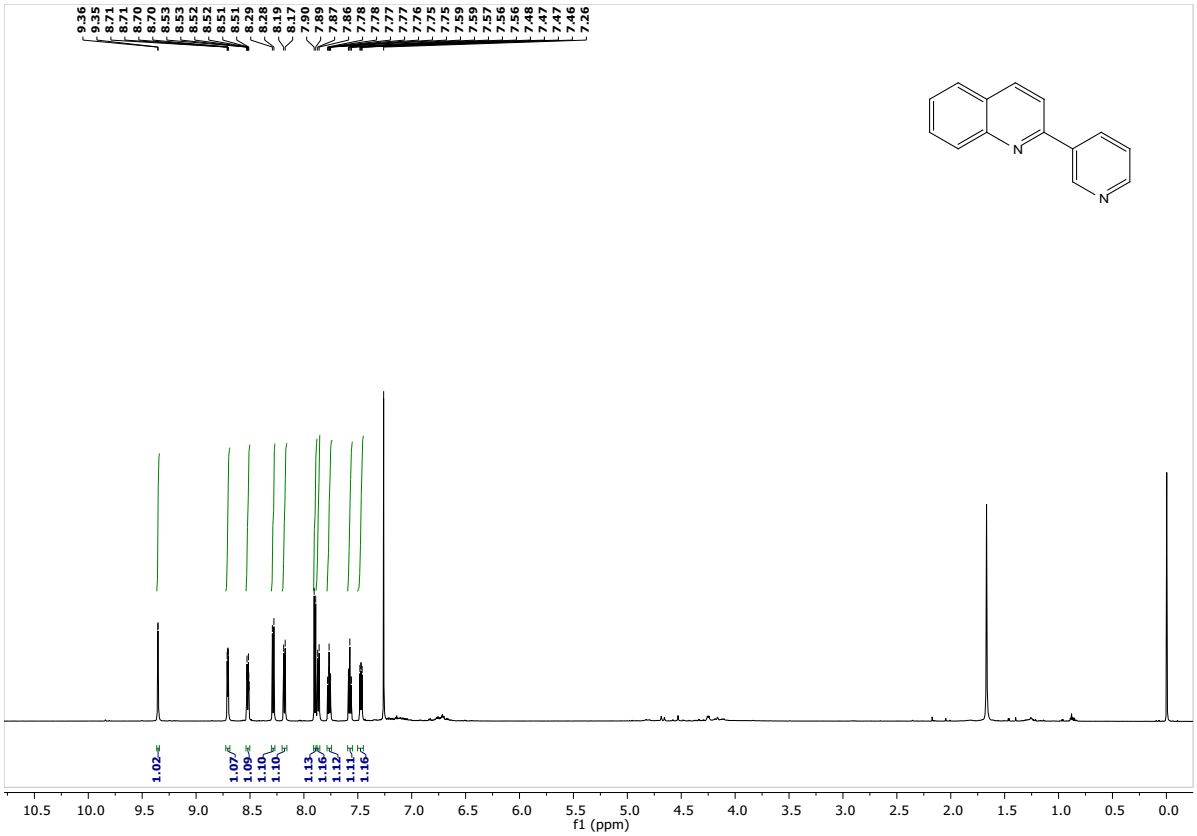


Figure S30: ^{1}H NMR Spectrum of **4n** ($CDCl_3$, 600 MHz, 298 K)

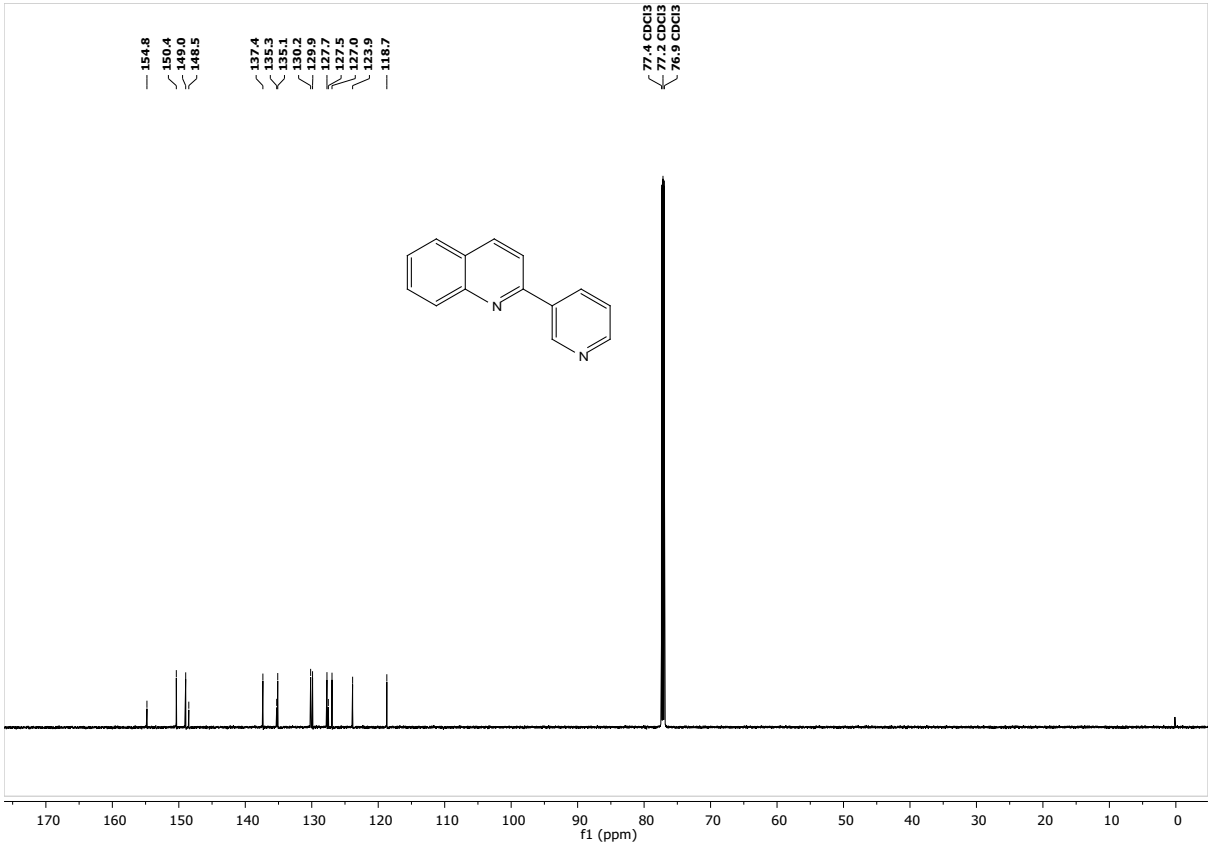


Figure S31: ^{13}C NMR Spectrum of **4n** ($CDCl_3$, 151 MHz, 298 K)

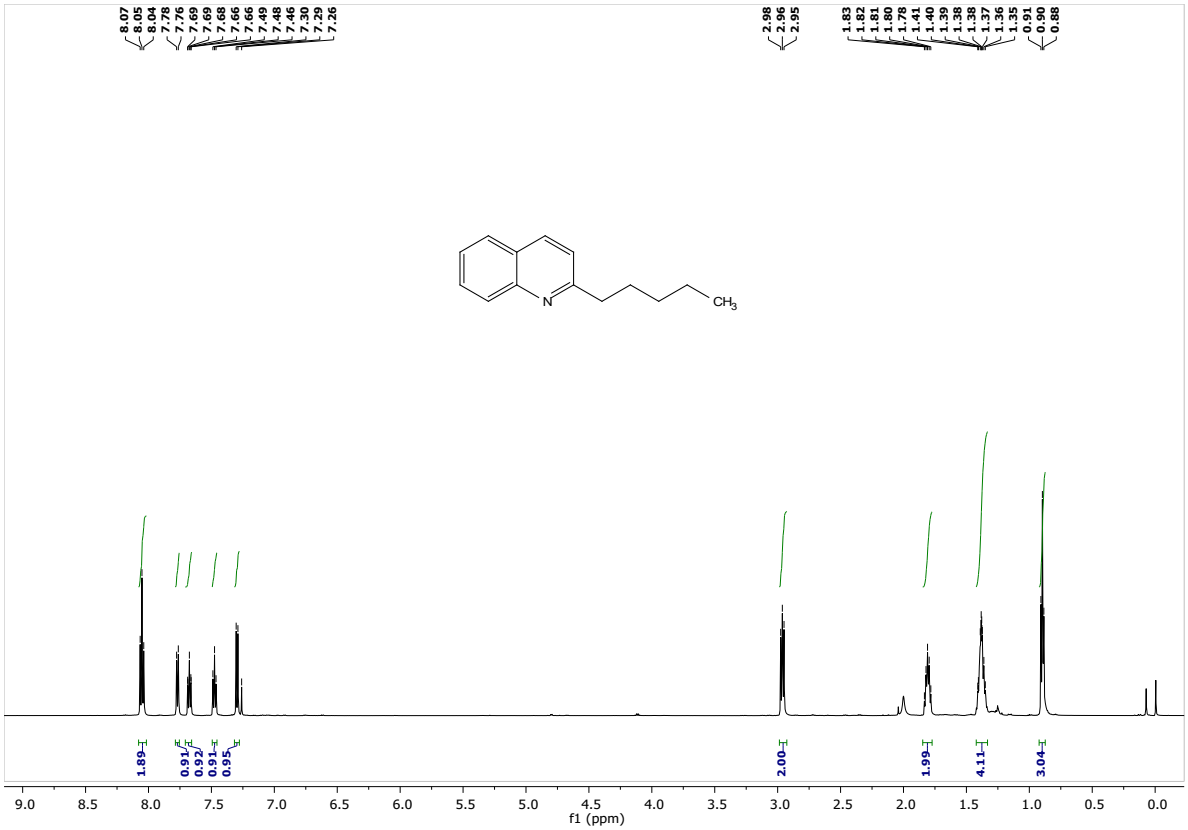


Figure S32: ^{1}H NMR Spectrum of **4o** ($CDCl_3$, 600 MHz, 298 K)

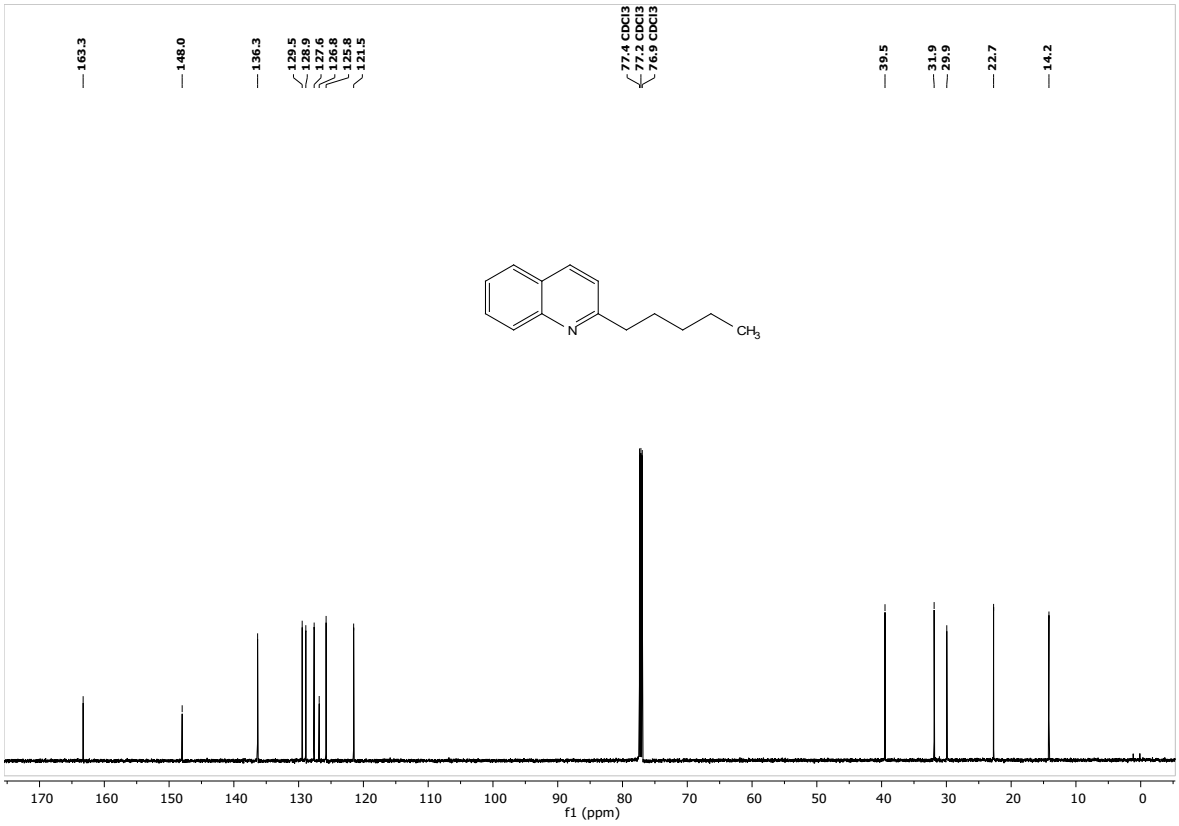


Figure S33: ^{13}C NMR Spectrum of **4o** ($CDCl_3$, 151 MHz, 298 K)

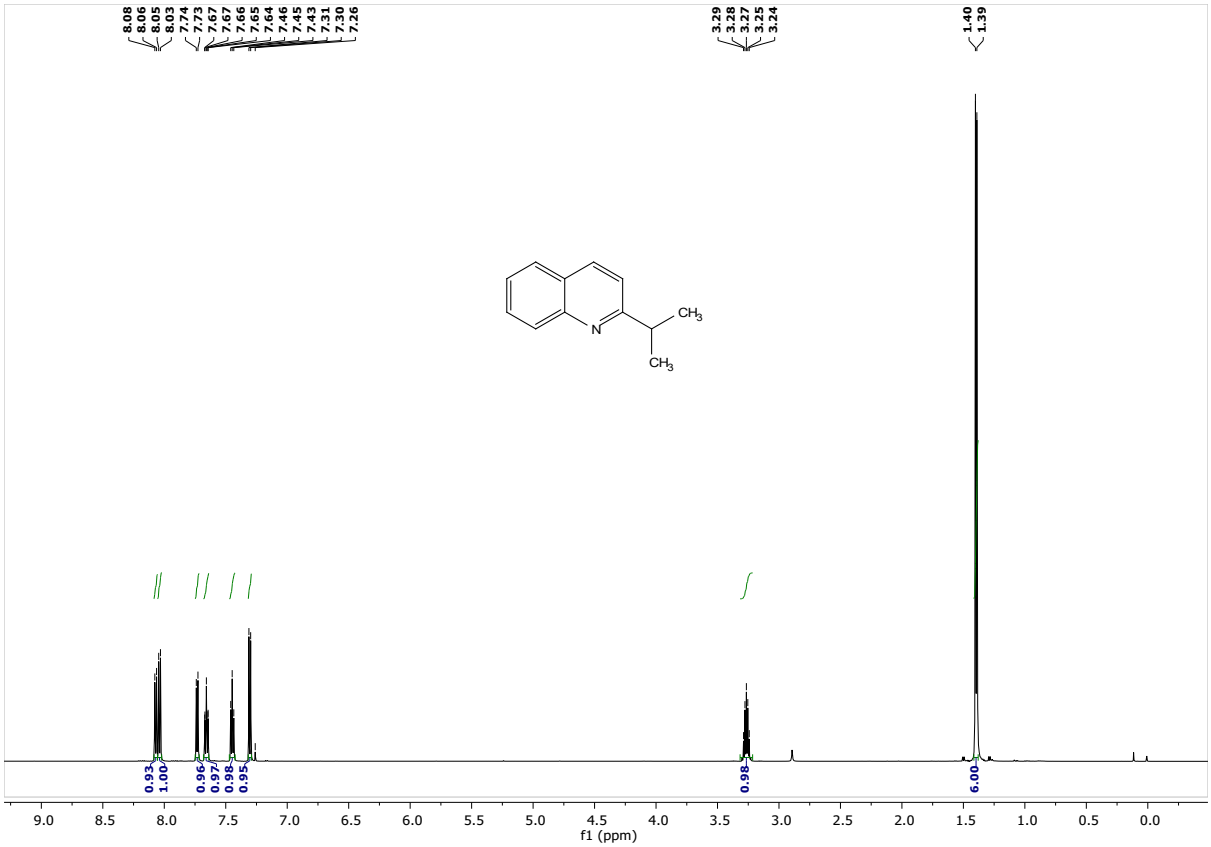


Figure S34: ^{1}H NMR Spectrum of **4p** ($CDCl_3$, 600 MHz, 298 K)

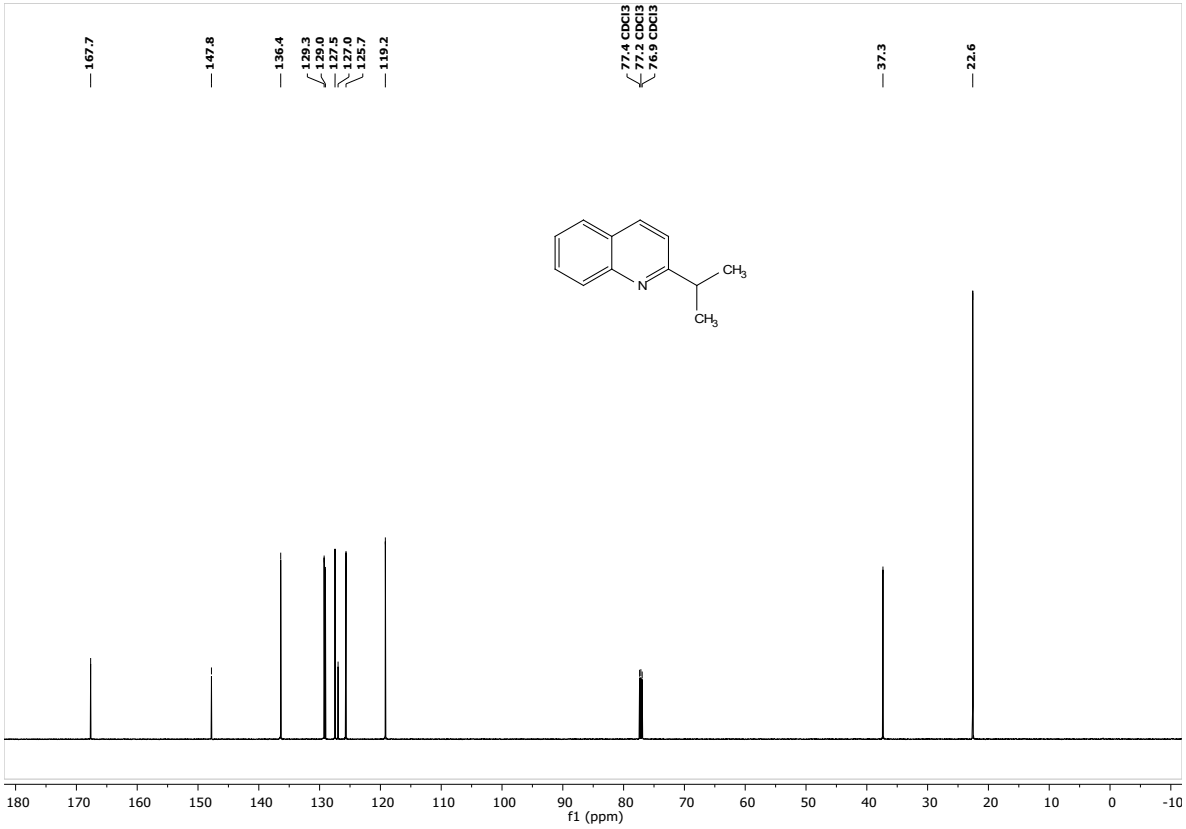


Figure S35: ^{13}C NMR Spectrum of **4p** ($CDCl_3$, 151 MHz, 298 K)

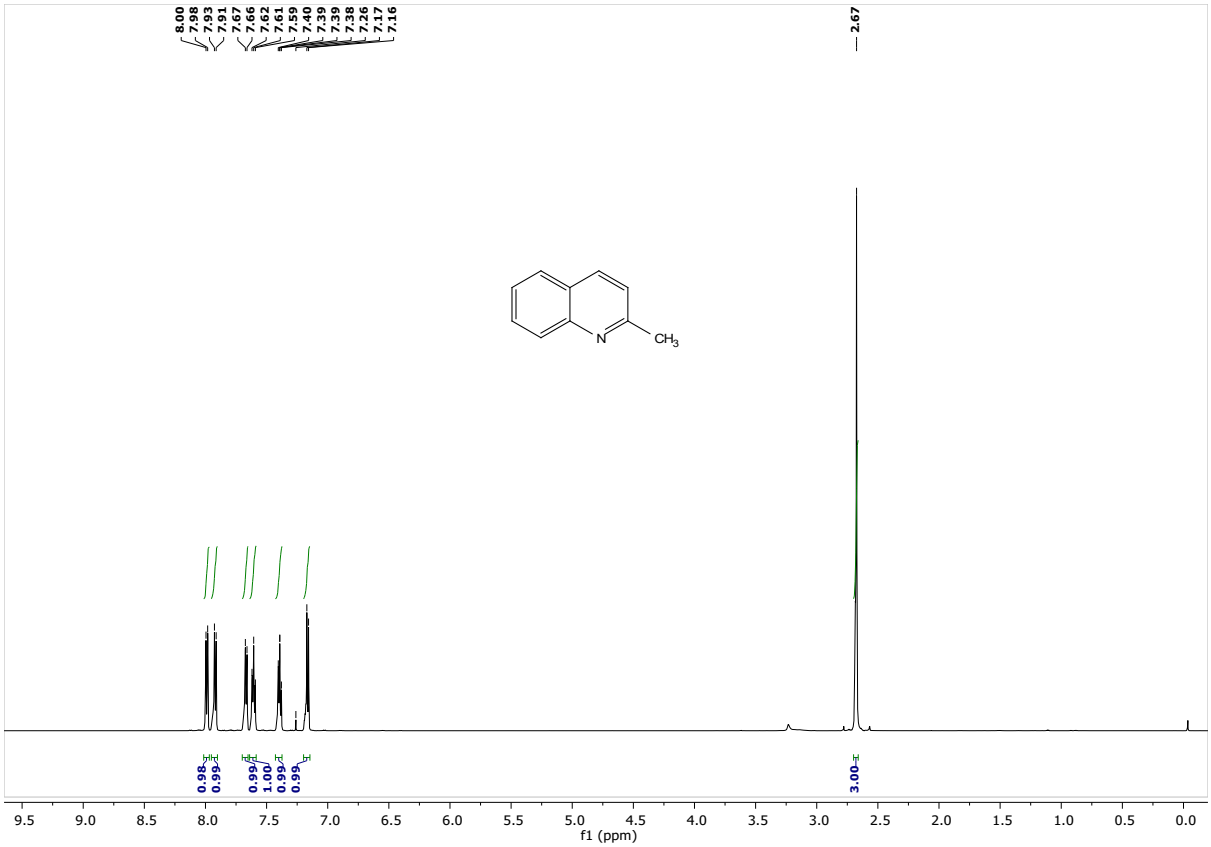


Figure S36: ^{1}H NMR Spectrum of **4q** ($CDCl_3$, 600 MHz, 298 K)

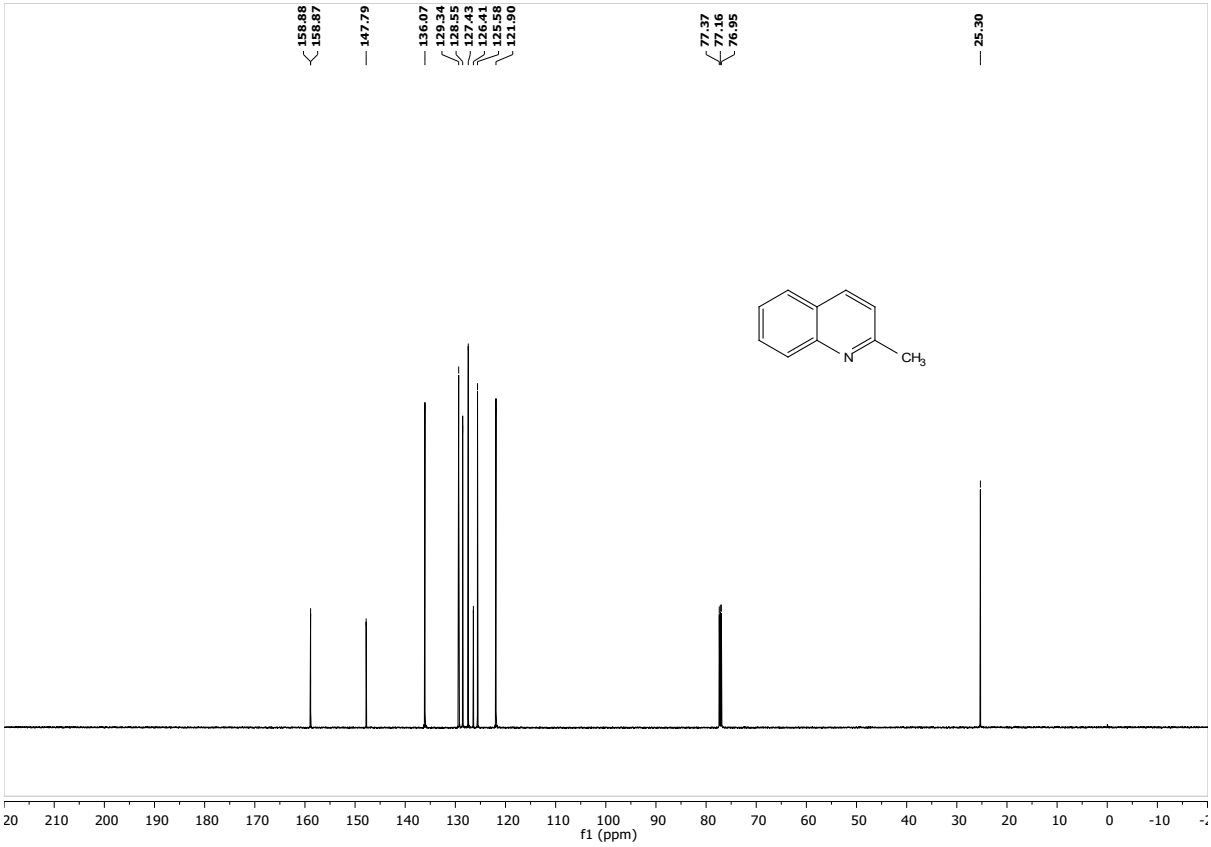


Figure S37: ^{13}C NMR Spectrum of **4q** ($CDCl_3$, 151 MHz, 298 K)

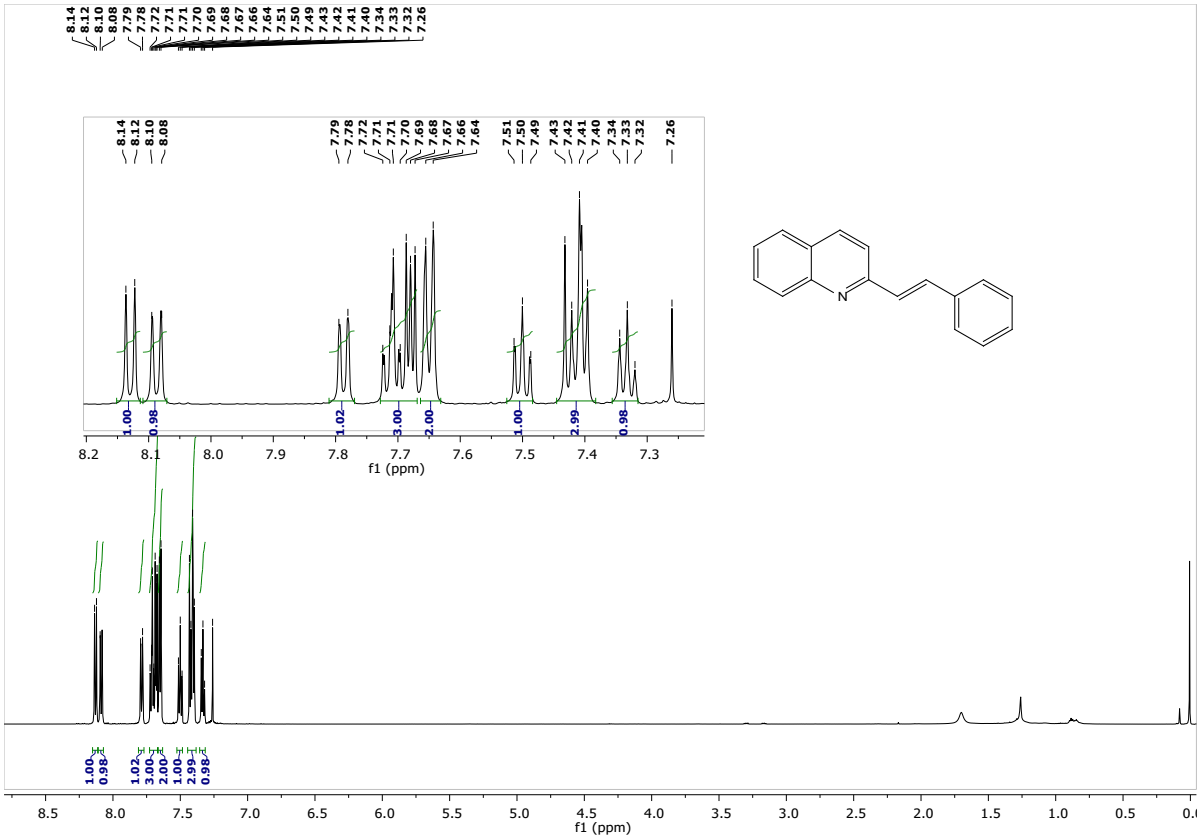


Figure S38: ^{1}H NMR Spectrum of **6a** ($CDCl_3$, 600 MHz, 298 K)

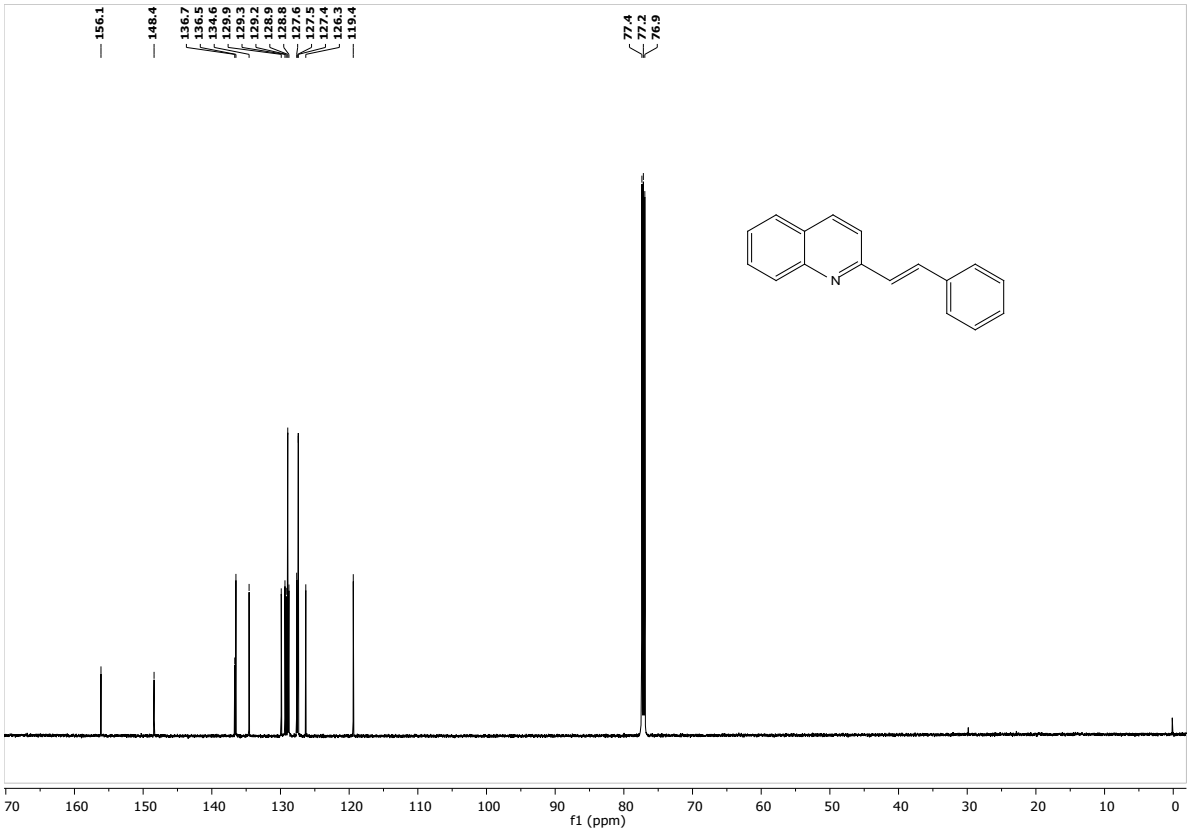


Figure S39: ^{13}C NMR Spectrum of **6a** ($CDCl_3$, 151 MHz, 298 K)

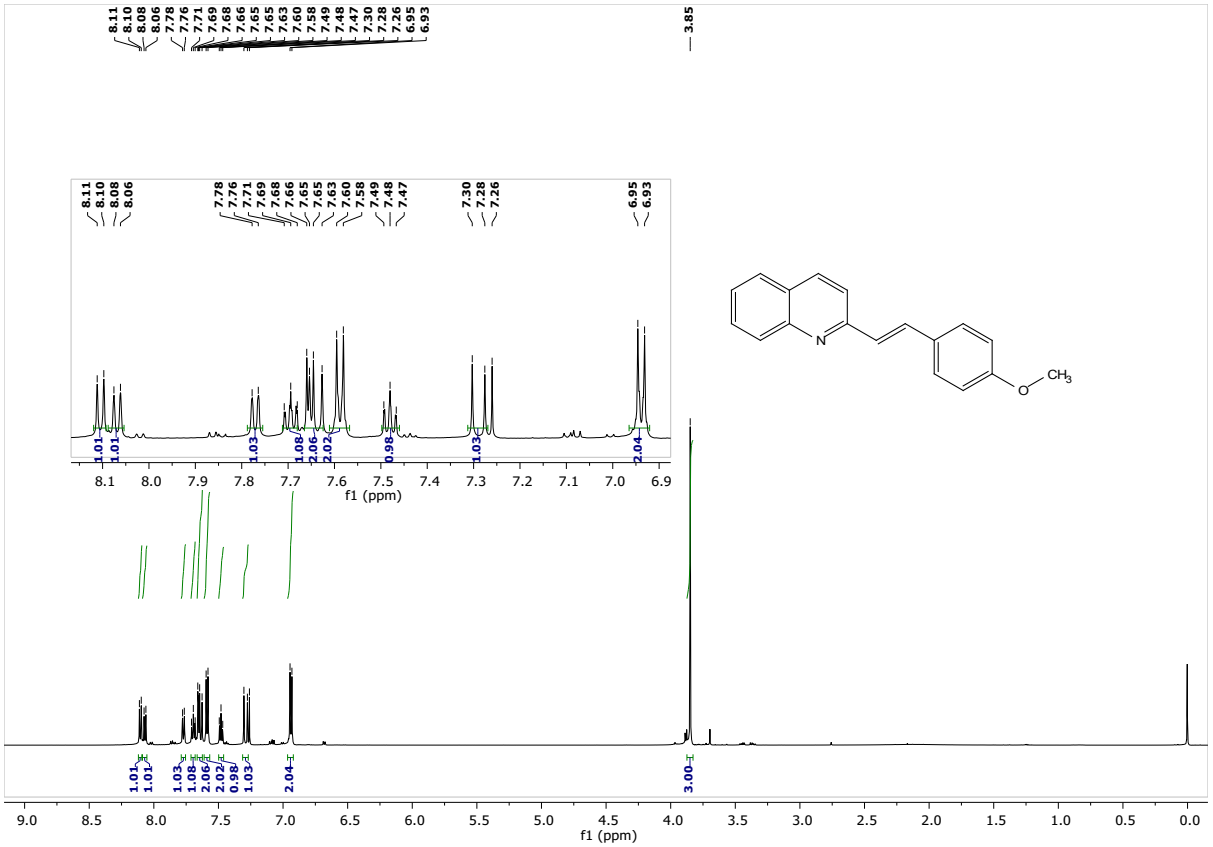


Figure S40: ^{1}H NMR Spectrum of **6b** ($CDCl_3$, 600 MHz, 298 K)

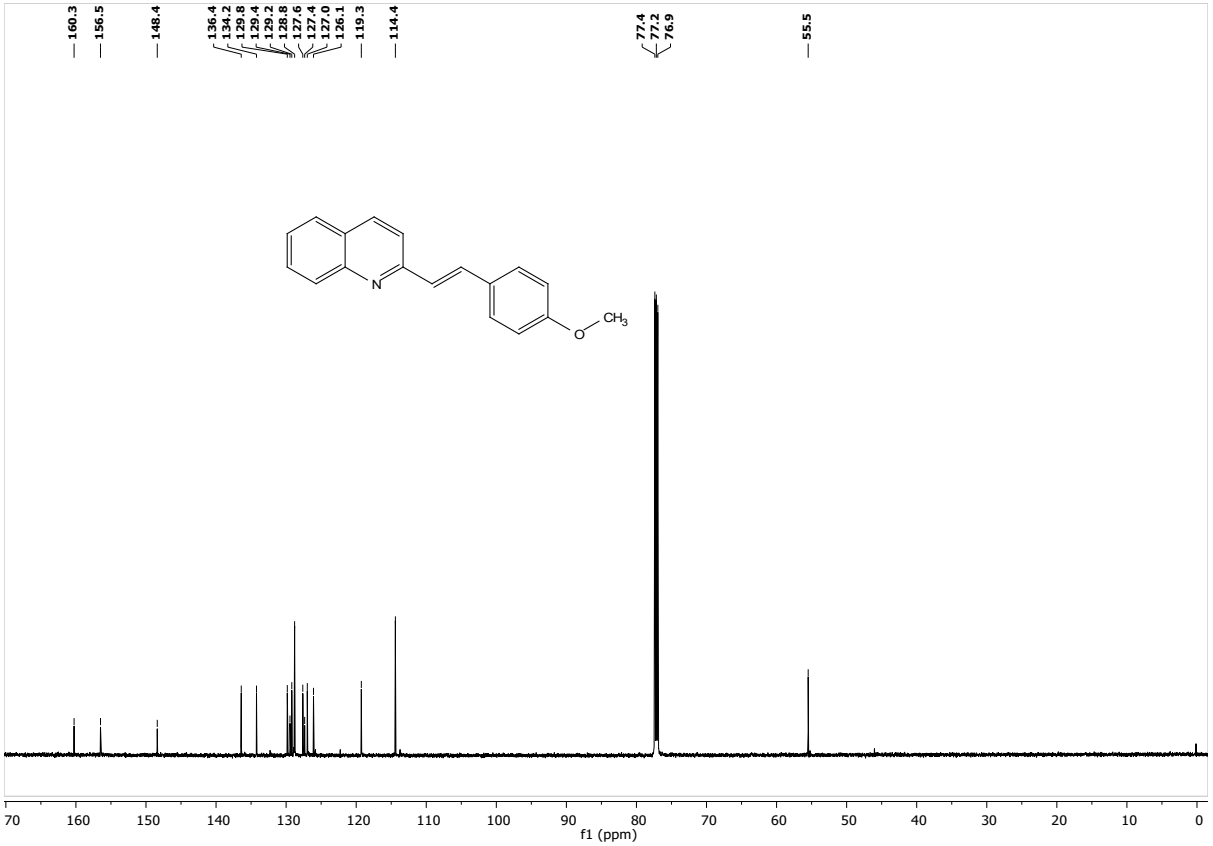


Figure S41: ^{13}C NMR Spectrum of **6b** ($CDCl_3$, 151 MHz, 298 K)

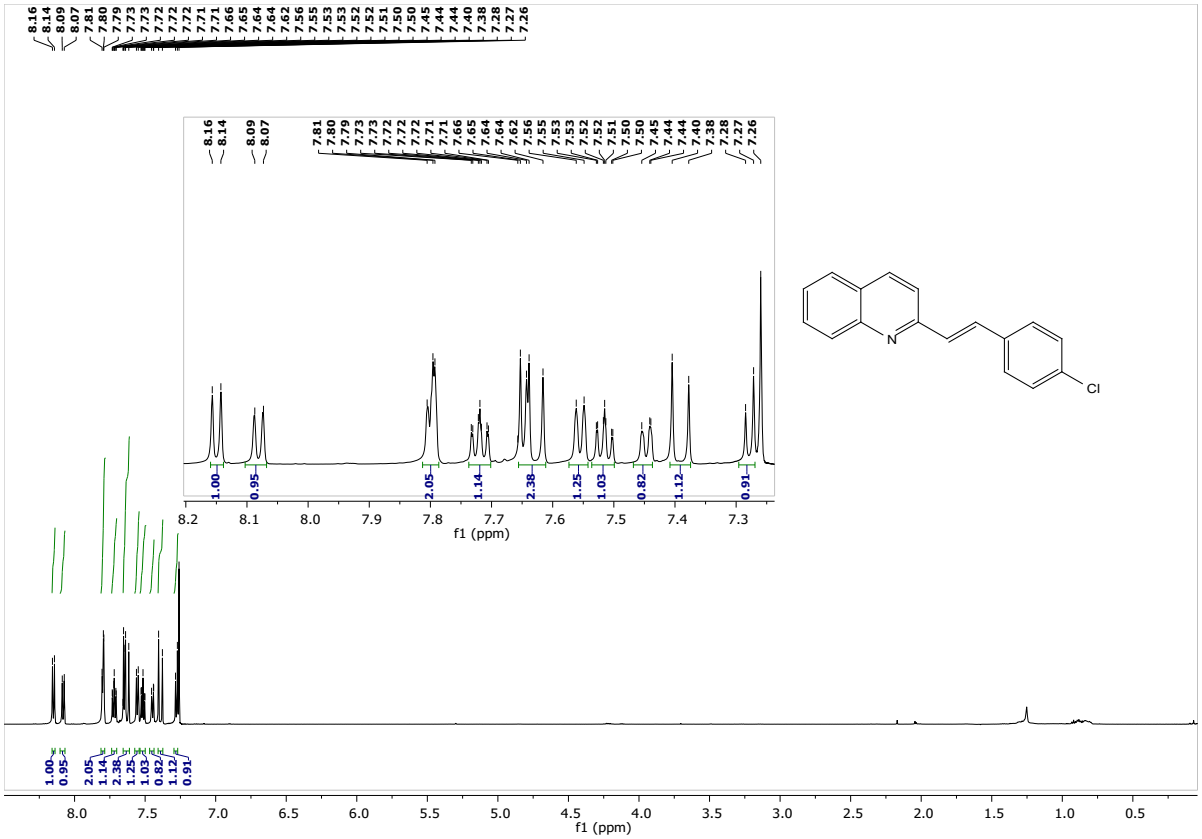


Figure S42: ^{1}H NMR Spectrum of **6c** ($CDCl_3$, 600 MHz, 298 K)

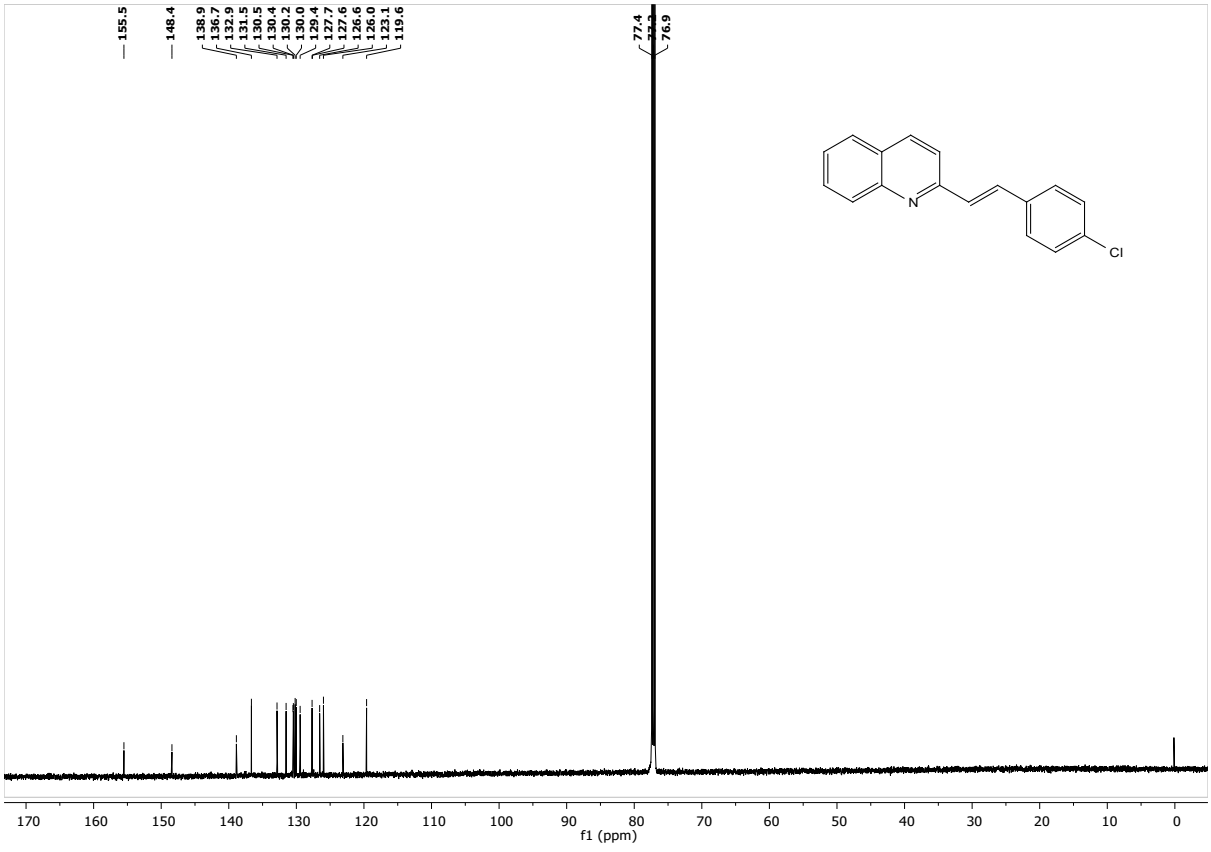


Figure S43: ^{13}C NMR Spectrum of **6c** ($CDCl_3$, 151 MHz, 298 K)

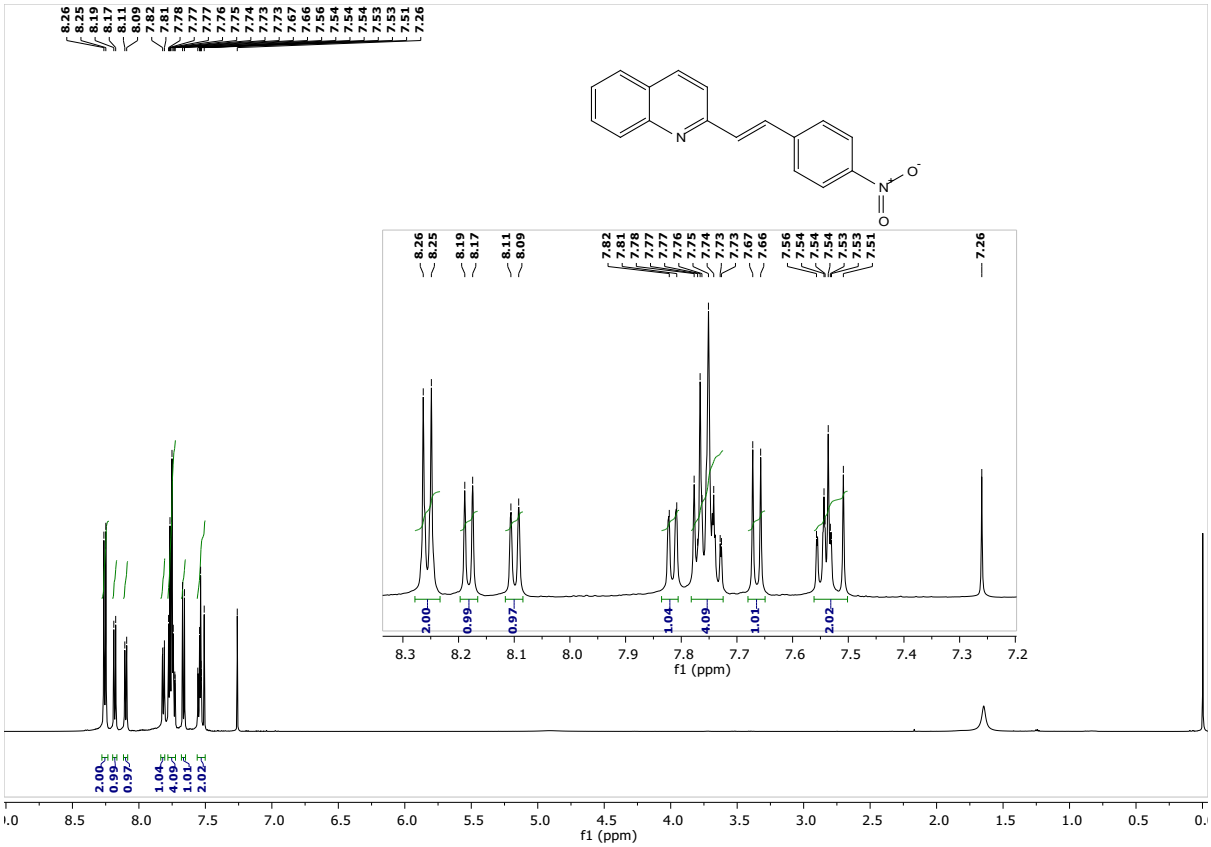


Figure S44: ^{1}H NMR Spectrum of **6d** ($CDCl_3$, 600 MHz, 298 K)

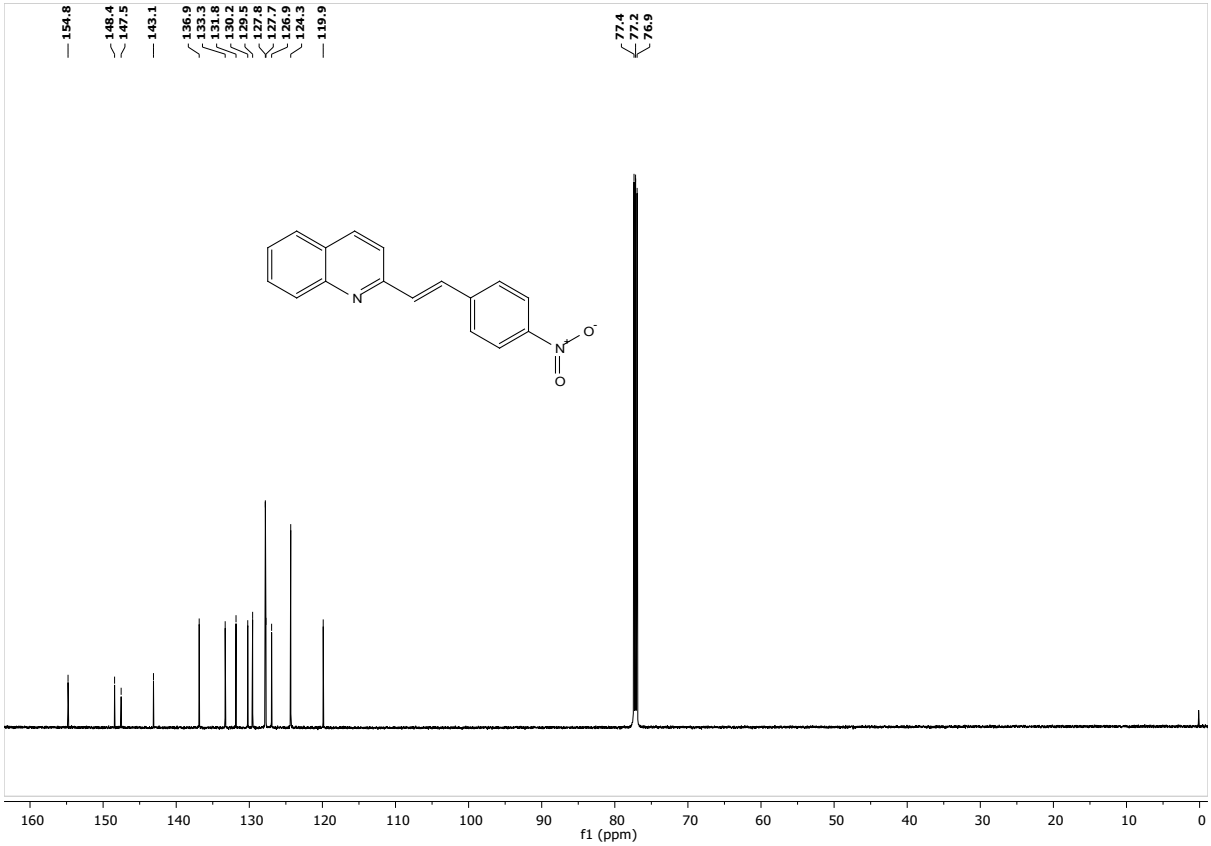


Figure S45: ^{13}C NMR Spectrum of **6d** ($CDCl_3$, 151 MHz, 298 K)

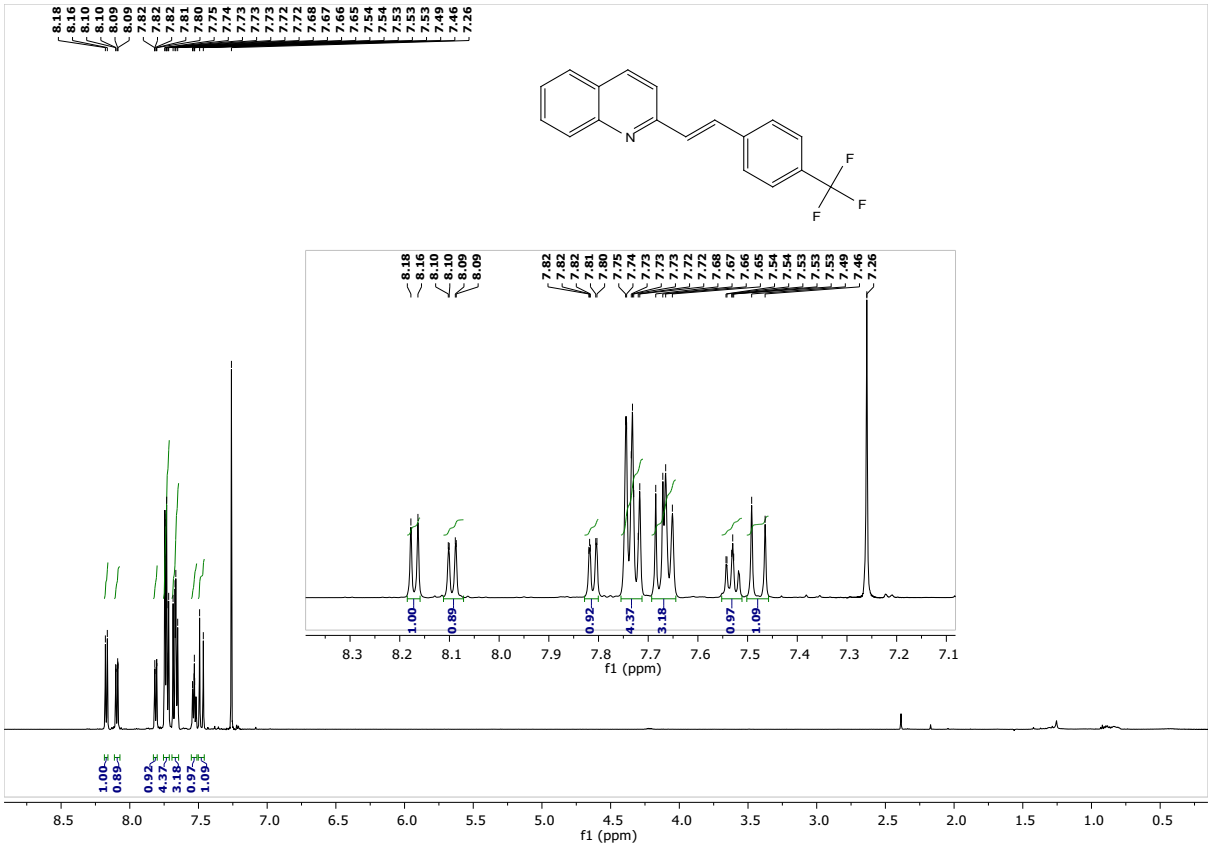


Figure S46: ^{1}H NMR Spectrum of **6e** ($CDCl_3$, 600 MHz, 298 K)

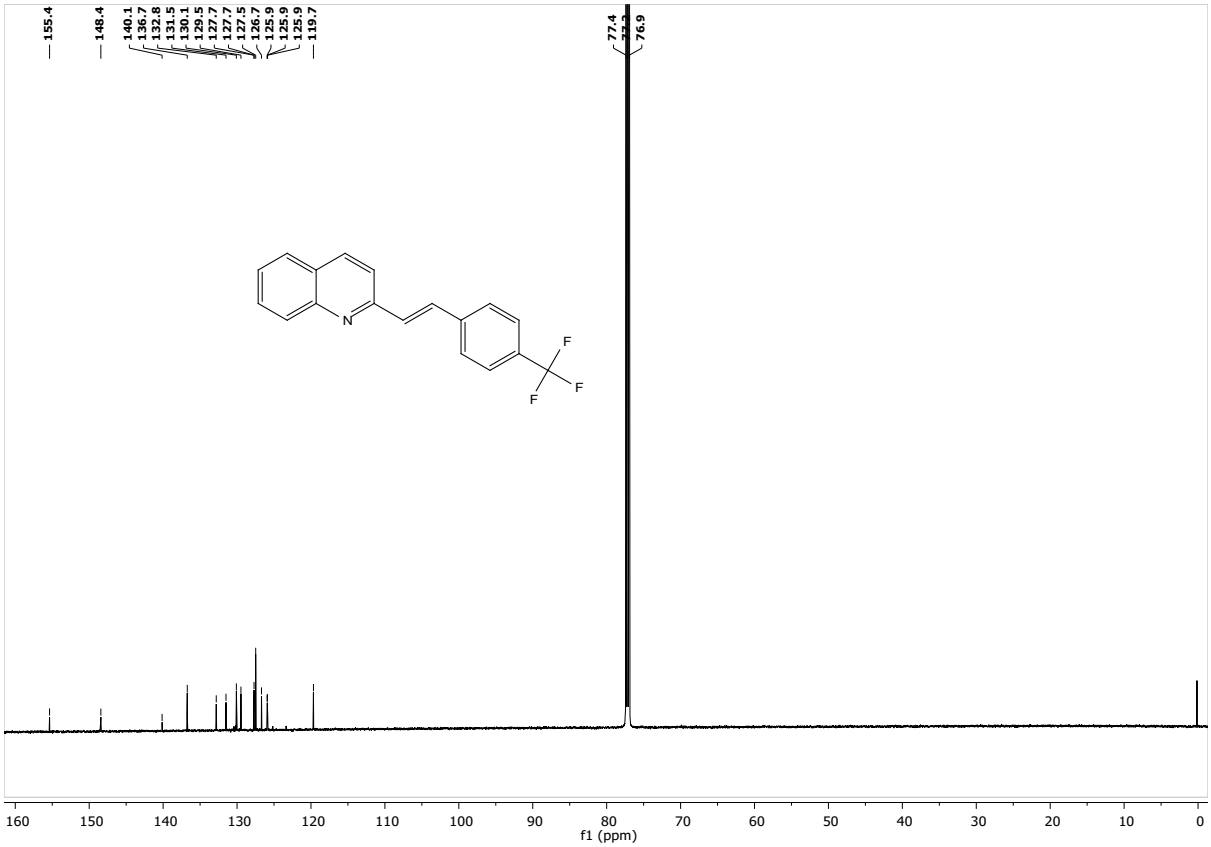


Figure S47: ^{13}C NMR Spectrum of **6e** ($CDCl_3$, 151 MHz, 298 K)

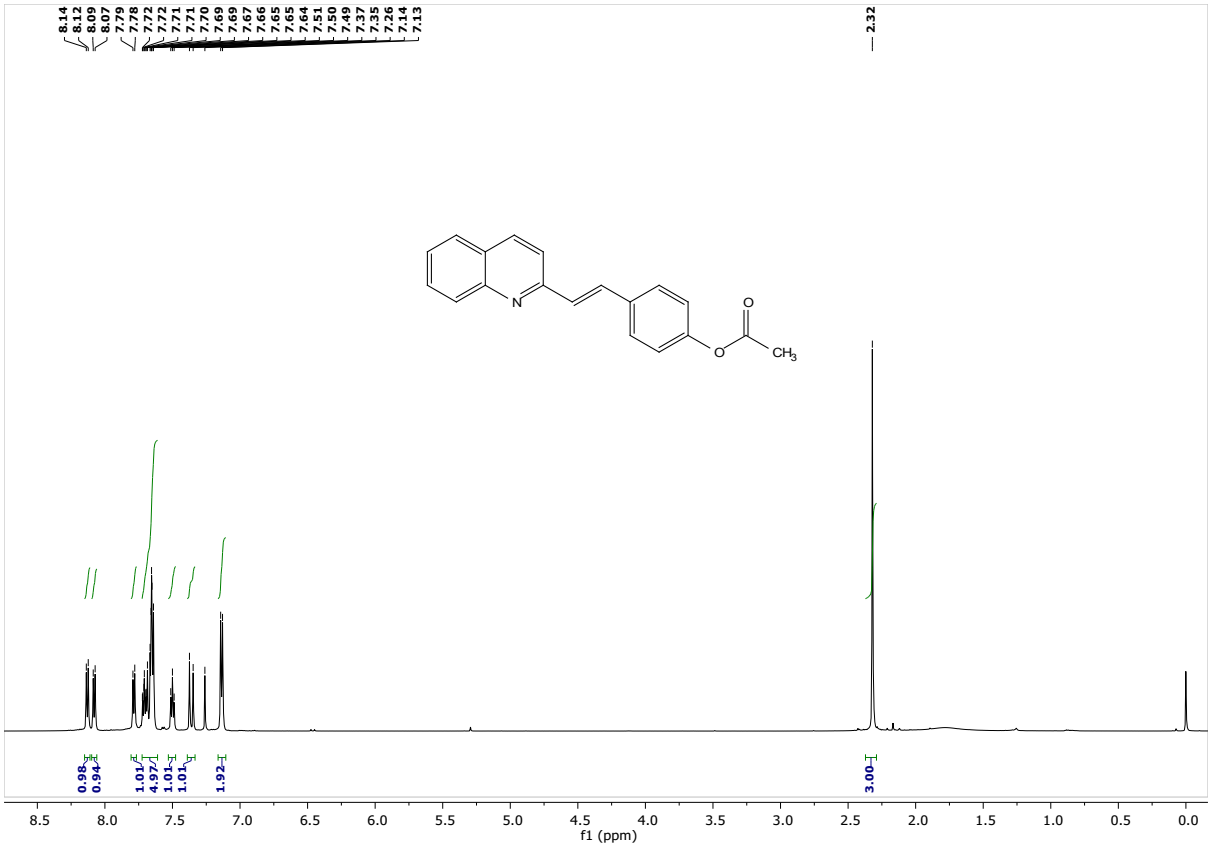


Figure S48: ^{1}H NMR Spectrum of **6f** ($CDCl_3$, 600 MHz, 298 K)

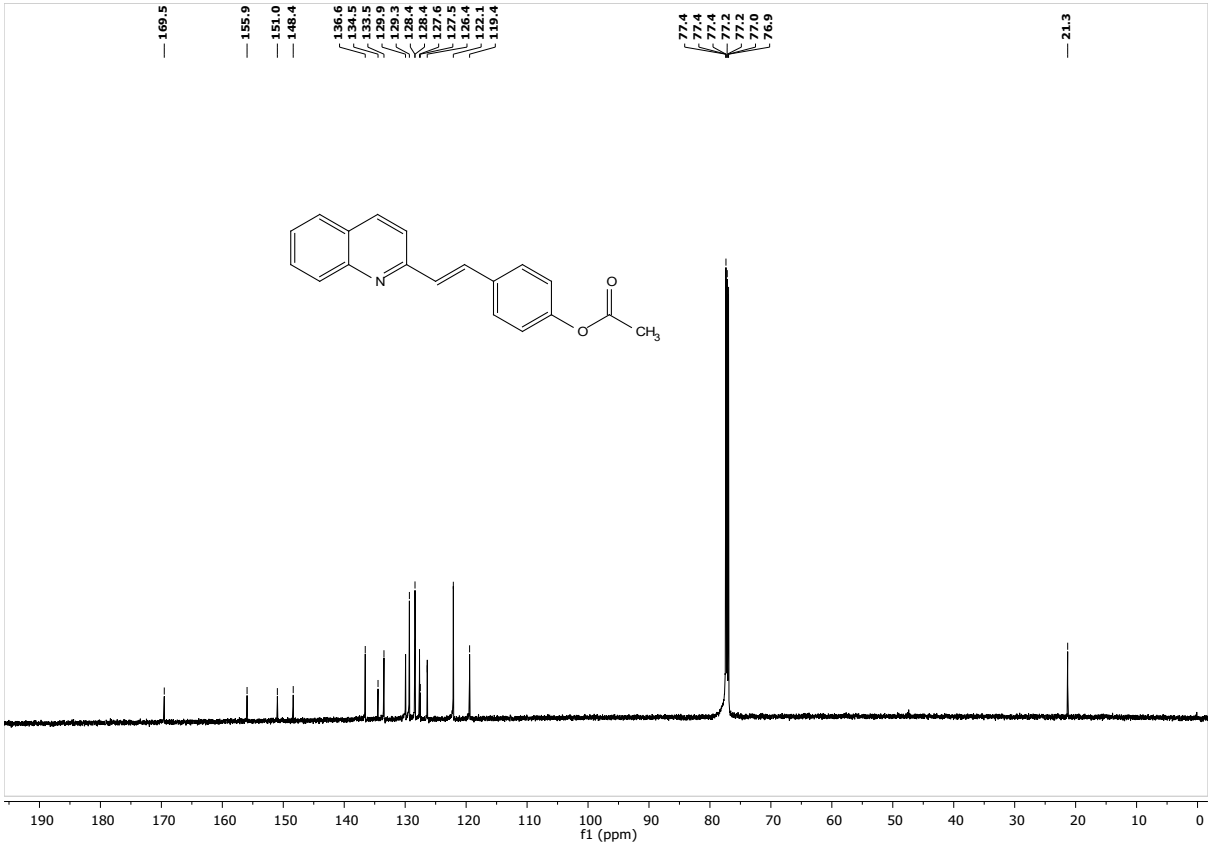


Figure S49: ^{13}C NMR Spectrum of **6f** ($CDCl_3$, 151 MHz, 298 K)

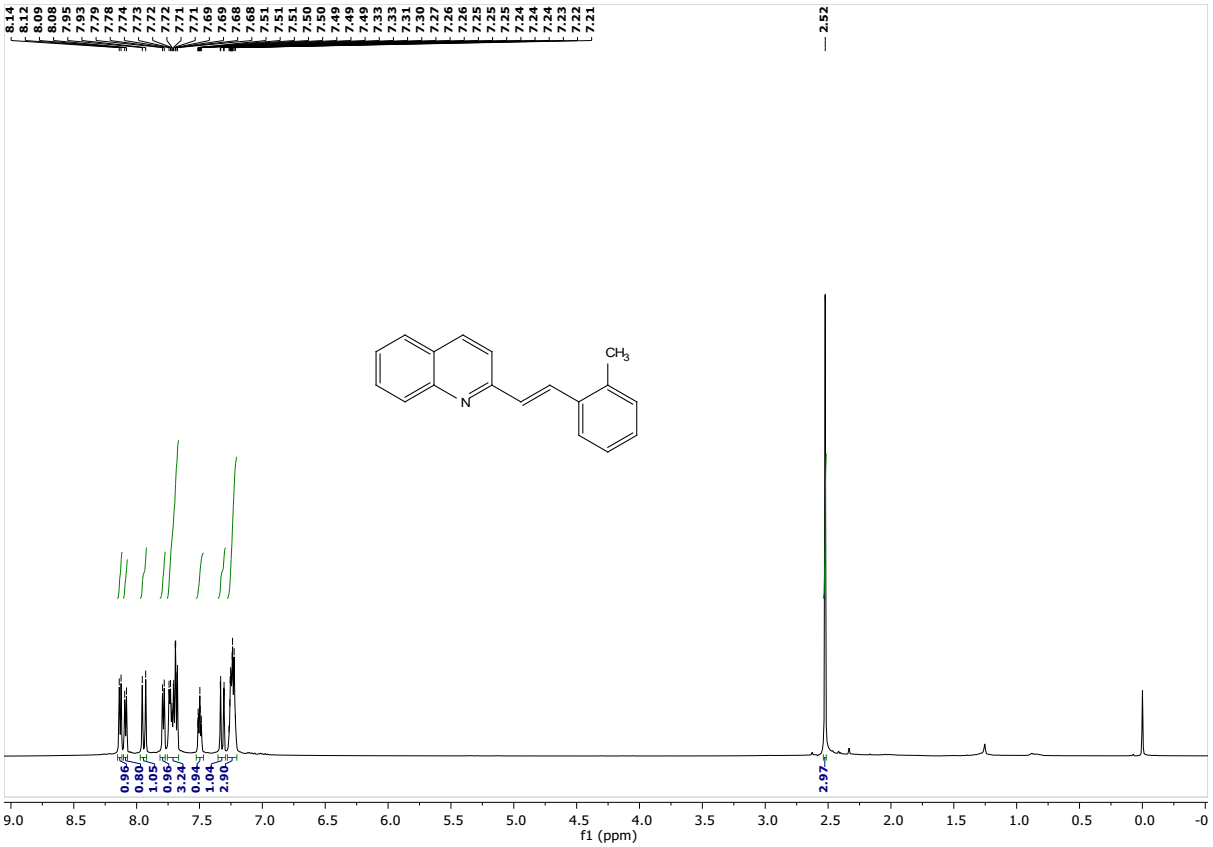


Figure S50: ^{1}H NMR Spectrum of **6g** ($CDCl_3$, 600 MHz, 298 K)

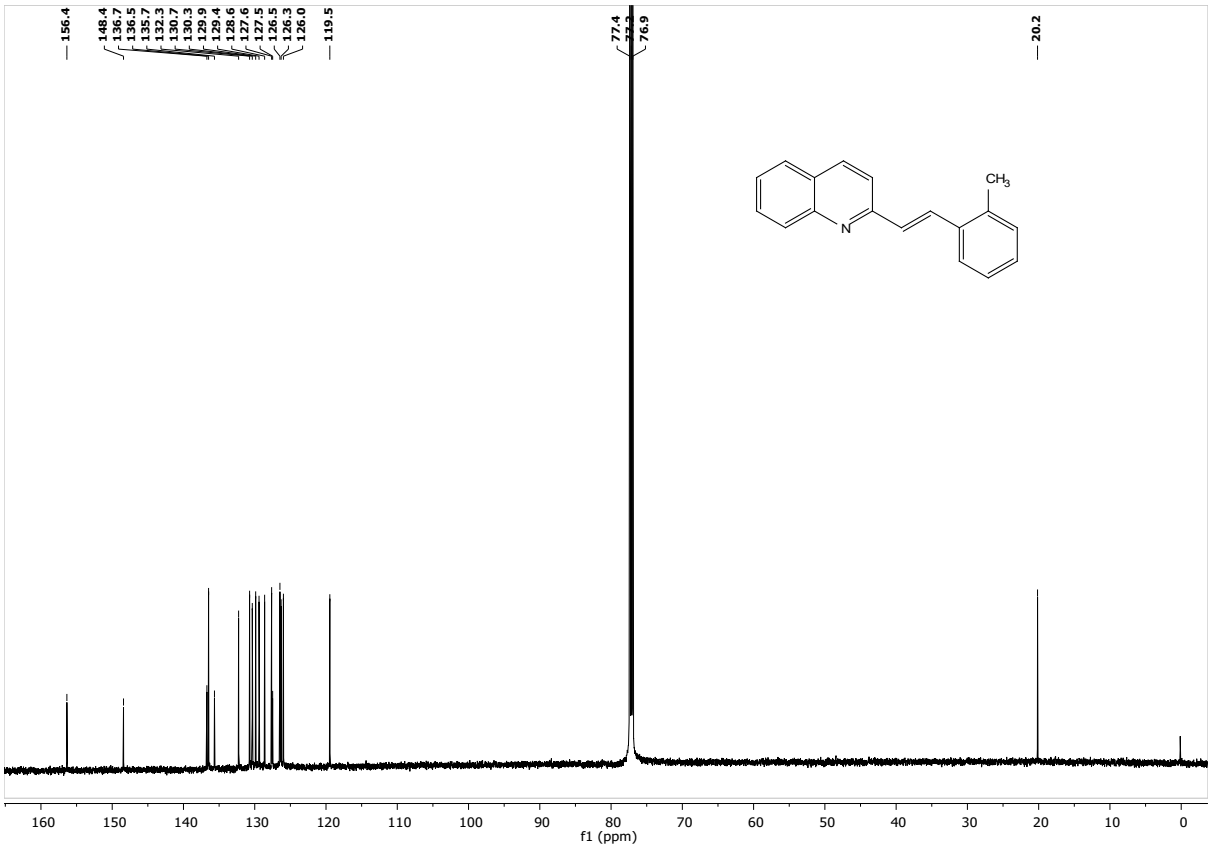


Figure S51: ^{13}C NMR Spectrum of **6g** ($CDCl_3$, 151 MHz, 298 K)

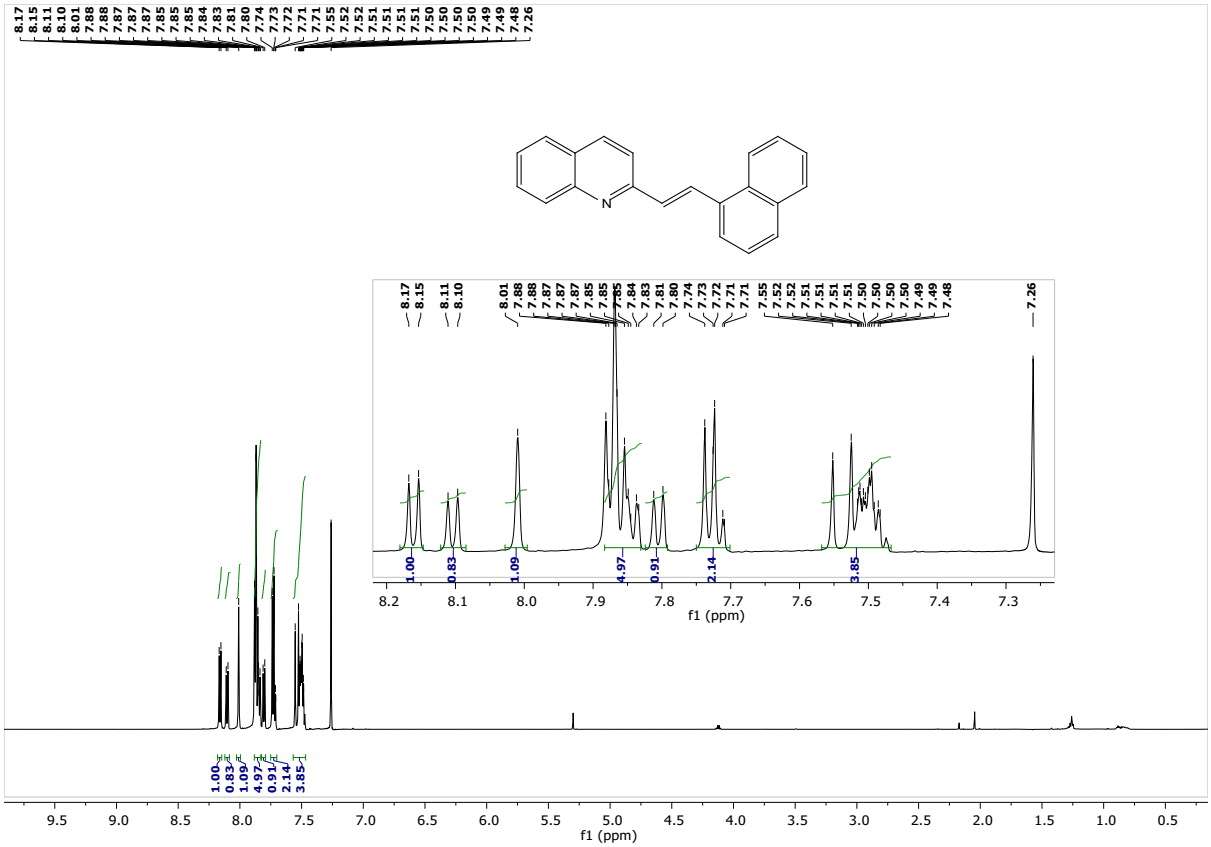


Figure S52: ^{1}H NMR Spectrum of **6h** ($CDCl_3$, 600 MHz, 298 K)

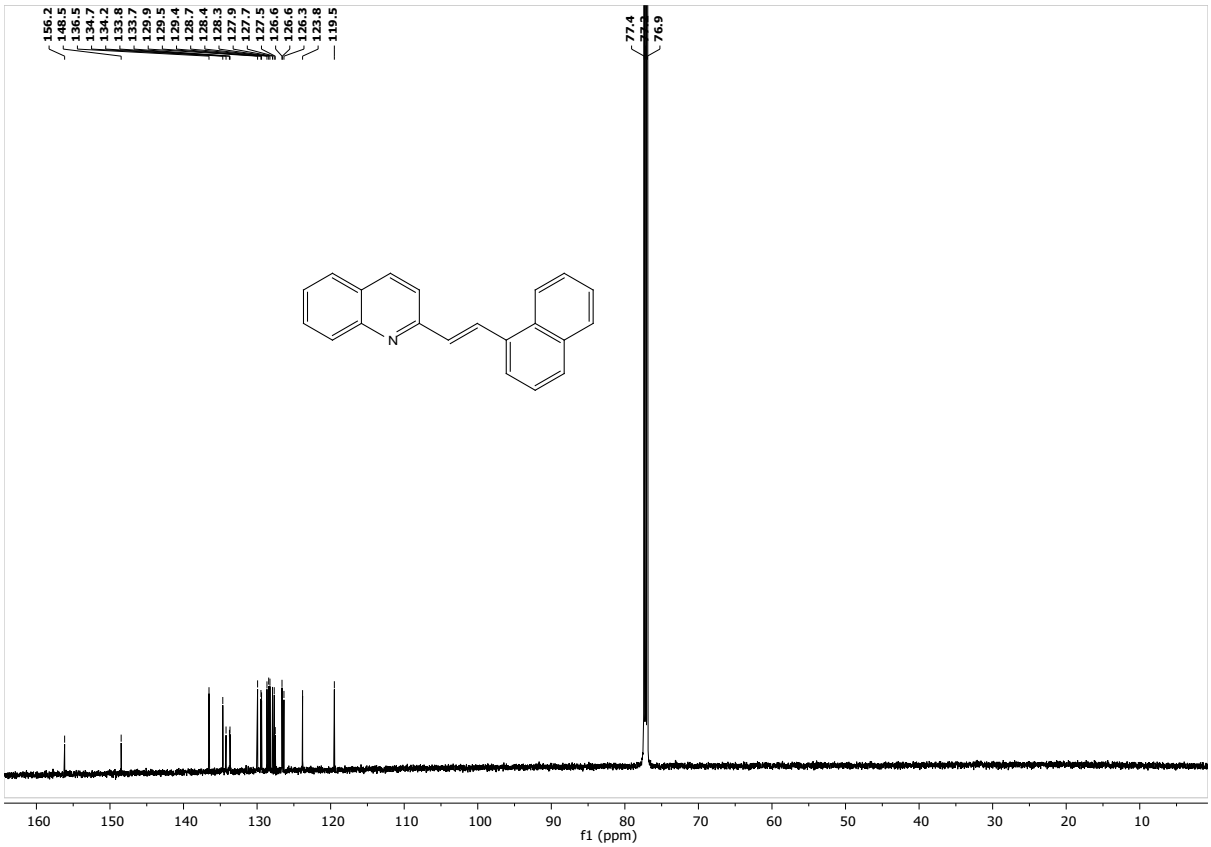


Figure S53: ^{13}C NMR Spectrum of **6h** ($CDCl_3$, 151 MHz, 298 K)

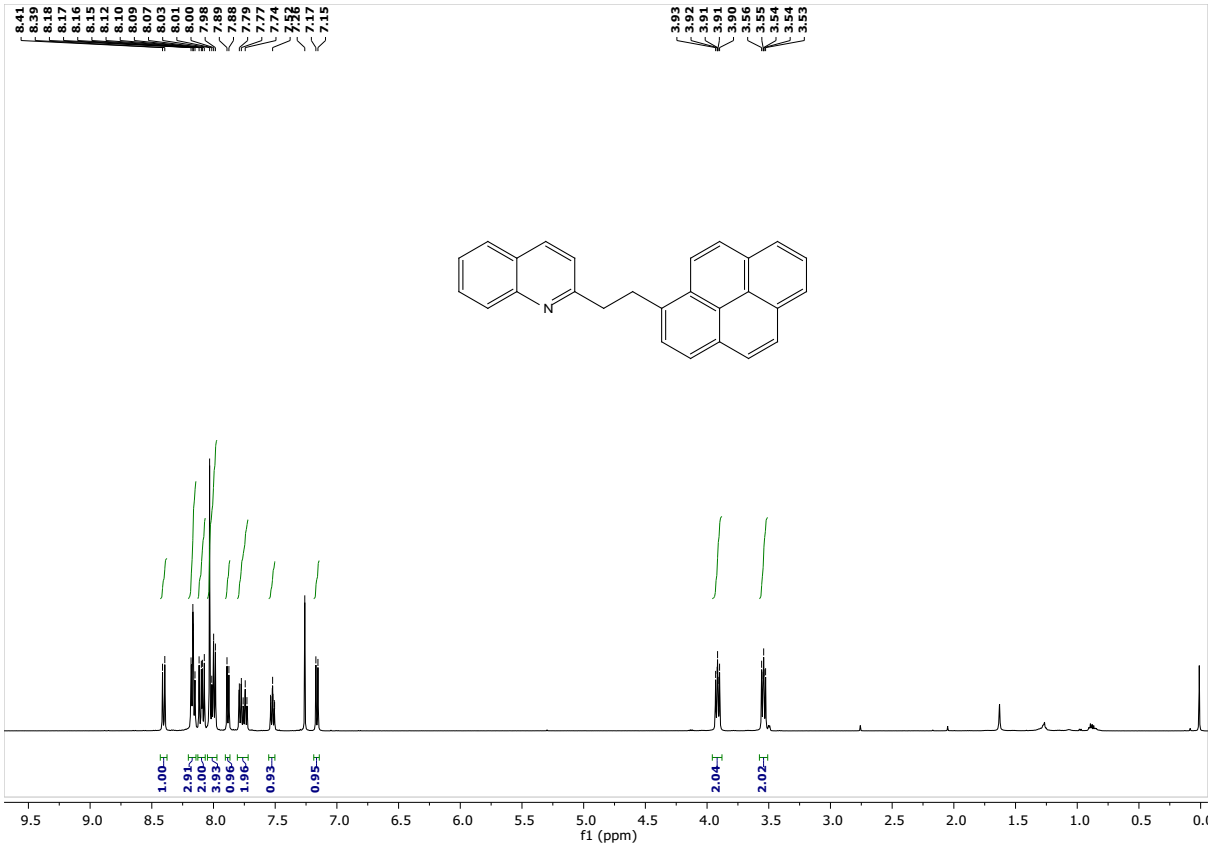


Figure S54: ^{1}H NMR Spectrum of **6i** ($CDCl_3$, 500 MHz, 298 K)

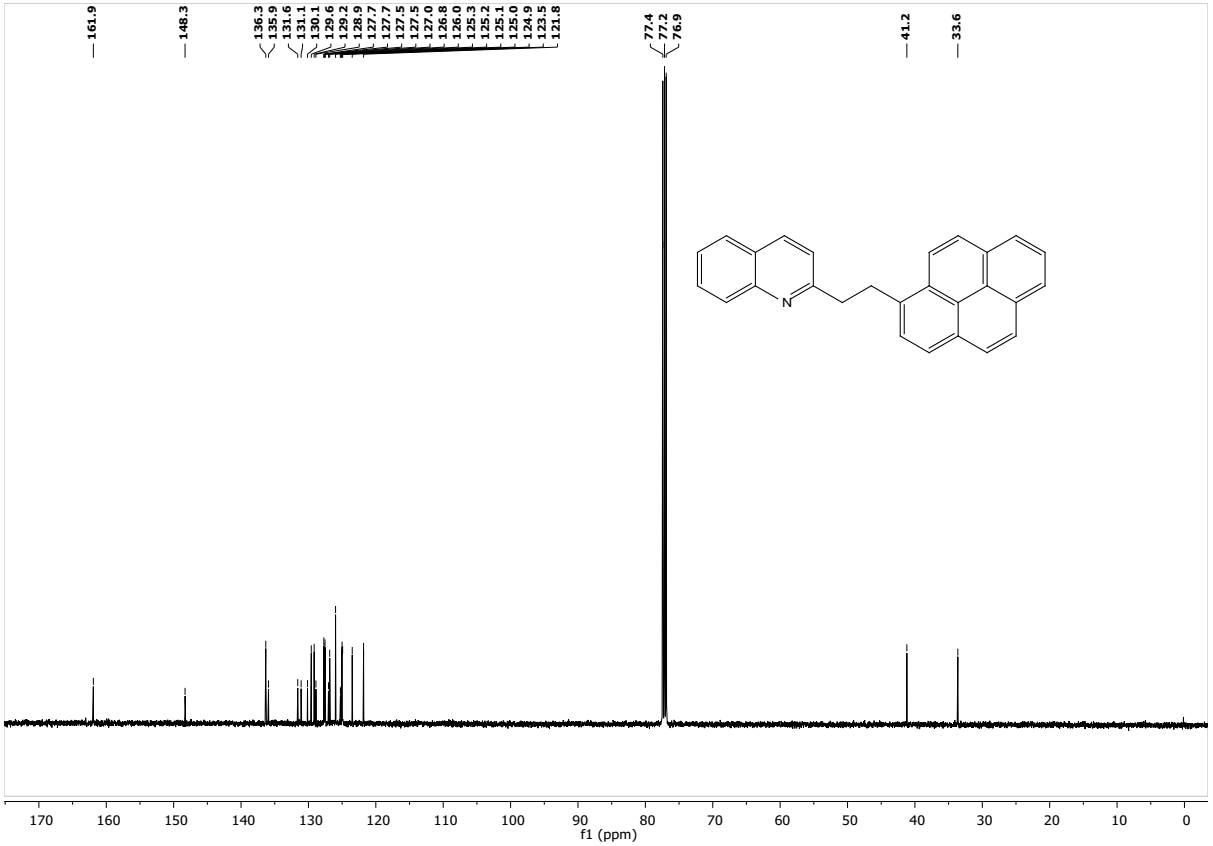


Figure S55: ^{13}C NMR Spectrum of **6i** ($CDCl_3$, 126 MHz, 298 K)

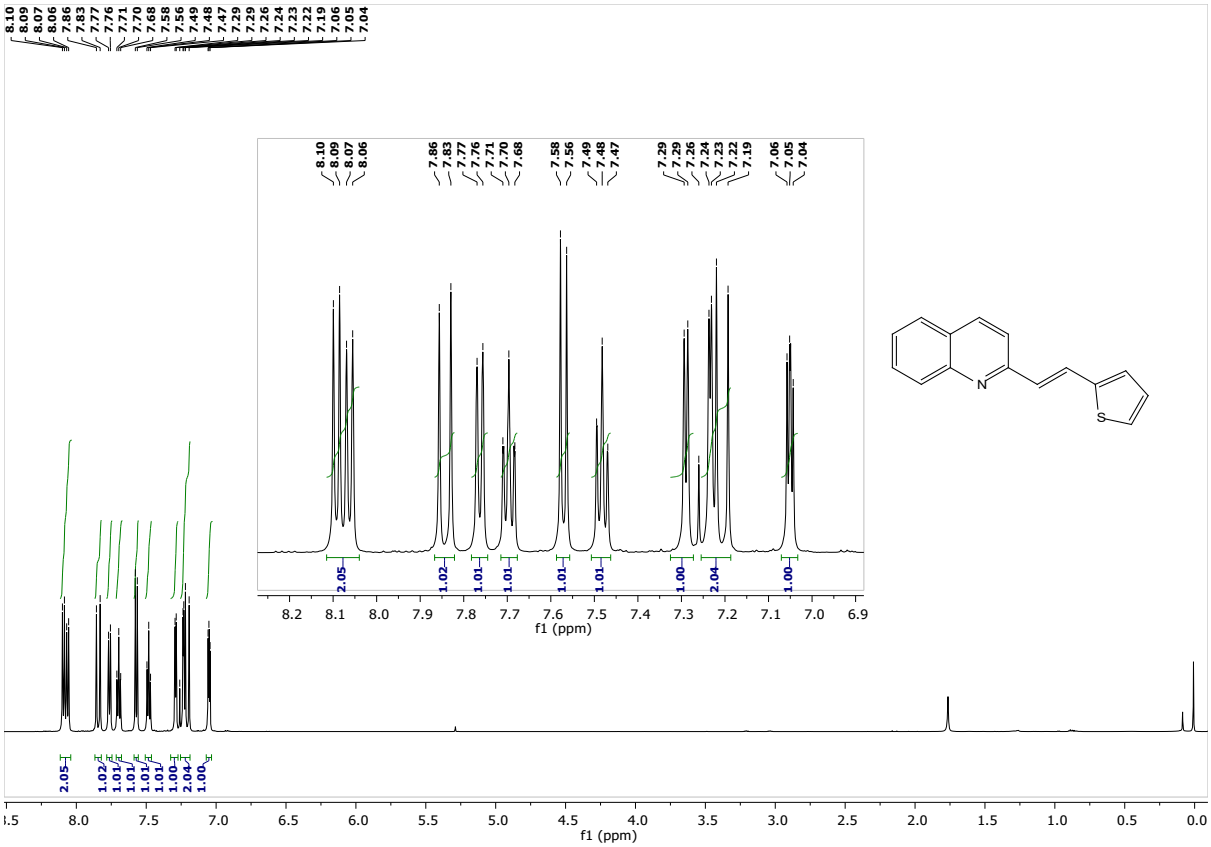


Figure S56: ^{1}H NMR Spectrum of **6j** ($CDCl_3$, 600 MHz, 298 K)

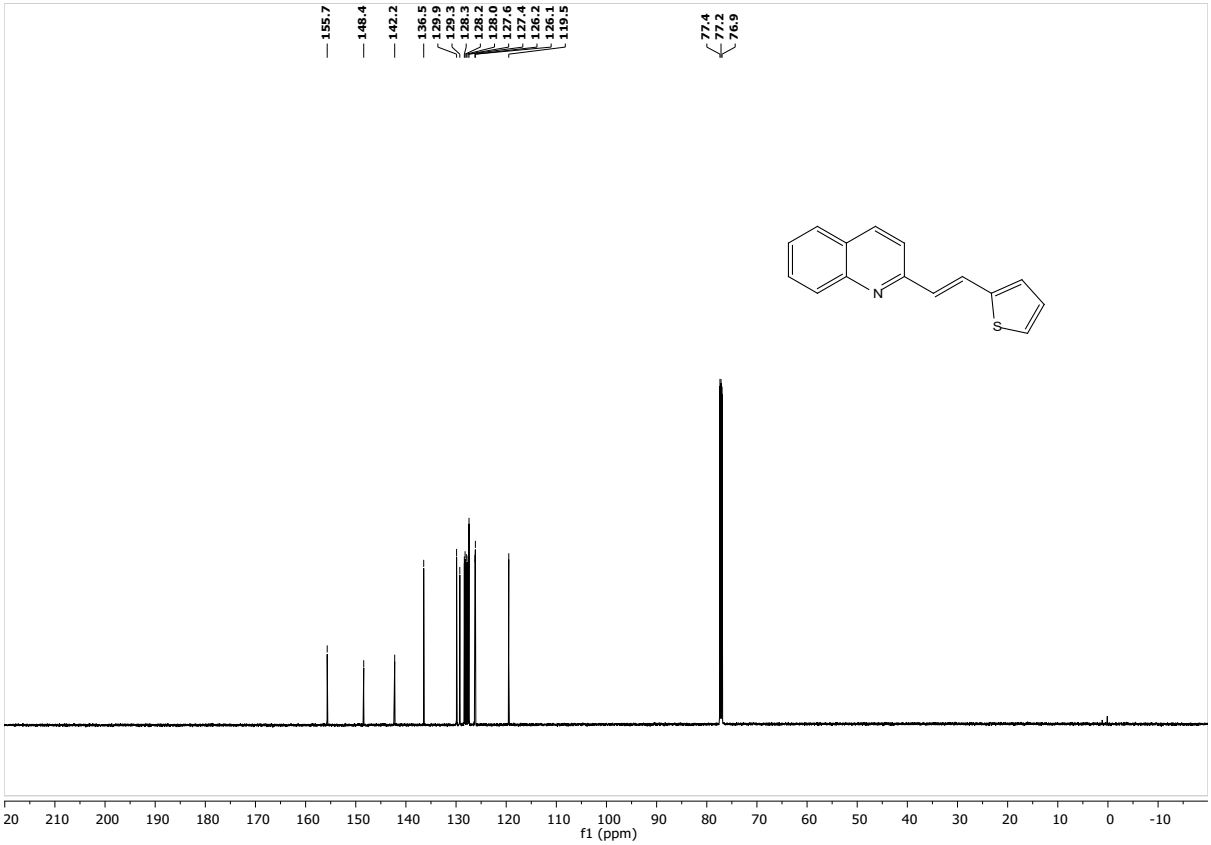


Figure S57: ^{13}C NMR Spectrum of **6j** ($CDCl_3$, 151 MHz, 298 K)

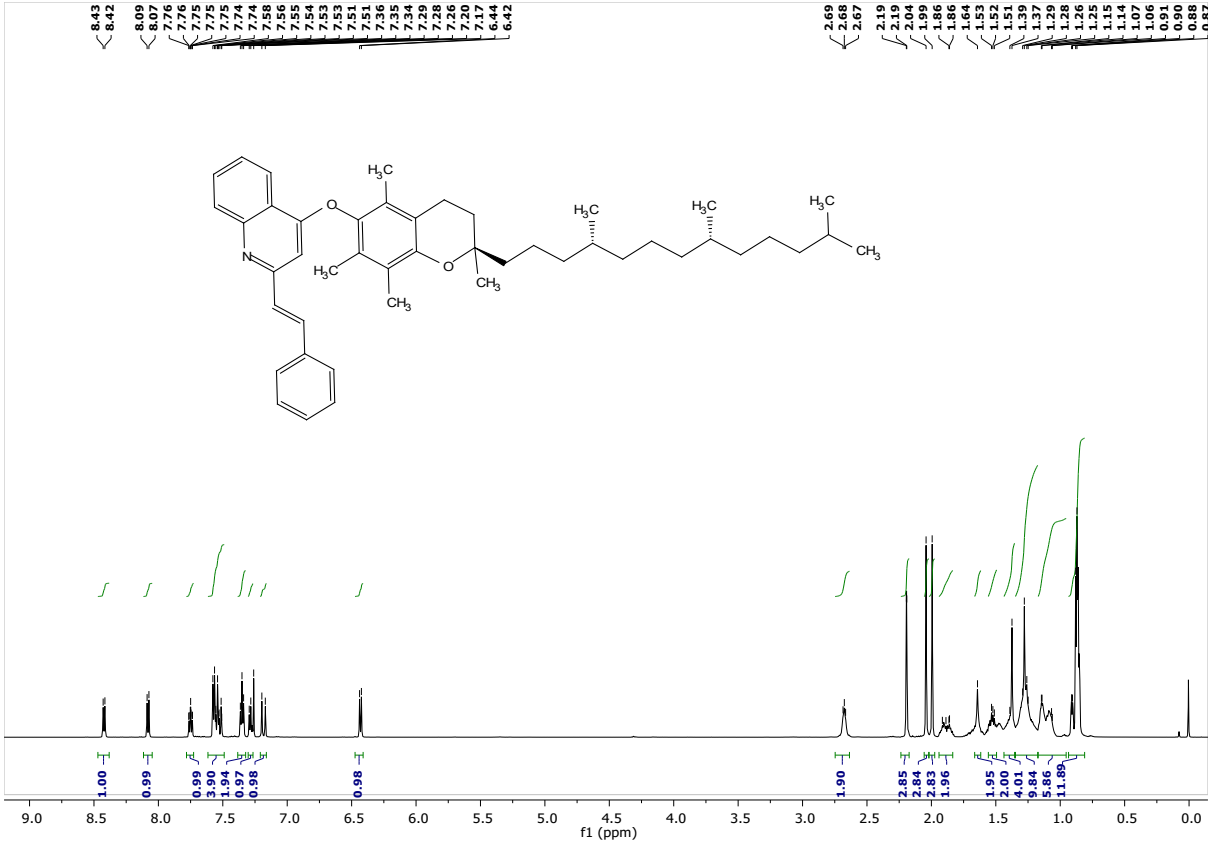


Figure S58: ^{1}H NMR Spectrum of **6k** ($CDCl_3$, 600 MHz, 298 K)

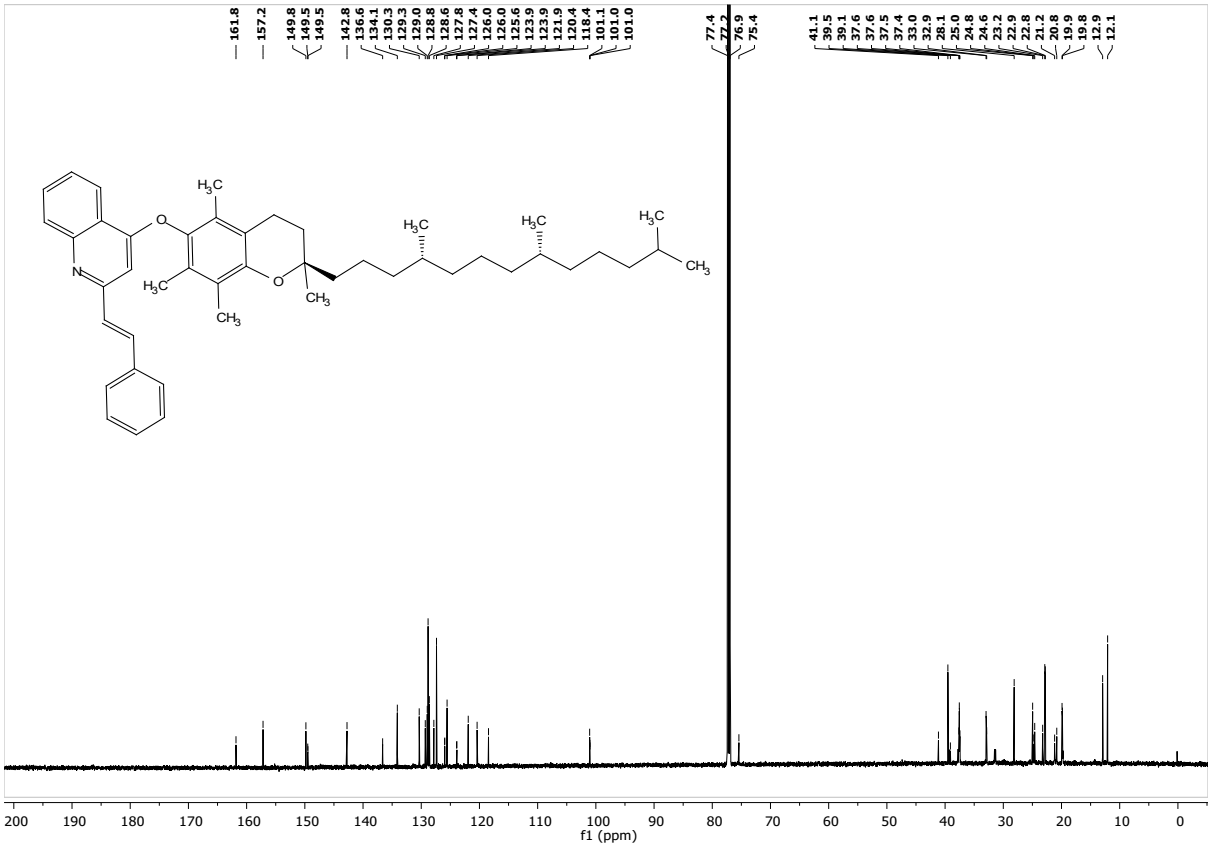


Figure S59: ^{13}C NMR Spectrum of **6k** ($CDCl_3$, 151 MHz, 298 K)

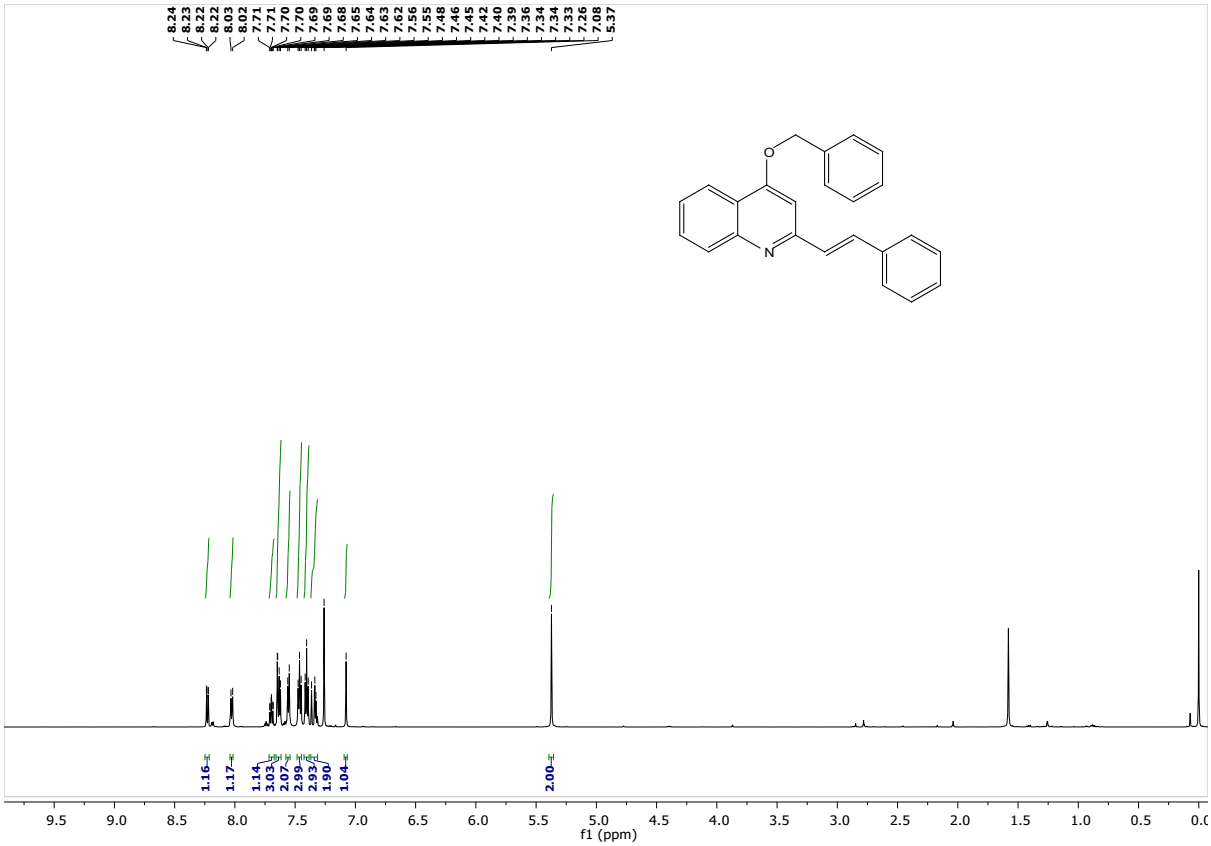


Figure S60: ^{1}H NMR Spectrum of **6l** ($CDCl_3$, 600 MHz, 298 K)

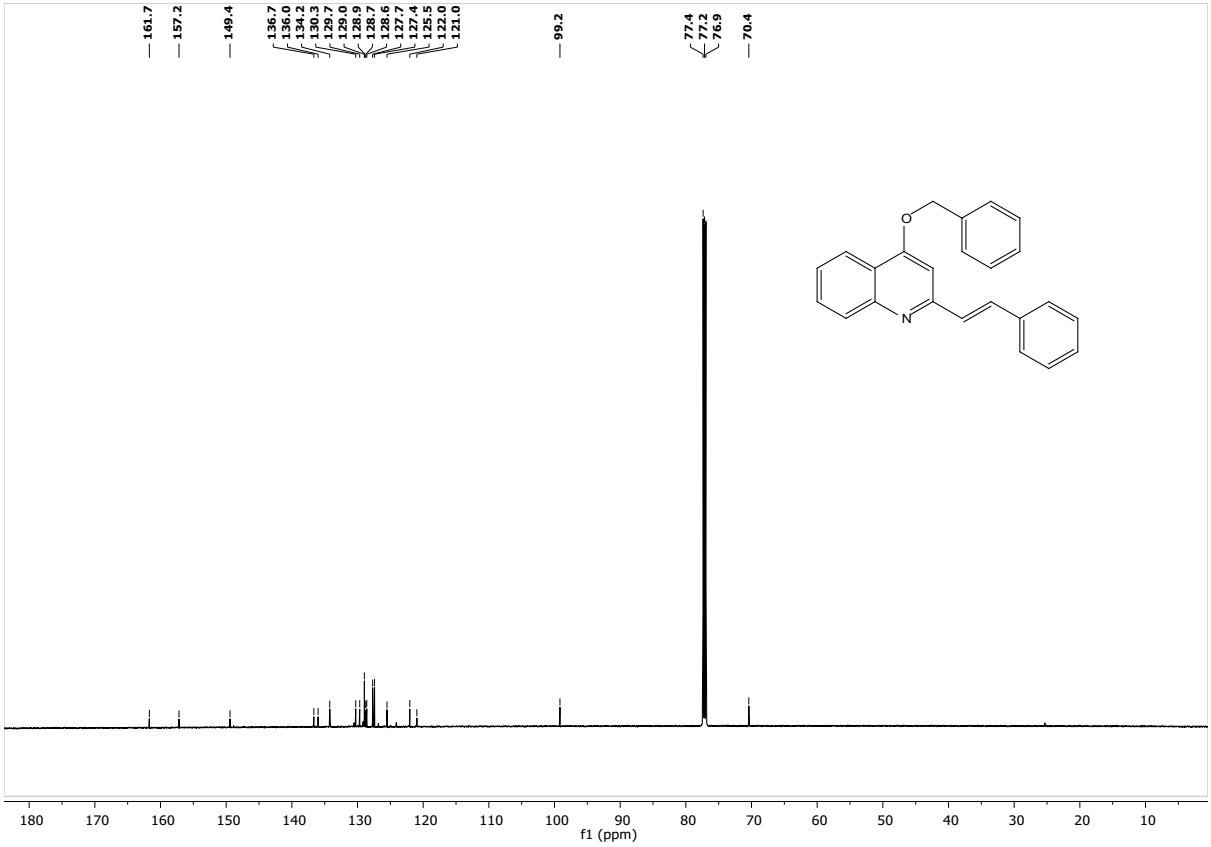


Figure S61: ^{13}C NMR Spectrum of **6l** ($CDCl_3$, 151 MHz, 298 K)

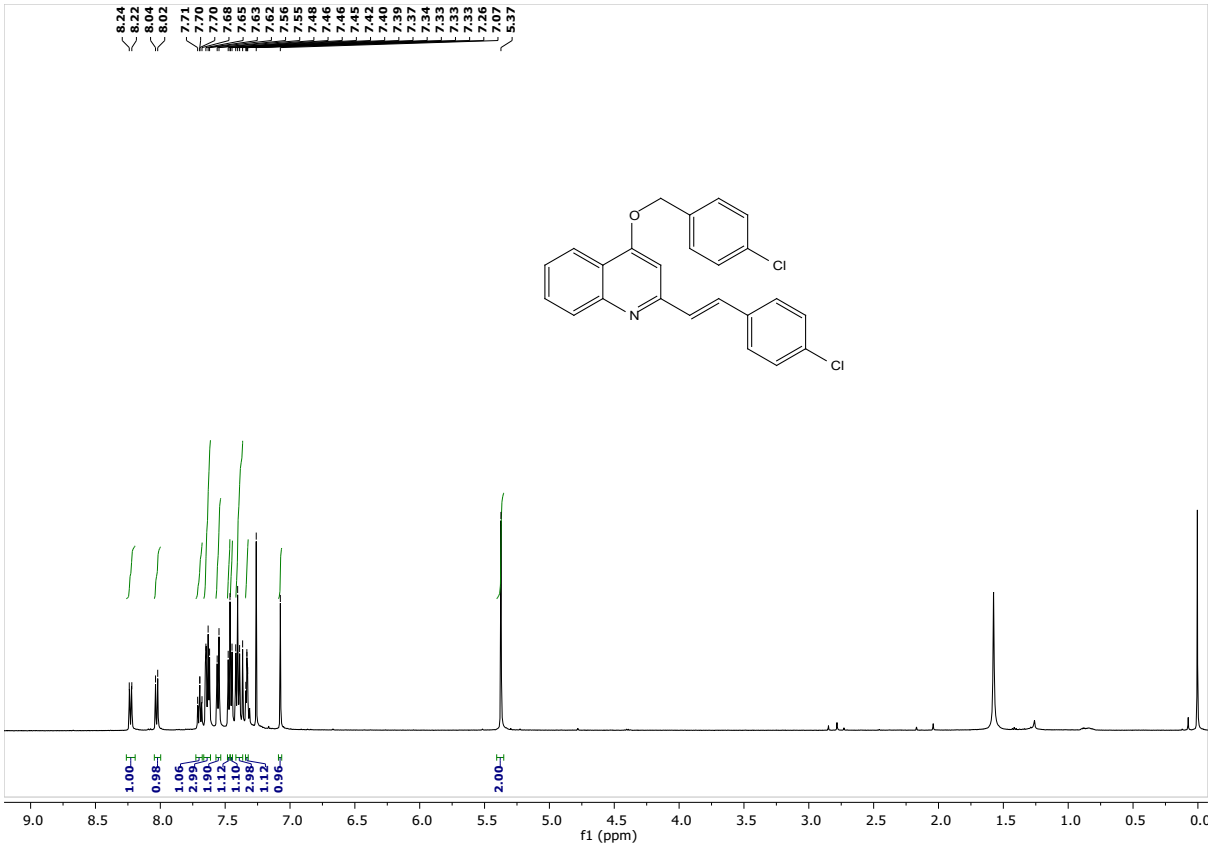


Figure S62: ^{1}H NMR Spectrum of **6m** ($CDCl_3$, 500 MHz, 298 K)

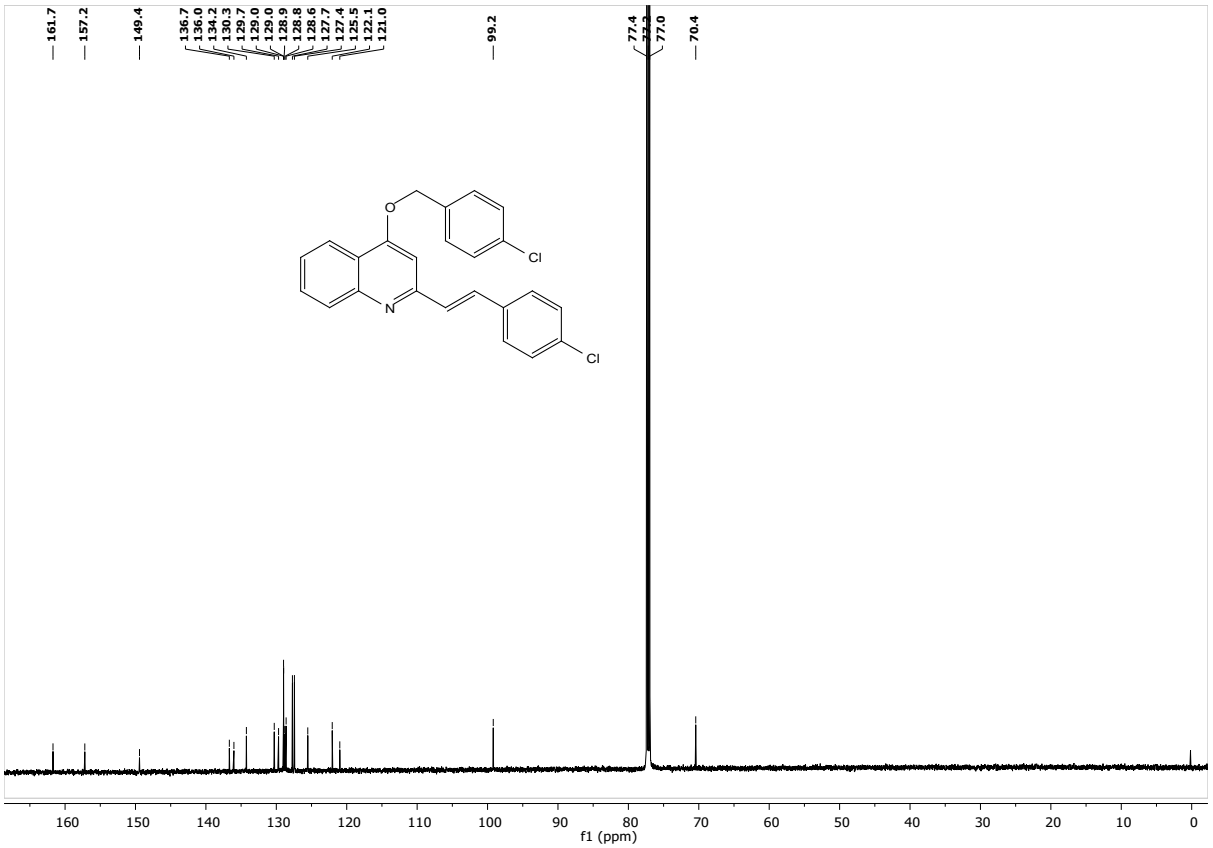


Figure S63: ^{13}C NMR Spectrum of **6m** ($CDCl_3$, 151 MHz, 298 K)

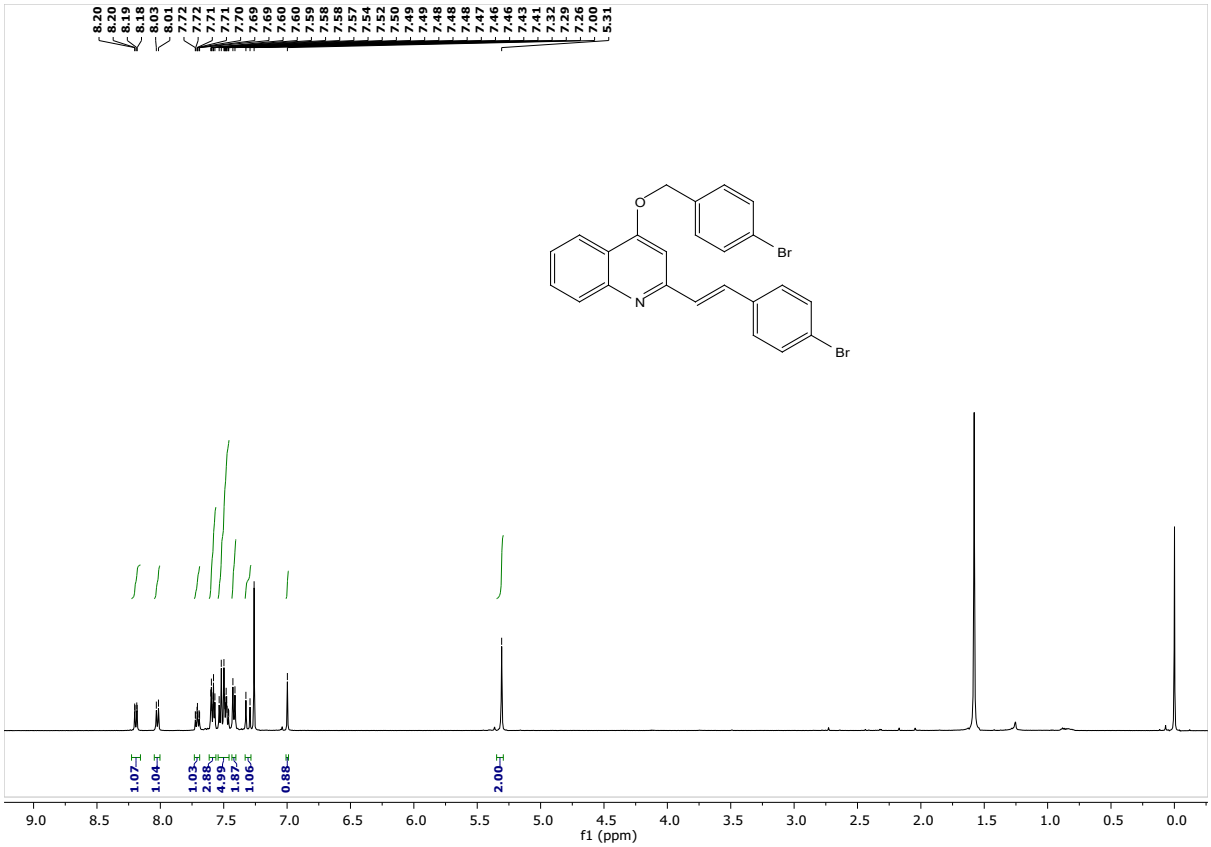


Figure S64: ^{1}H NMR Spectrum of **6n** ($CDCl_3$, 500 MHz, 298 K)

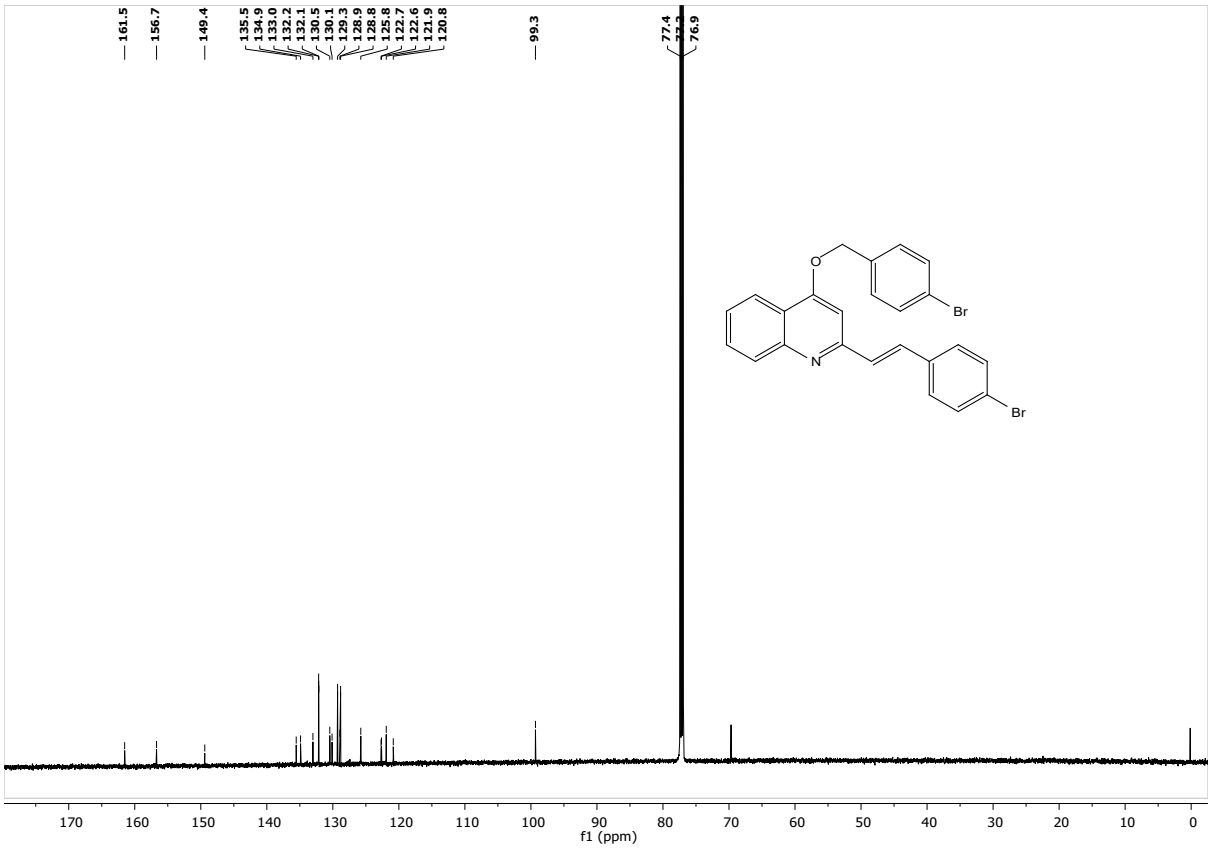


Figure S65: ^{13}C NMR Spectrum of **6n** ($CDCl_3$, 151 MHz, 298 K)

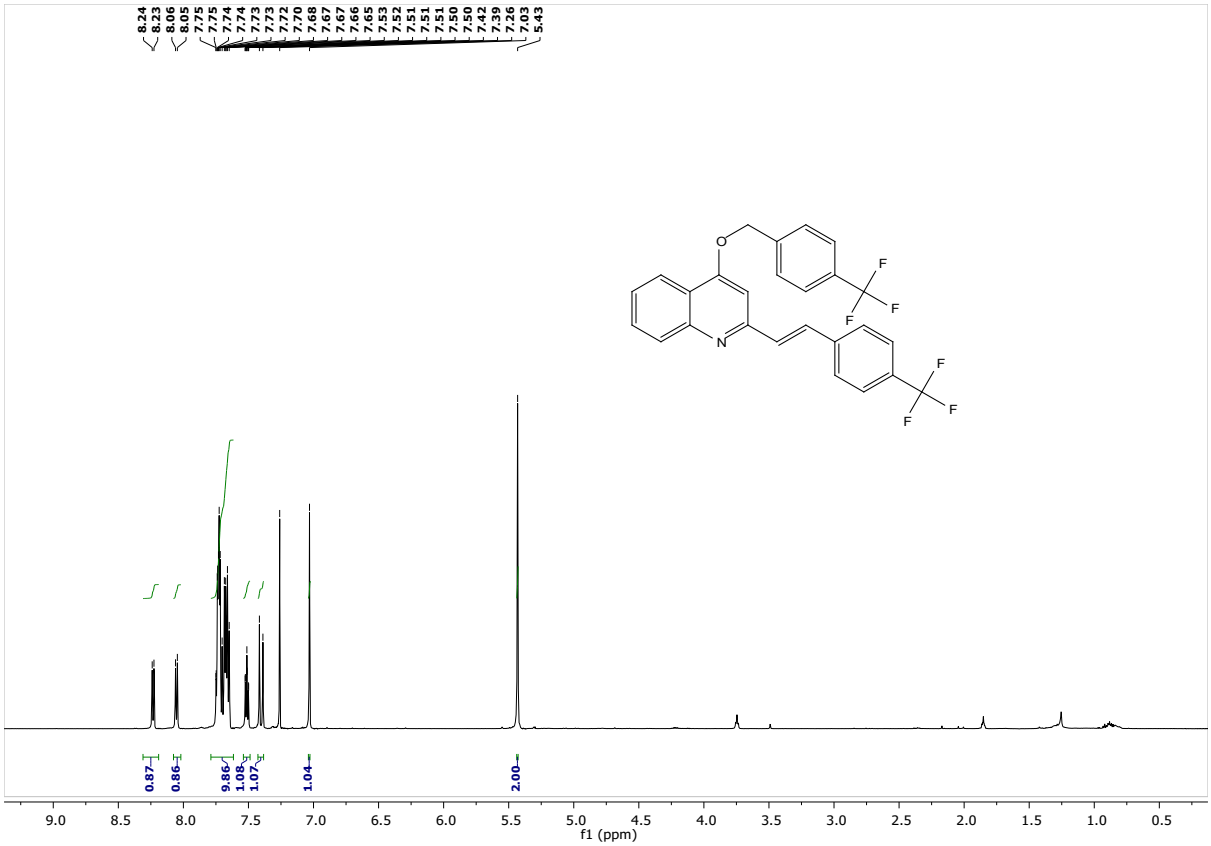


Figure S66: ^{1}H NMR Spectrum of **6o** ($CDCl_3$, 400 MHz, 298 K)

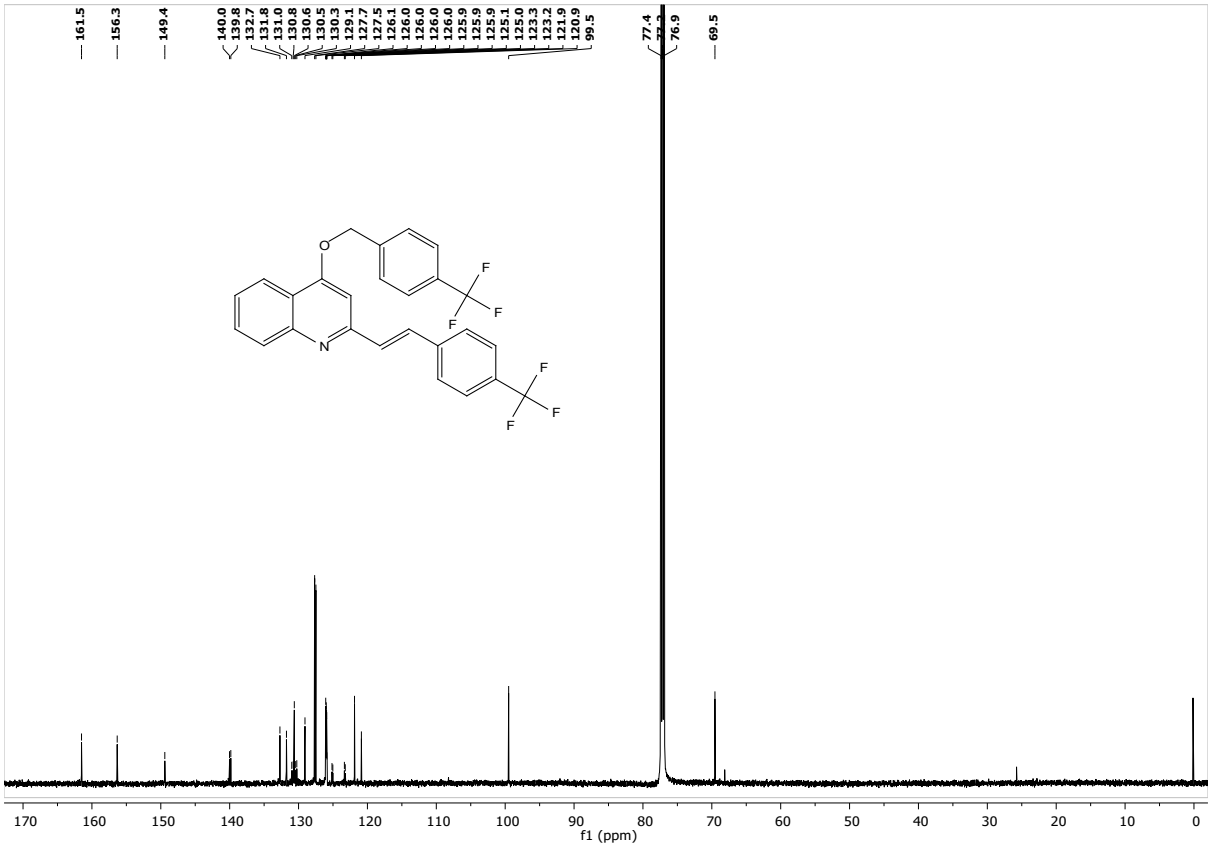


Figure S67: ^{13}C NMR Spectrum of **6o** ($CDCl_3$, 151 MHz, 298 K)

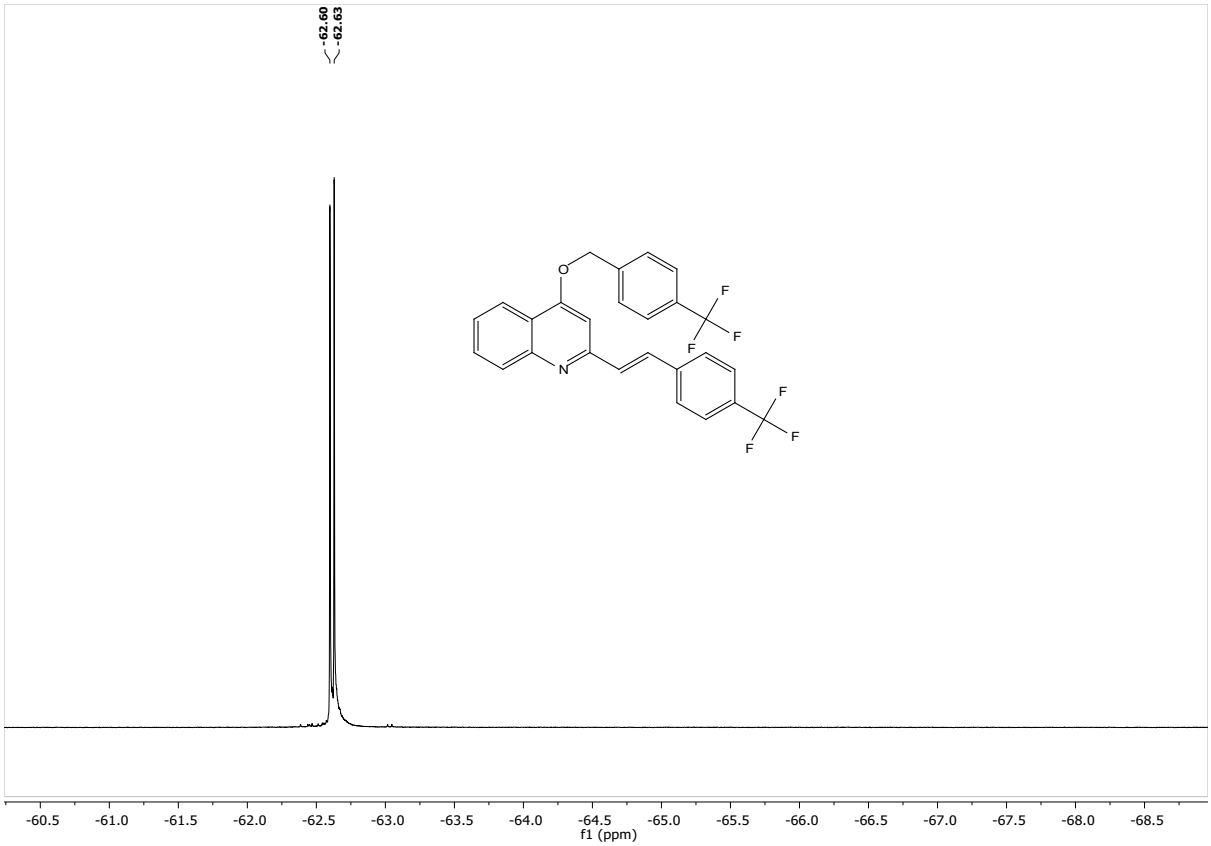


Figure S68: ^{19}F NMR Spectrum of **6o** ($CDCl_3$, 471 MHz, 298 K)

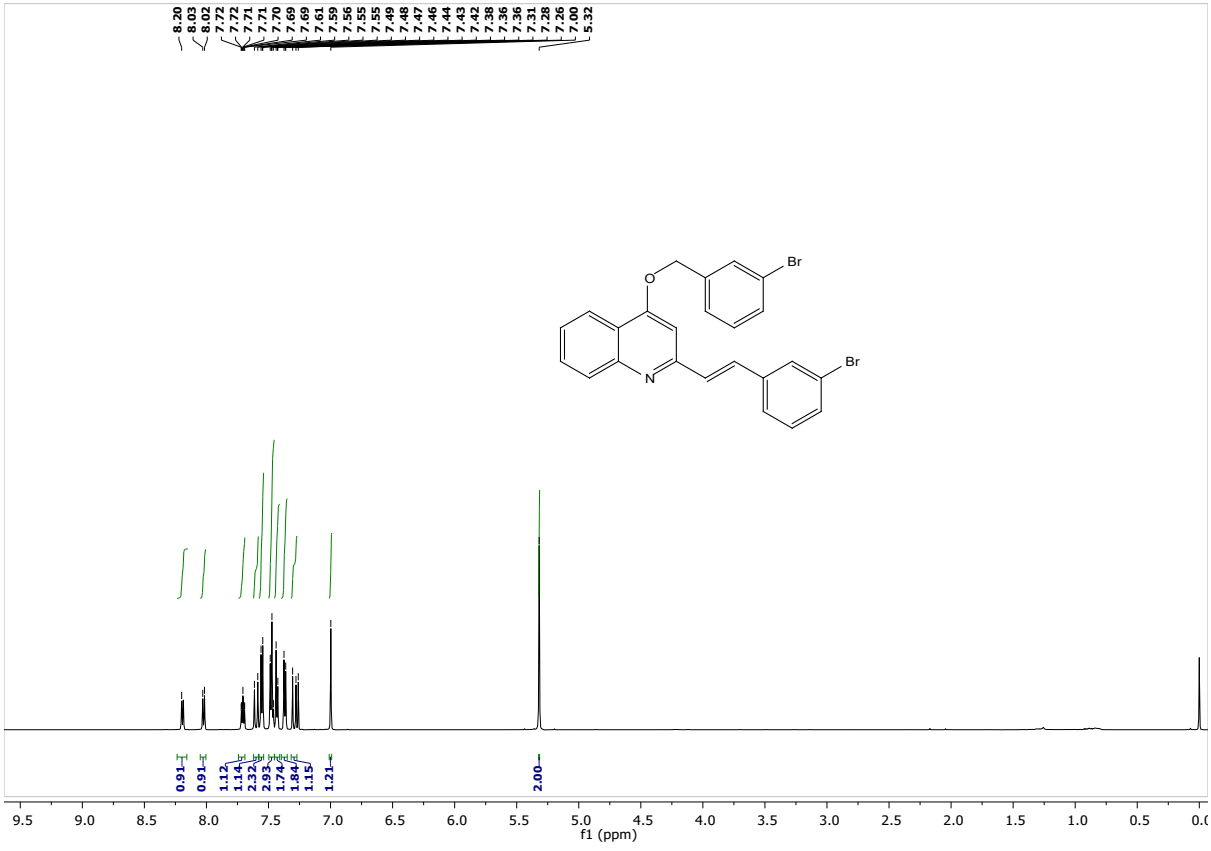


Figure S69: ^{1}H NMR Spectrum of **6p** ($CDCl_3$, 600 MHz, 298 K)

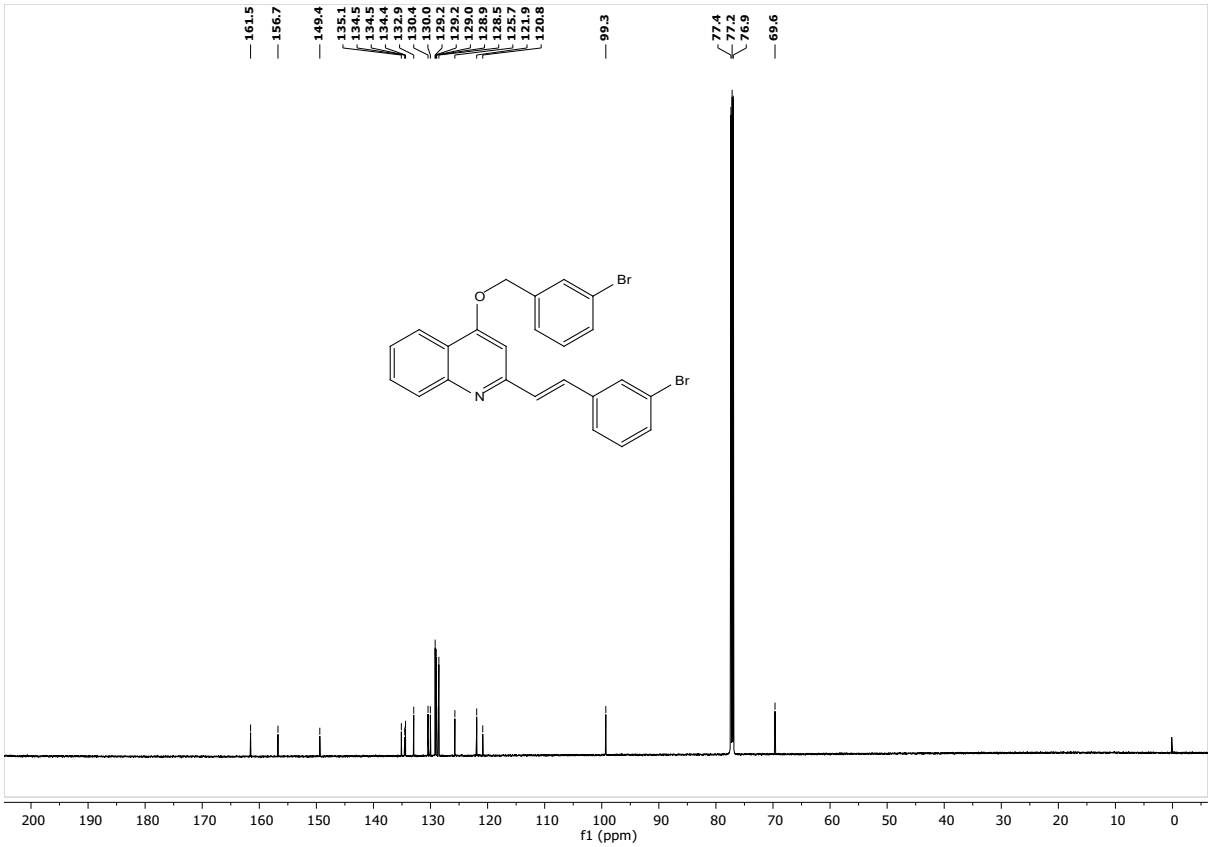


Figure S70: ^{13}C NMR Spectrum of **6p** ($CDCl_3$, 151 MHz, 298 K)

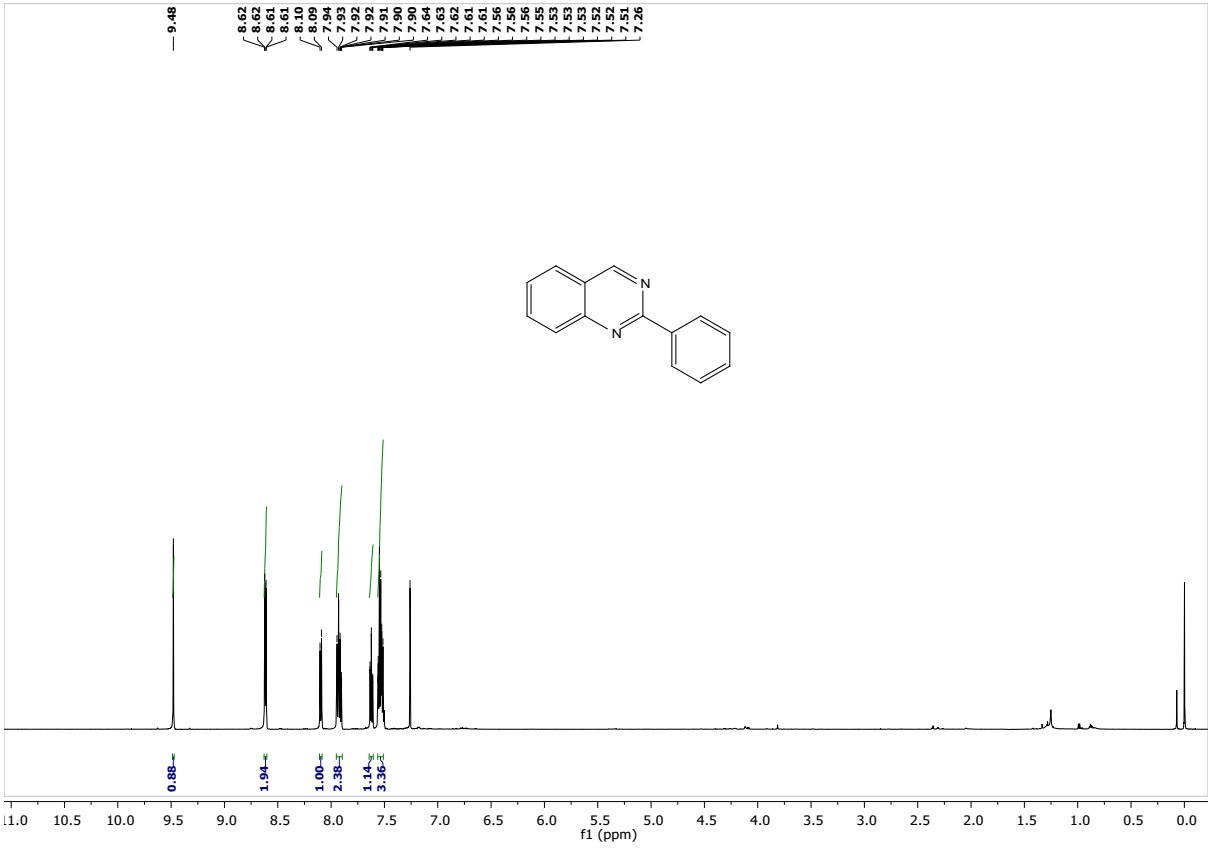


Figure S71: ^{1}H NMR Spectrum of **8a** ($CDCl_3$, 600 MHz, 298 K)

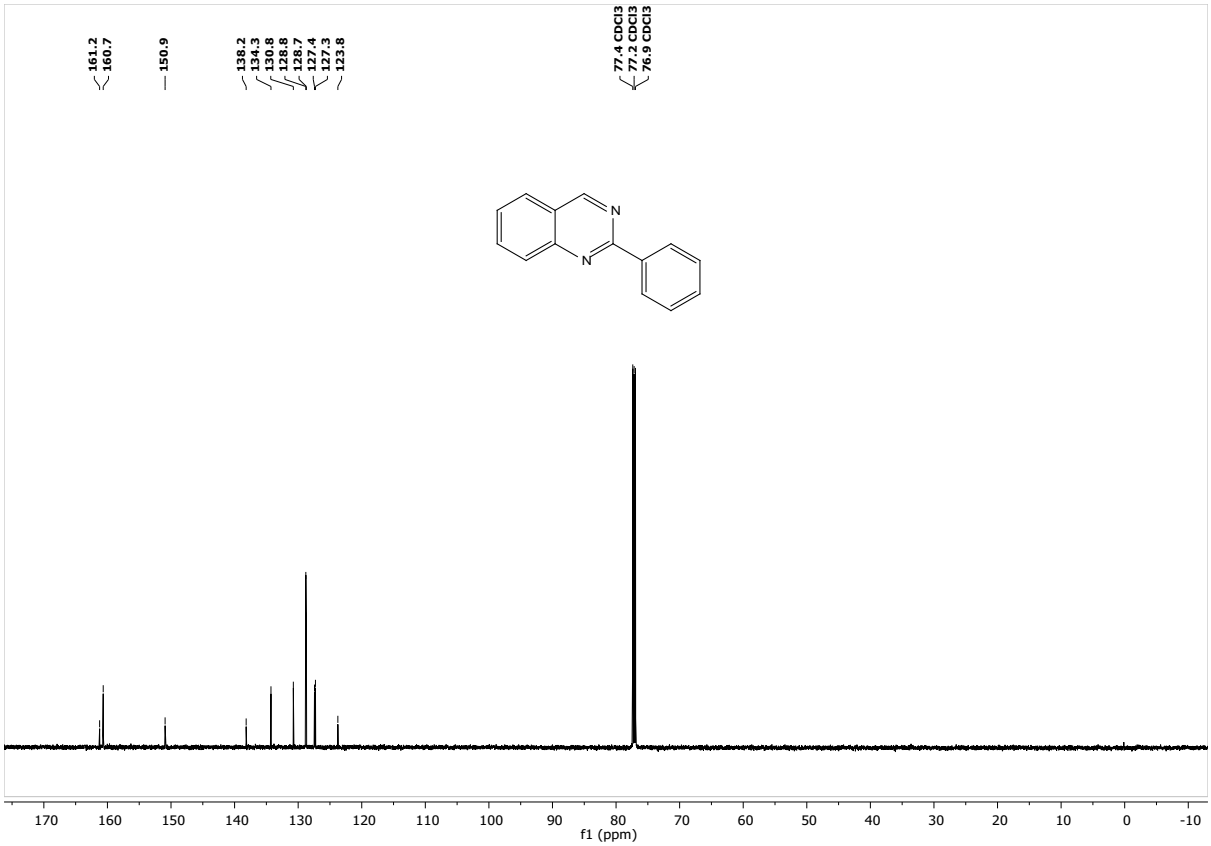


Figure S72: ^{13}C NMR Spectrum of **8a** ($CDCl_3$, 151 MHz, 298 K)

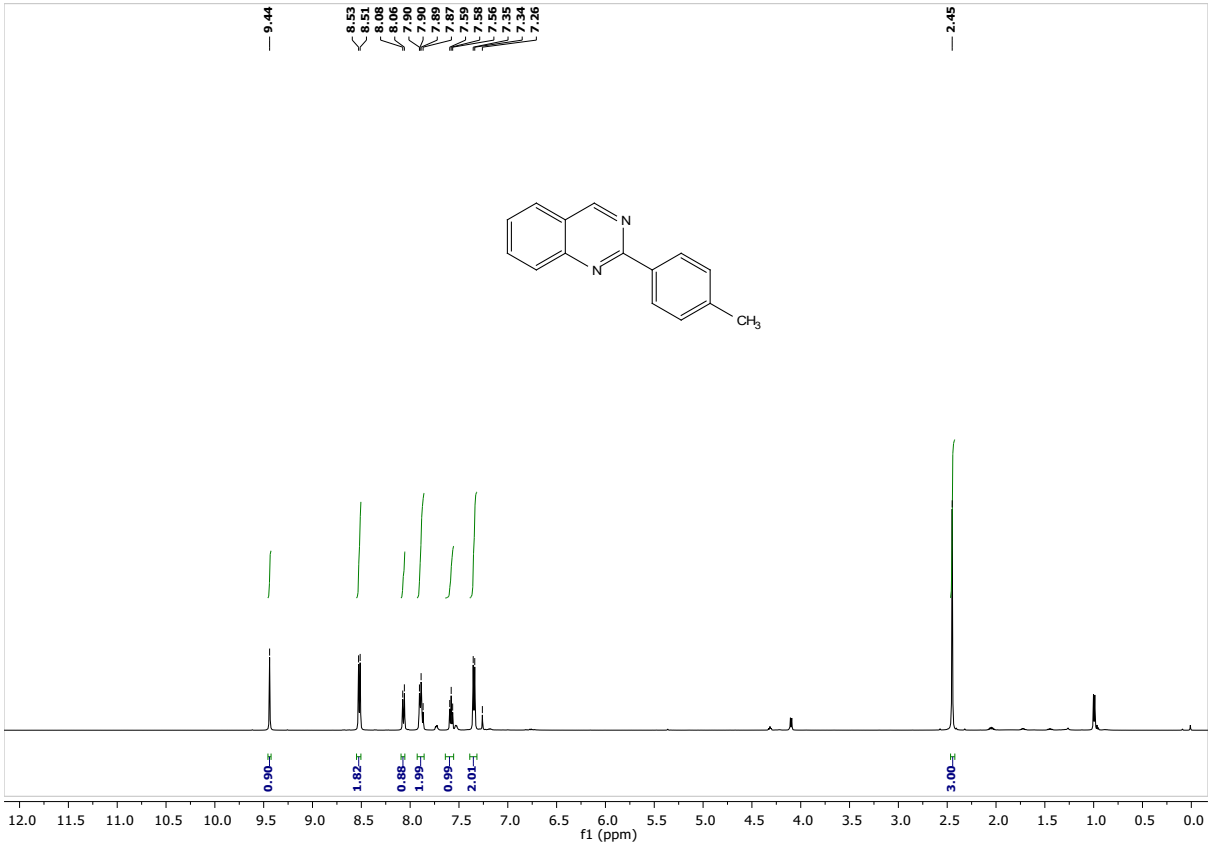


Figure S73: ^{1}H NMR Spectrum of **8b** ($CDCl_3$, 500 MHz, 298 K)

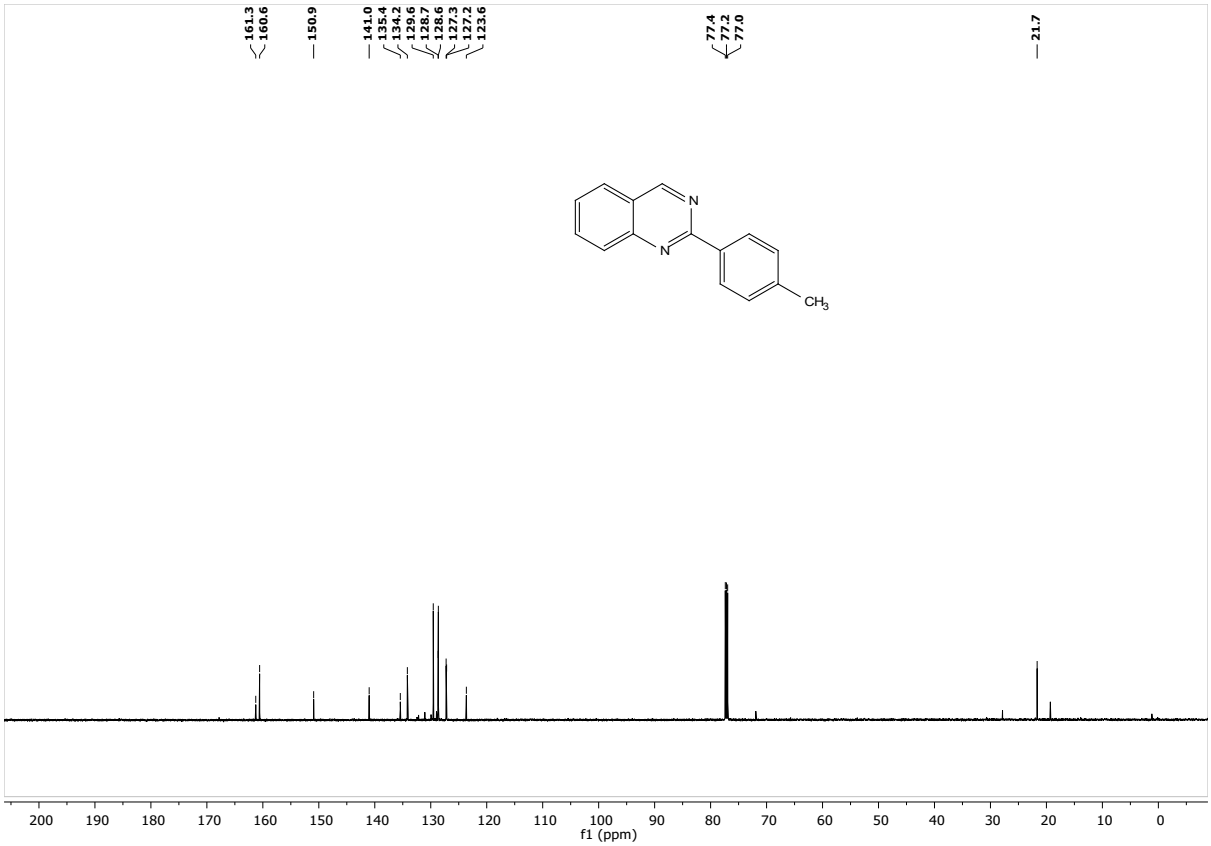


Figure S74: ^{13}C NMR Spectrum of **8b** ($CDCl_3$, 151 MHz, 298 K)

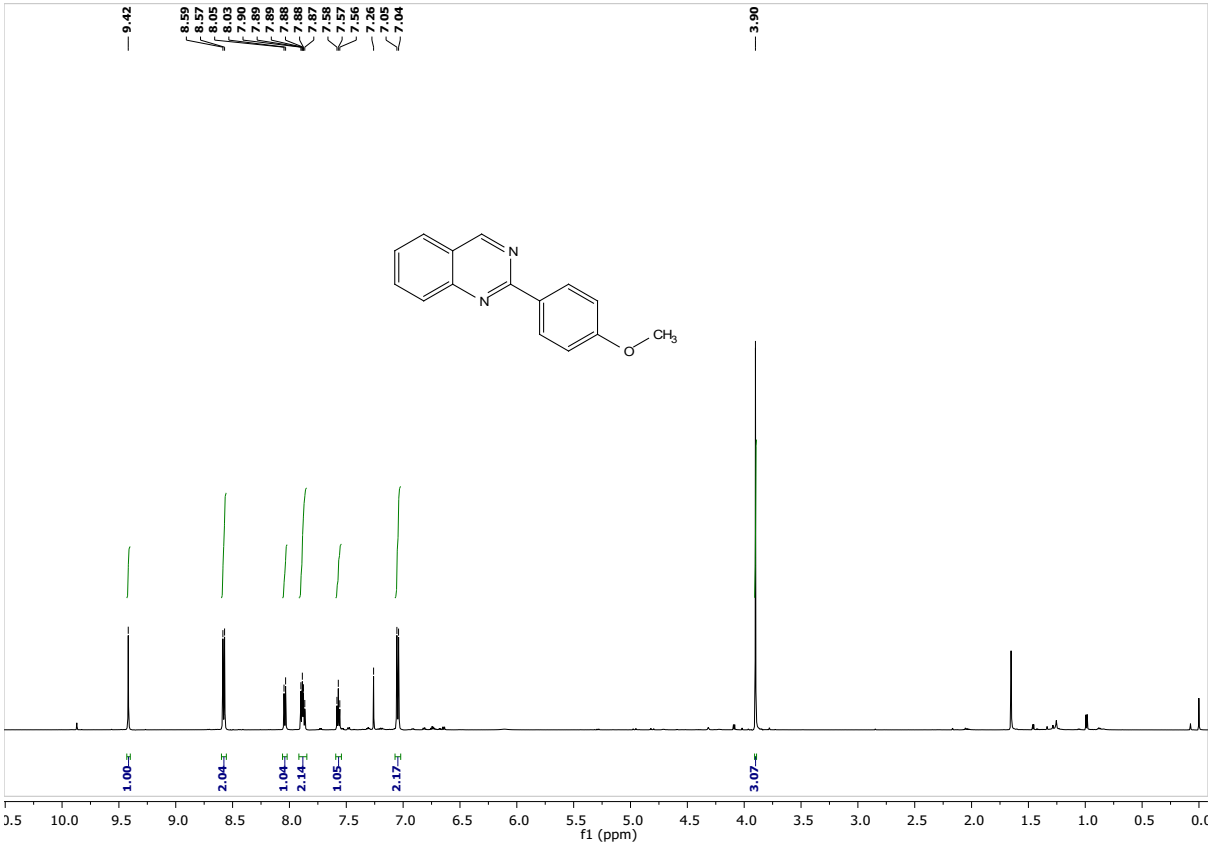


Figure S75: ^{1}H NMR Spectrum of **8c** ($CDCl_3$, 600 MHz, 298 K)

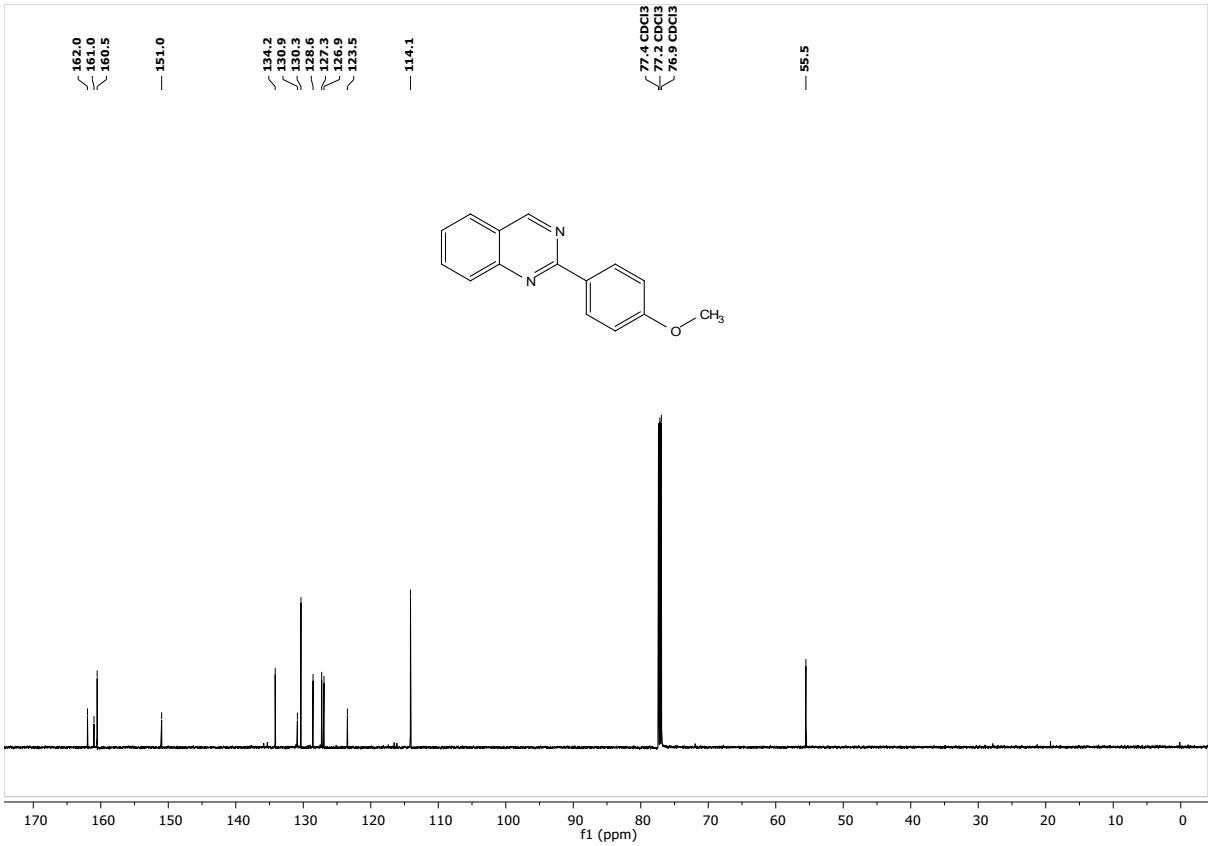


Figure S76: ^{13}C NMR Spectrum of **8c** ($CDCl_3$, 151 MHz, 298 K)

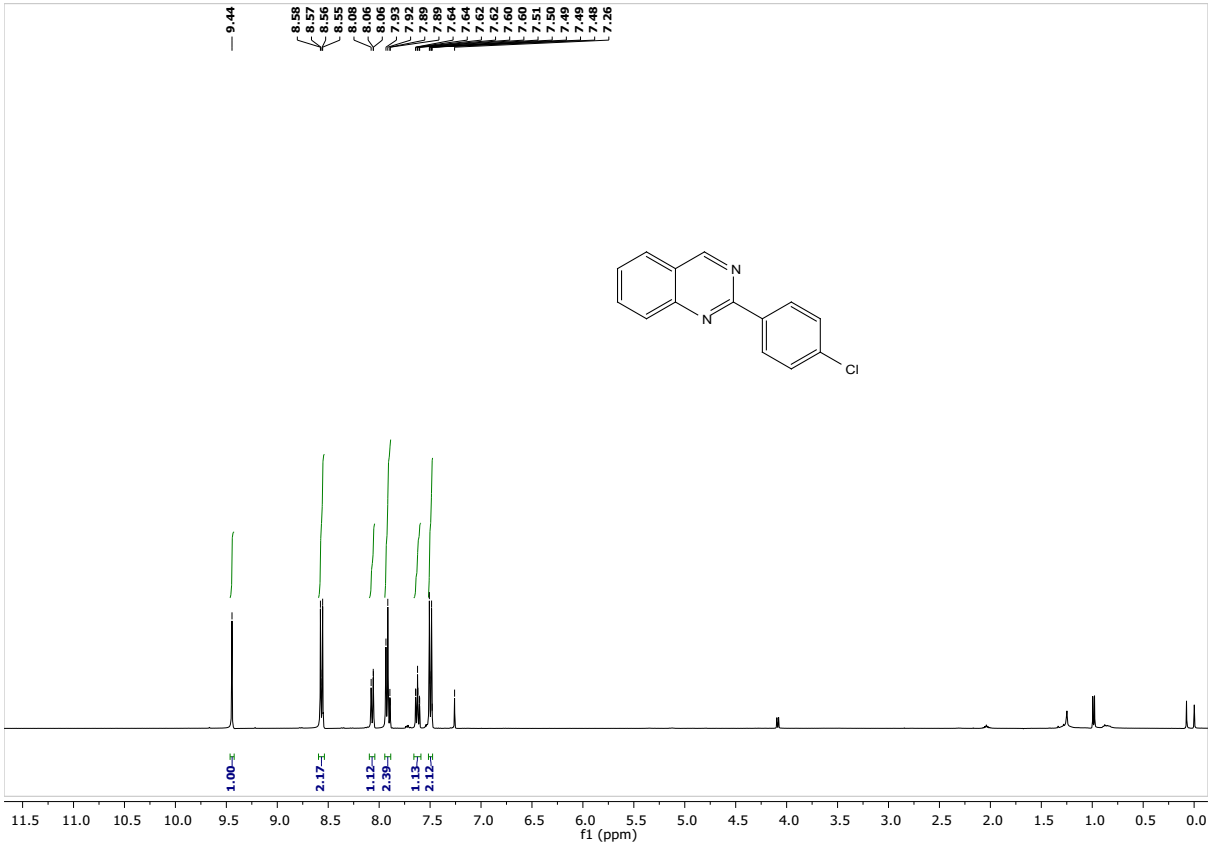


Figure S77: ^{1}H NMR Spectrum of **8d** ($CDCl_3$, 400 MHz, 298 K)

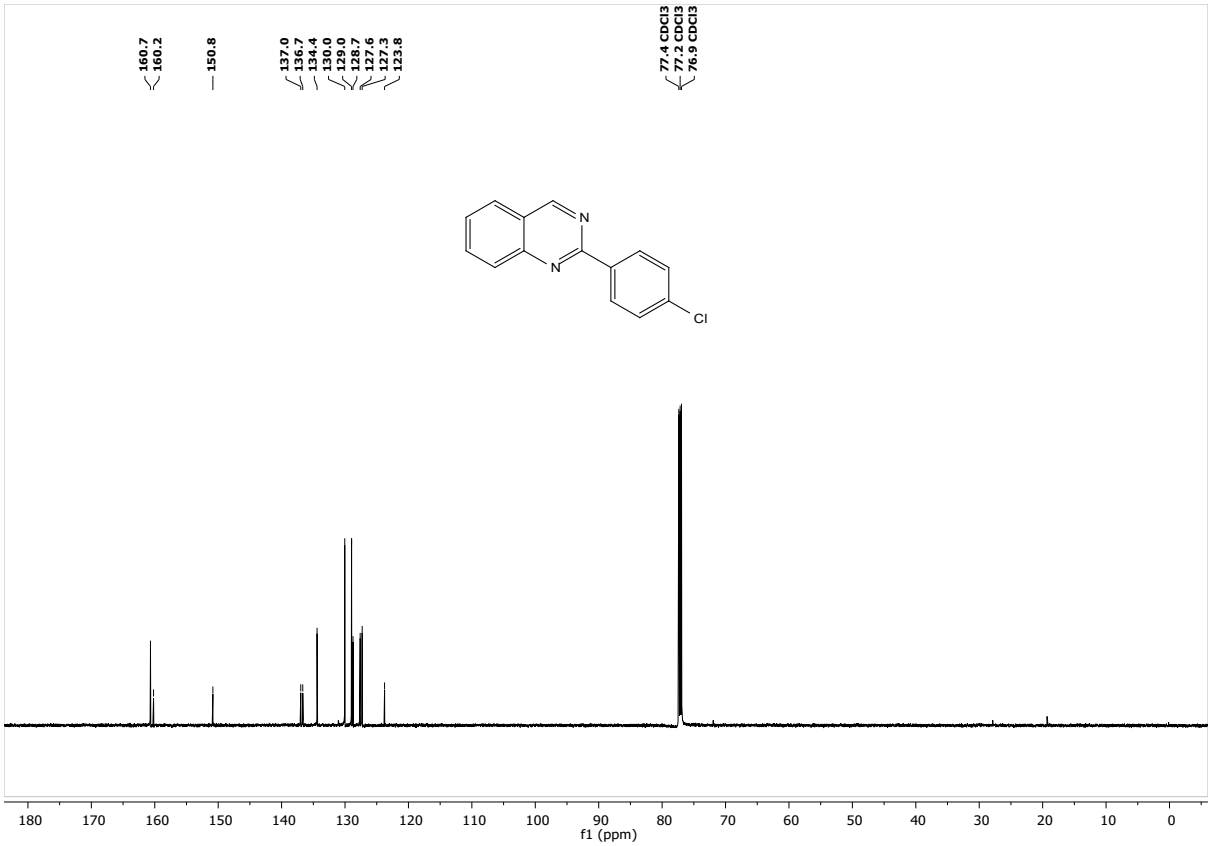


Figure S78: ^{13}C NMR Spectrum of **8d** ($CDCl_3$, 151 MHz, 298 K)

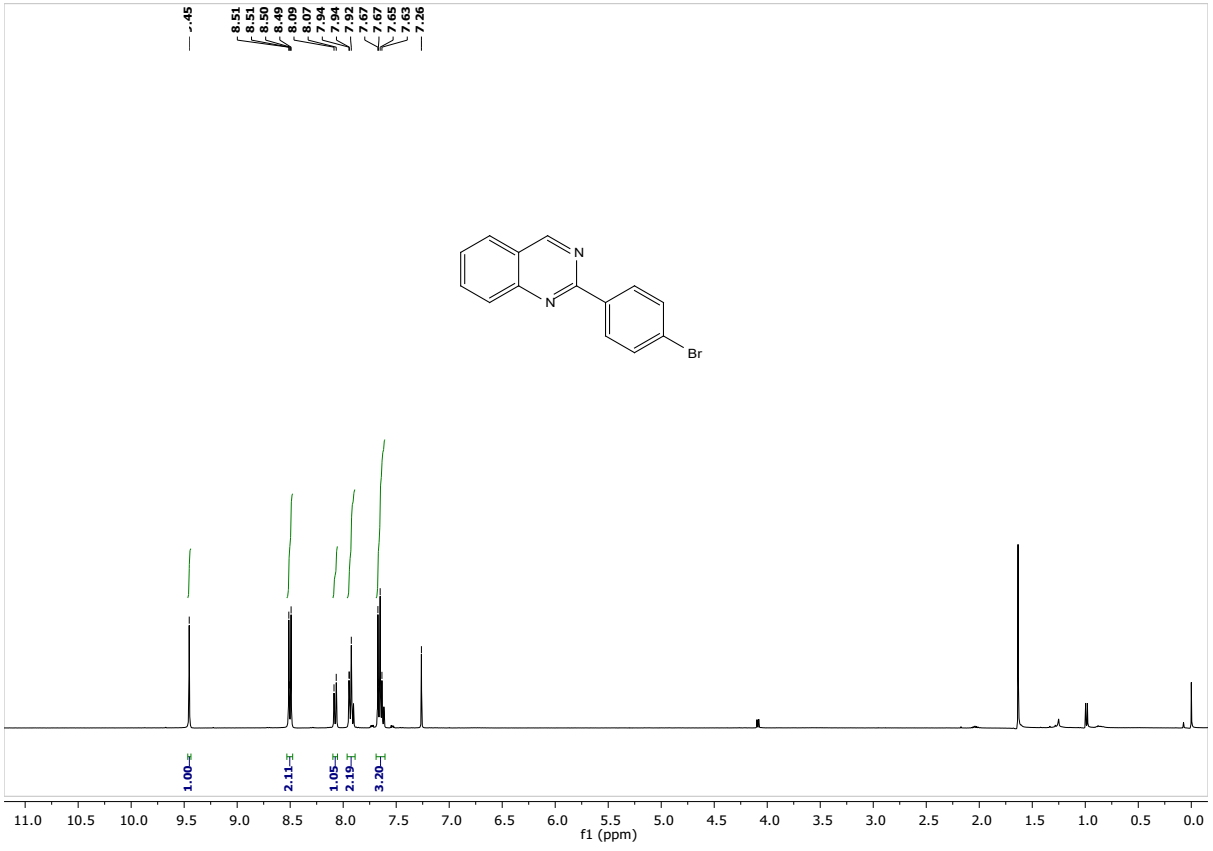


Figure S79: ^{1}H NMR Spectrum of **8e** ($CDCl_3$, 400 MHz, 298 K)

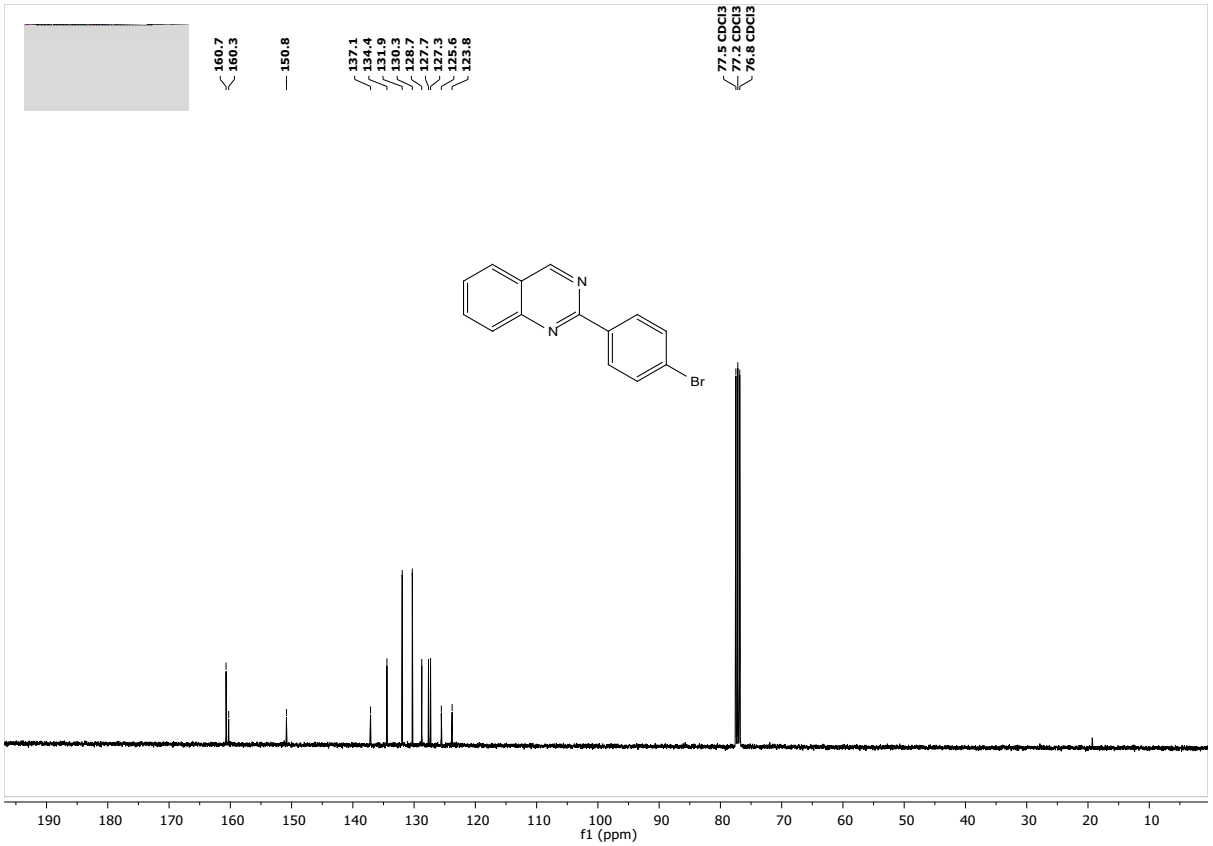


Figure S80: ^{13}C NMR Spectrum of **8e** ($CDCl_3$, 101 MHz, 298 K)

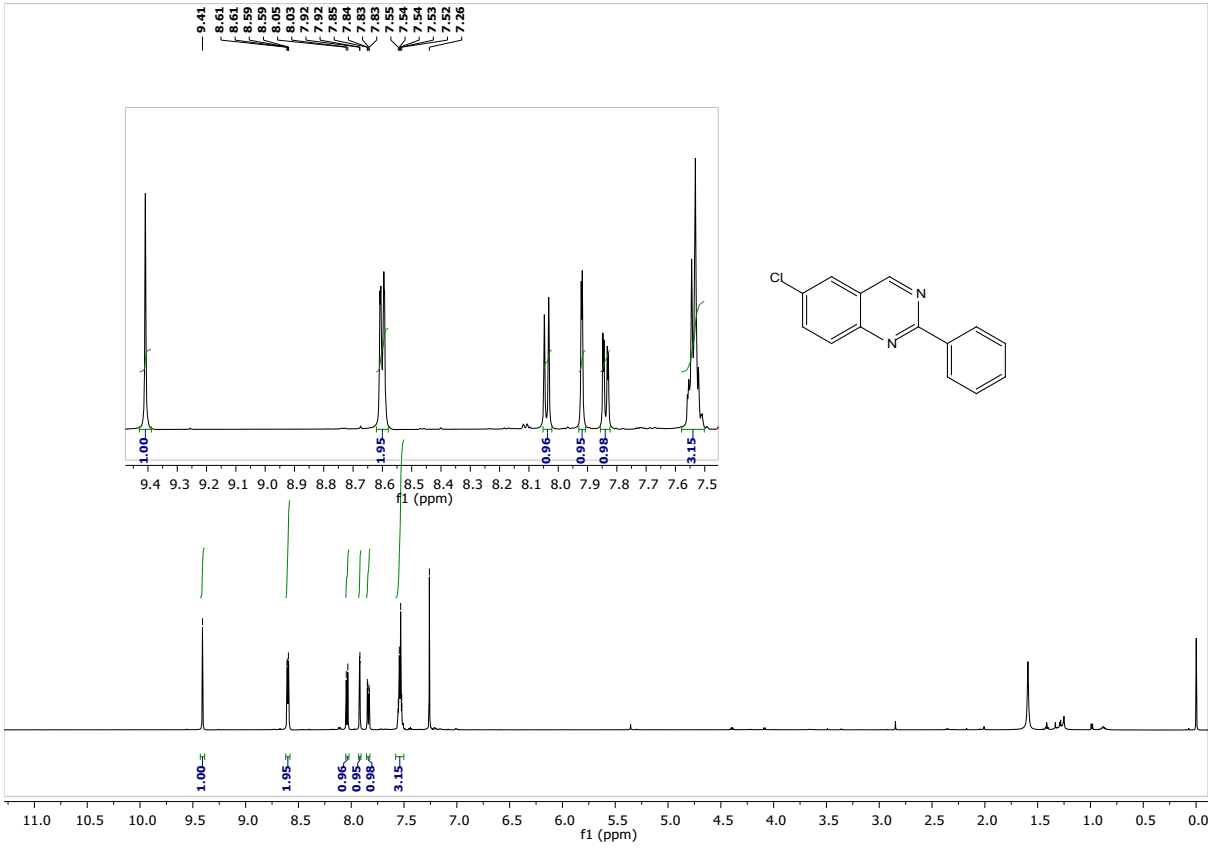


Figure S81: ^{1}H NMR Spectrum of **8f** ($CDCl_3$, 600 MHz, 298 K)

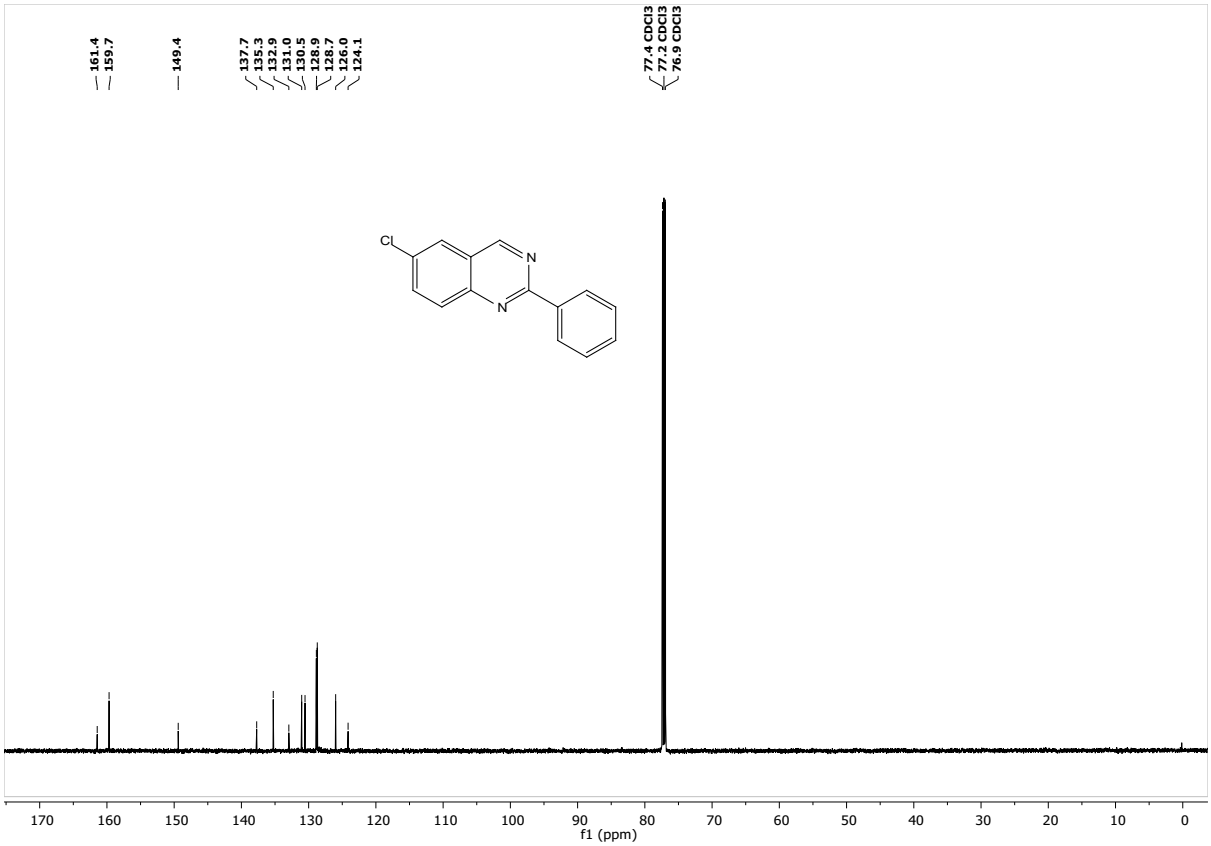


Figure S82: ^{13}C NMR Spectrum of **8f** ($CDCl_3$, 151 MHz, 298 K)

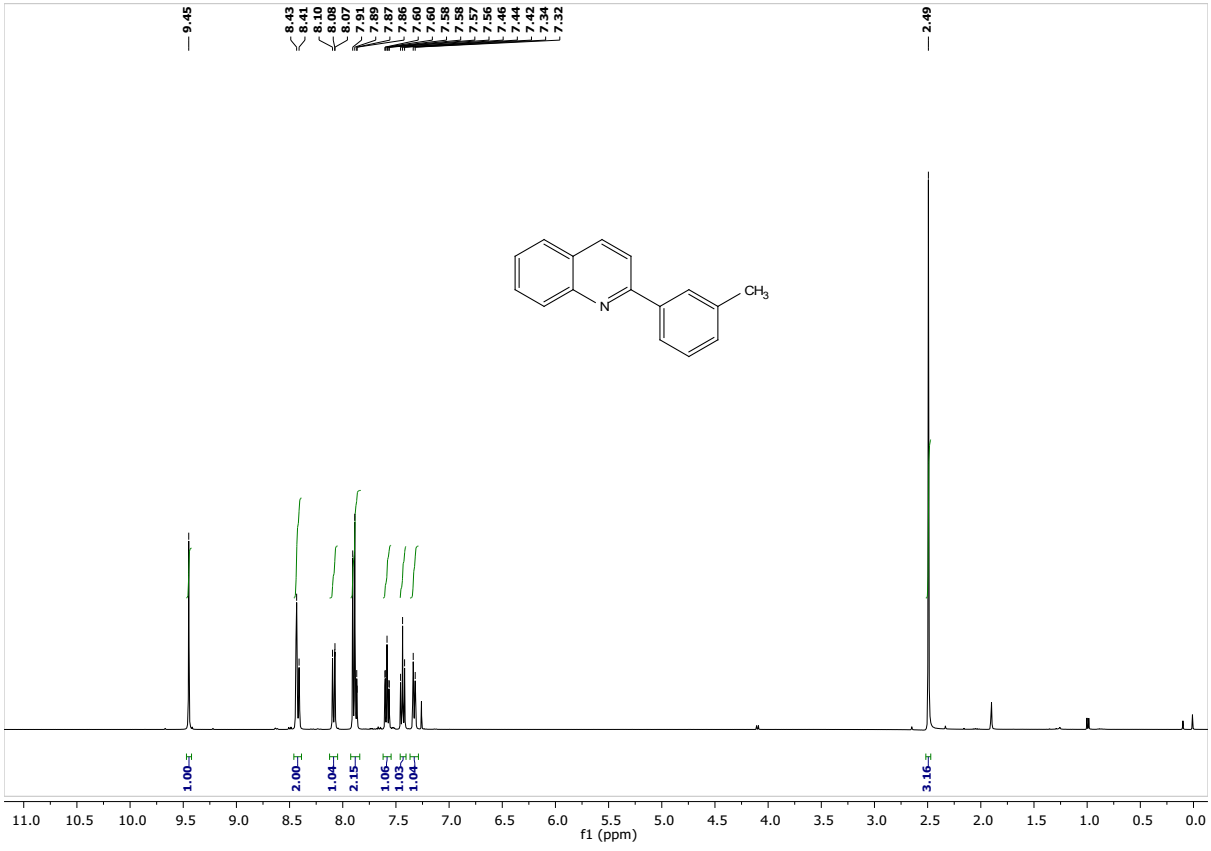


Figure S83: ^{1}H NMR Spectrum of **8g** ($CDCl_3$, 400 MHz, 298 K)

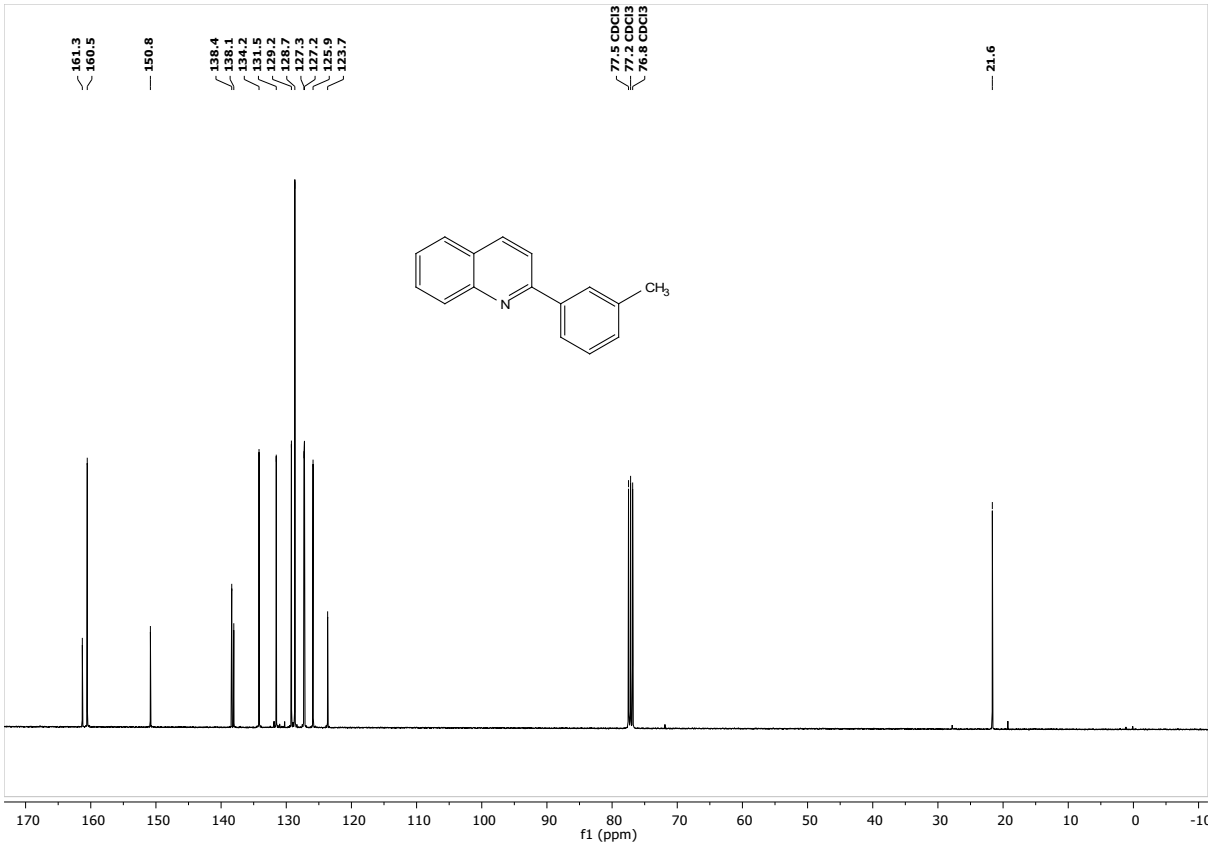


Figure S84: ^{13}C NMR Spectrum of **8g** ($CDCl_3$, 101 MHz, 298 K)

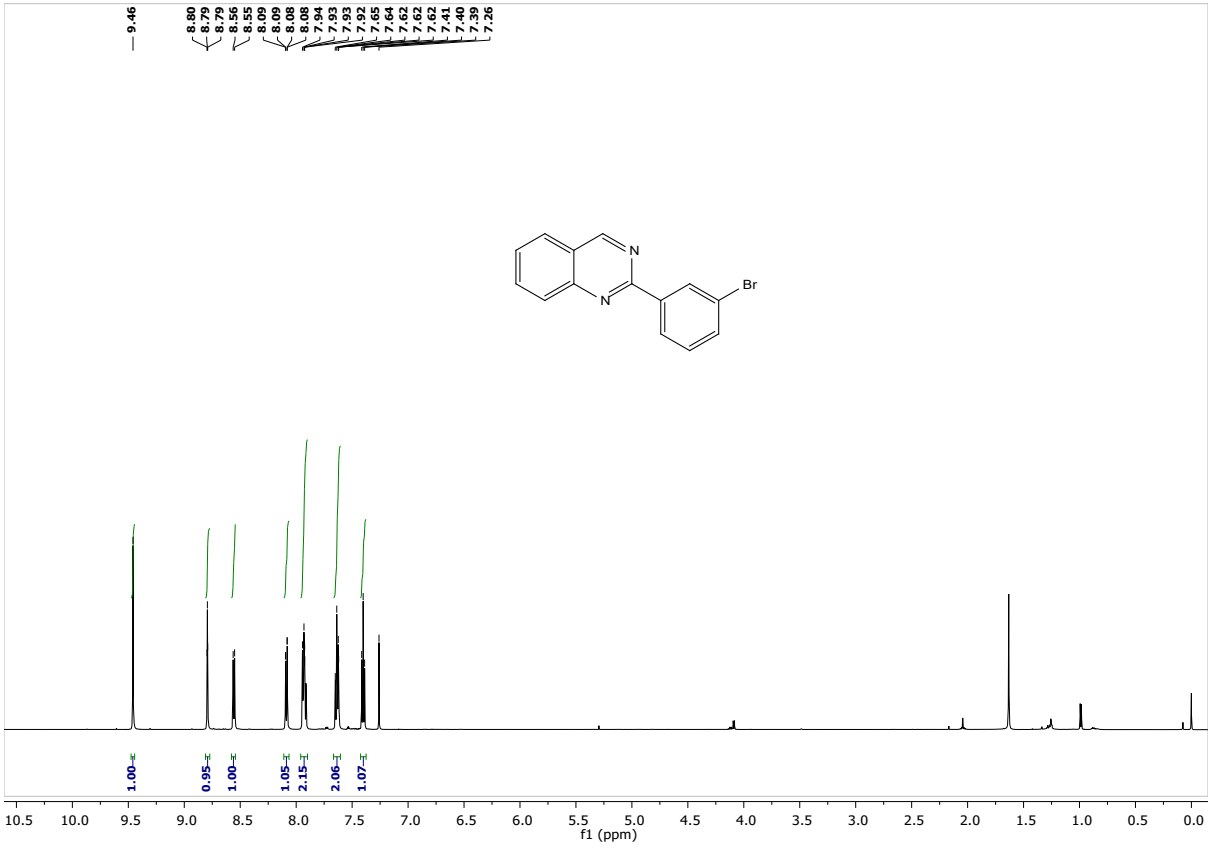


Figure S85: ^{1}H NMR Spectrum of **8h** ($CDCl_3$, 600 MHz, 298 K)

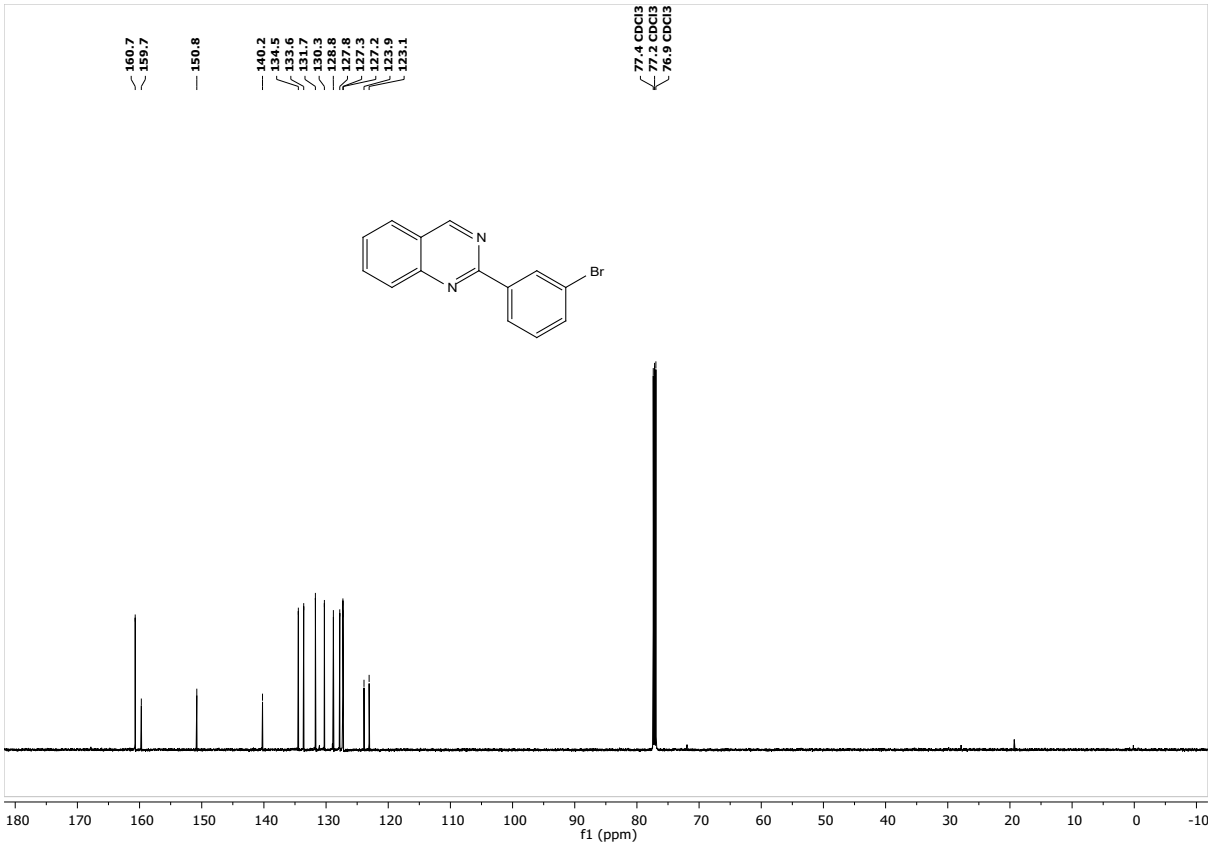


Figure S86: ^{13}C NMR Spectrum of **8h** ($CDCl_3$, 151 MHz, 298 K)

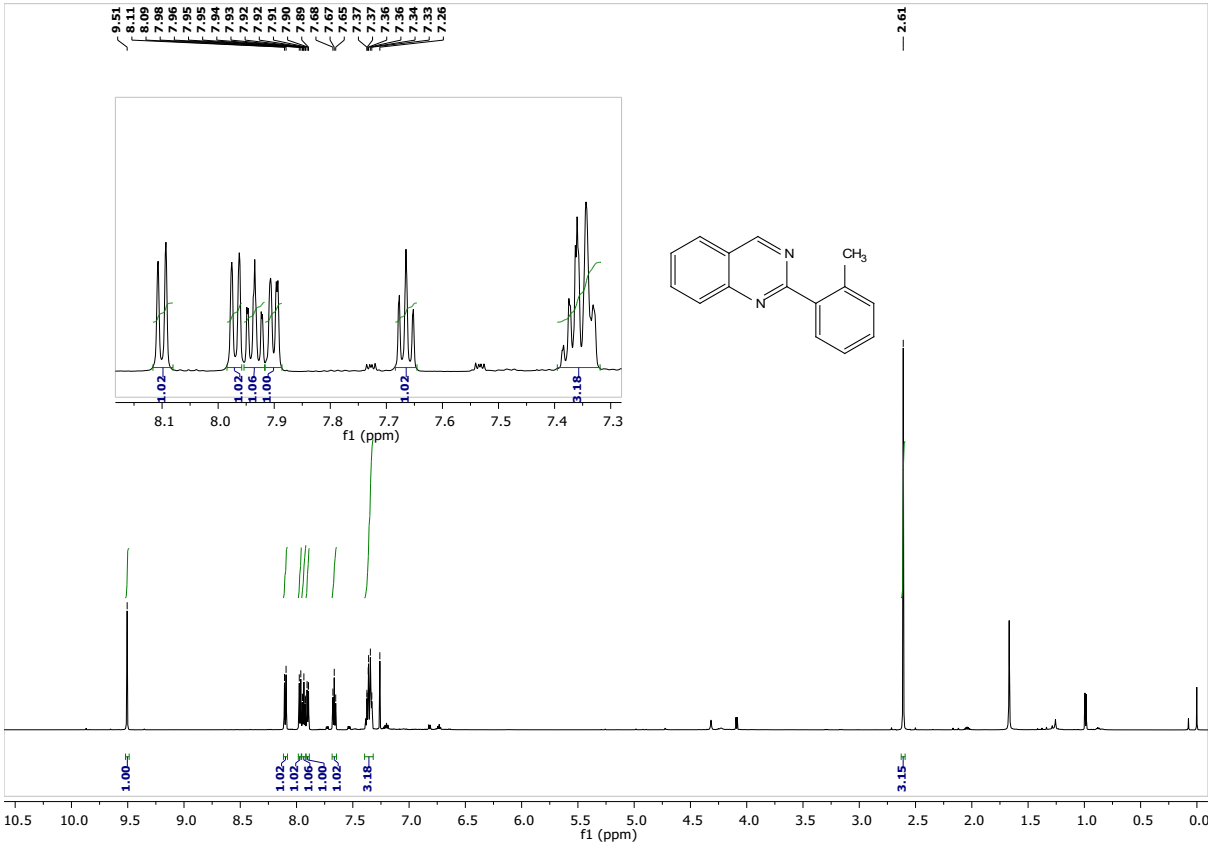


Figure S87: ^{1}H NMR Spectrum of **8i** ($CDCl_3$, 600 MHz, 298 K)

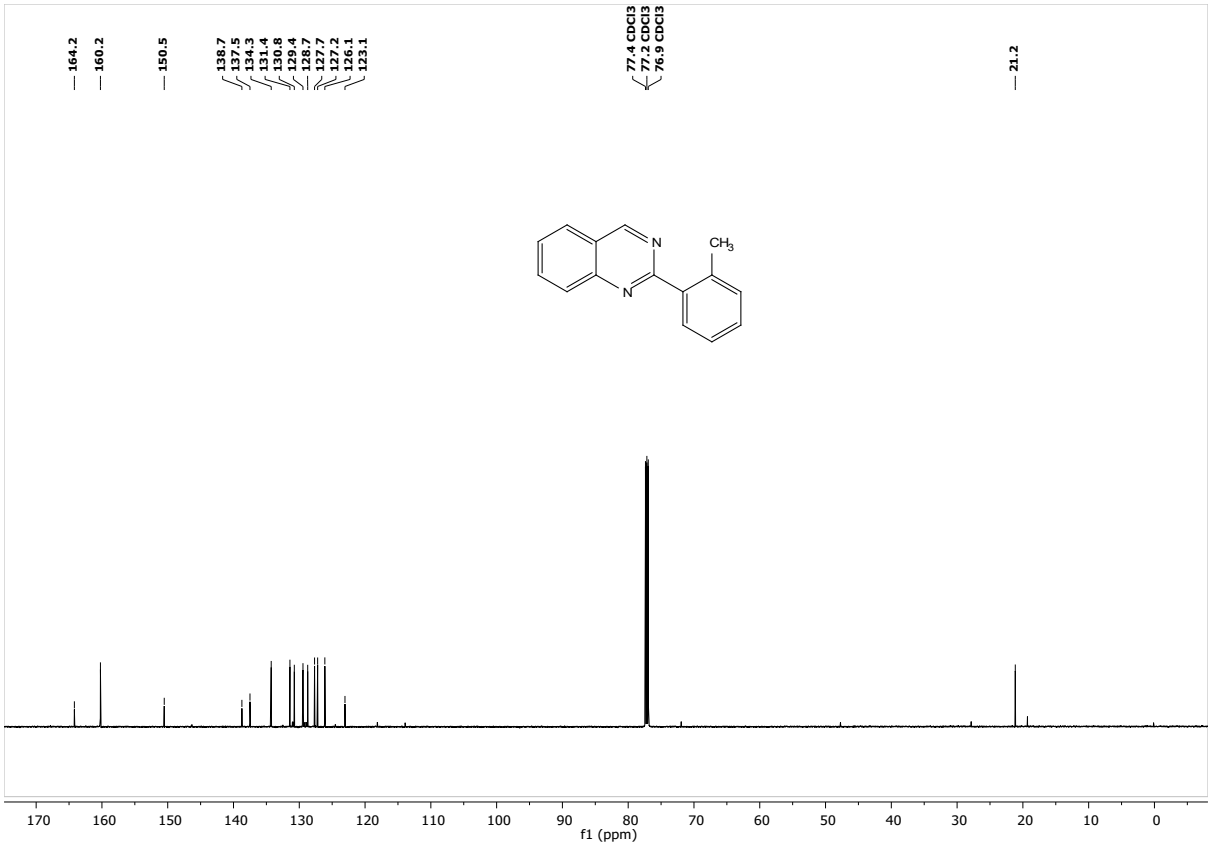


Figure S88: ^{13}C NMR Spectrum of **8i** ($CDCl_3$, 151 MHz, 298 K)

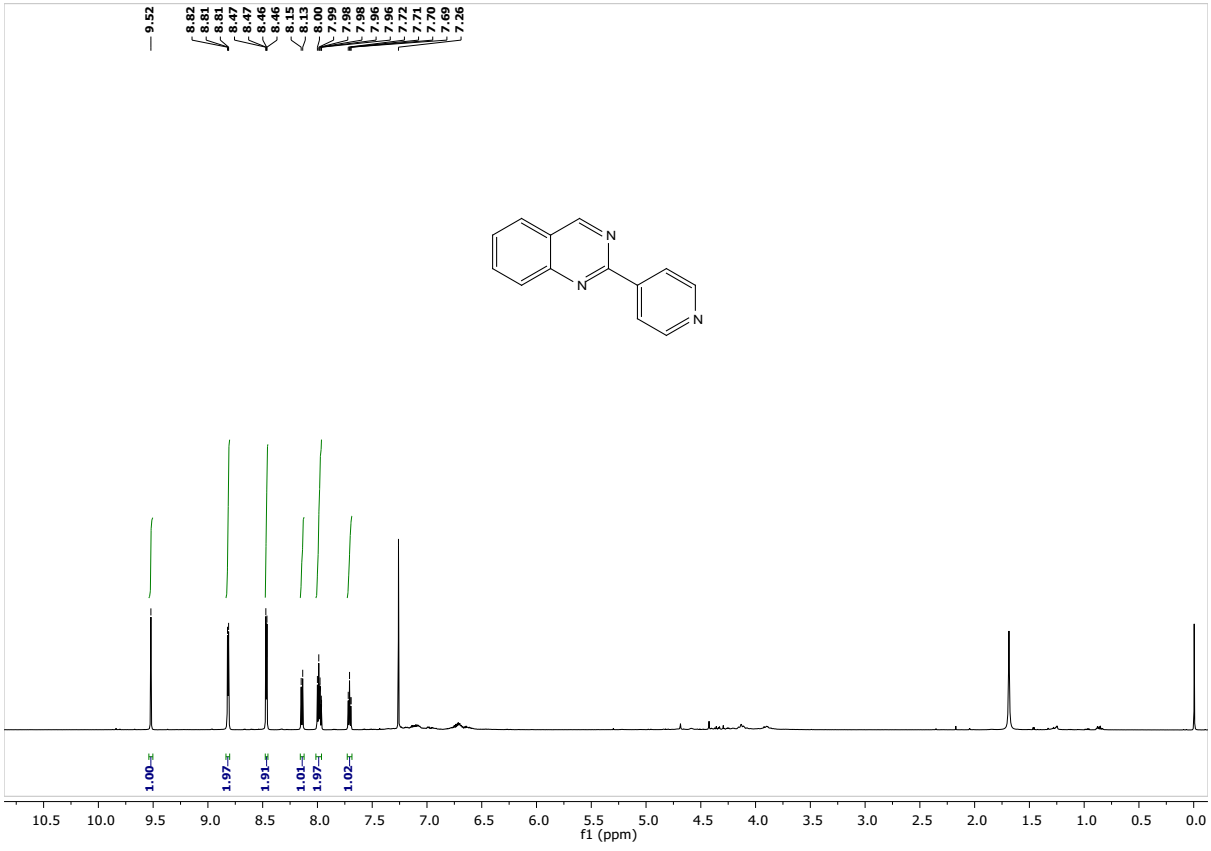


Figure S89: ^{1}H NMR Spectrum of **8j** ($CDCl_3$, 600 MHz, 298 K)

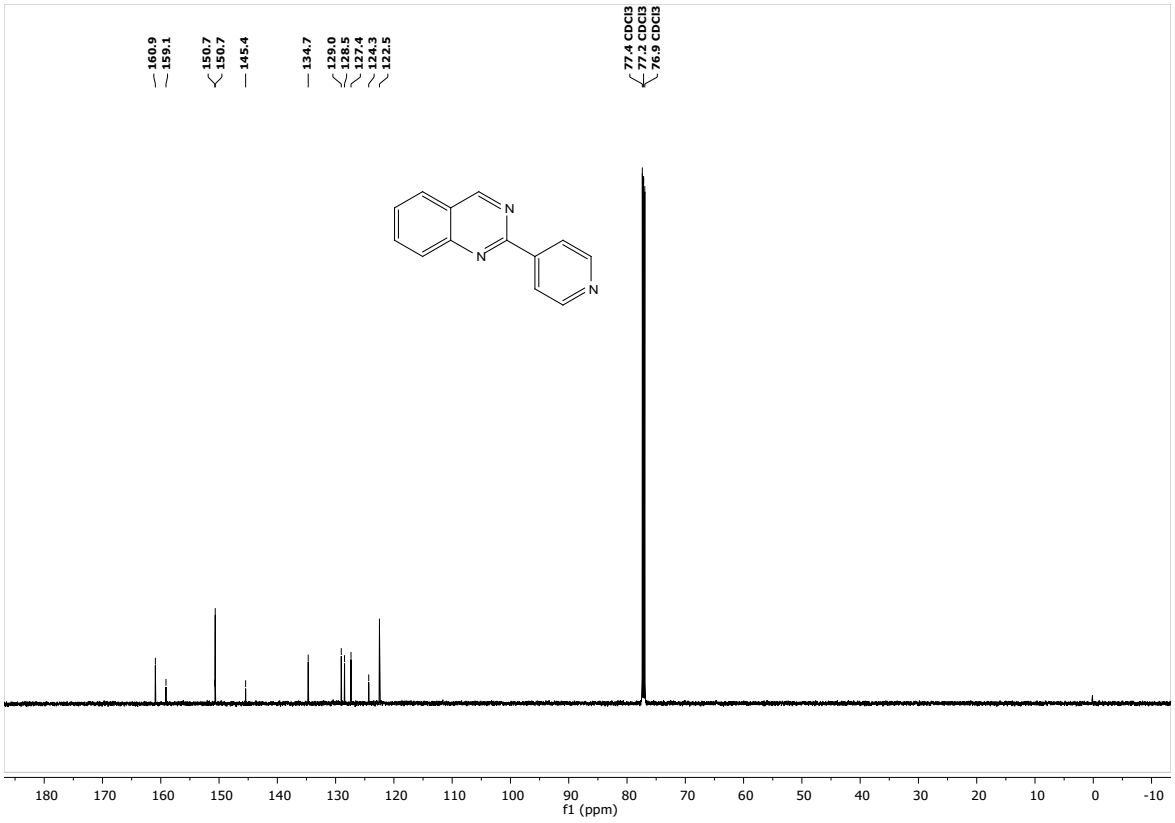


Figure S90: ^{13}C NMR Spectrum of **8j** ($CDCl_3$, 151 MHz, 298 K).

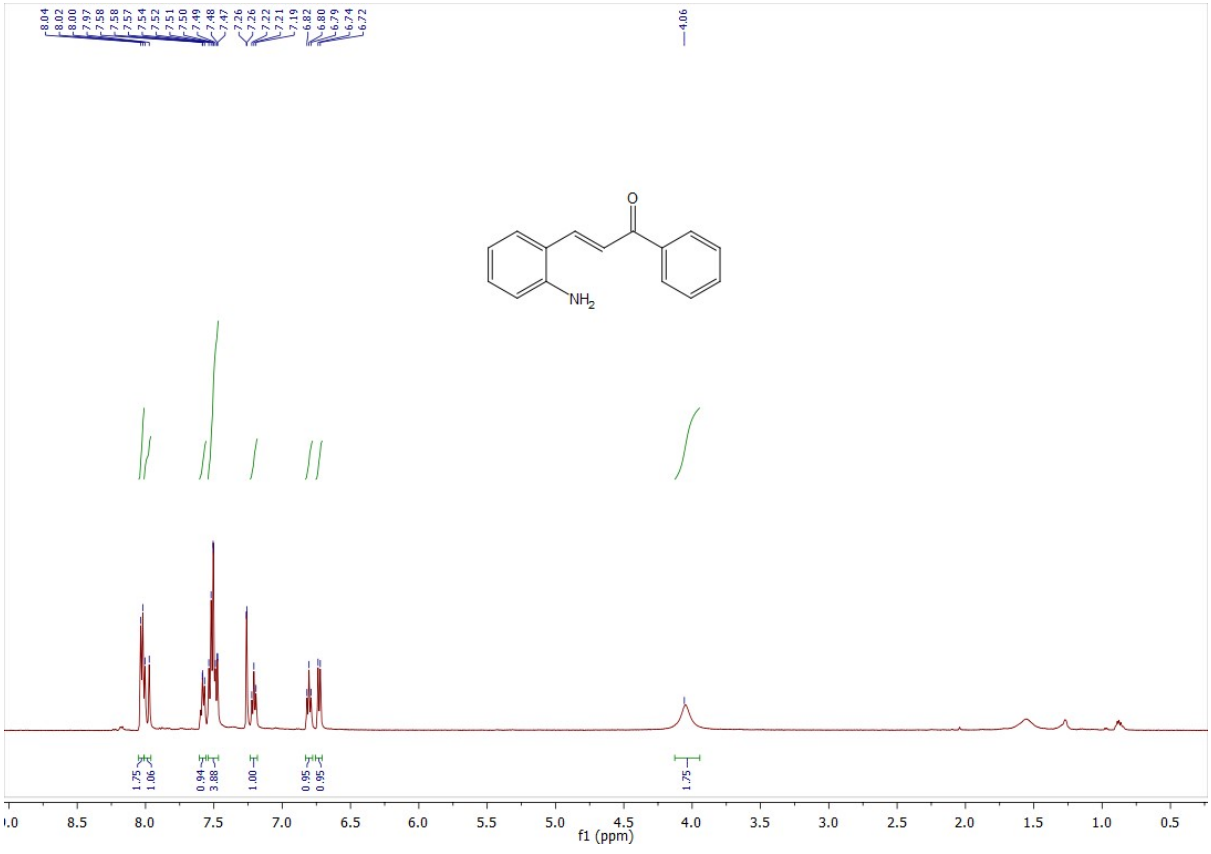


Figure S91: ^{1}H NMR Spectrum of **9** ($CDCl_3$, 500 MHz, 298 K).

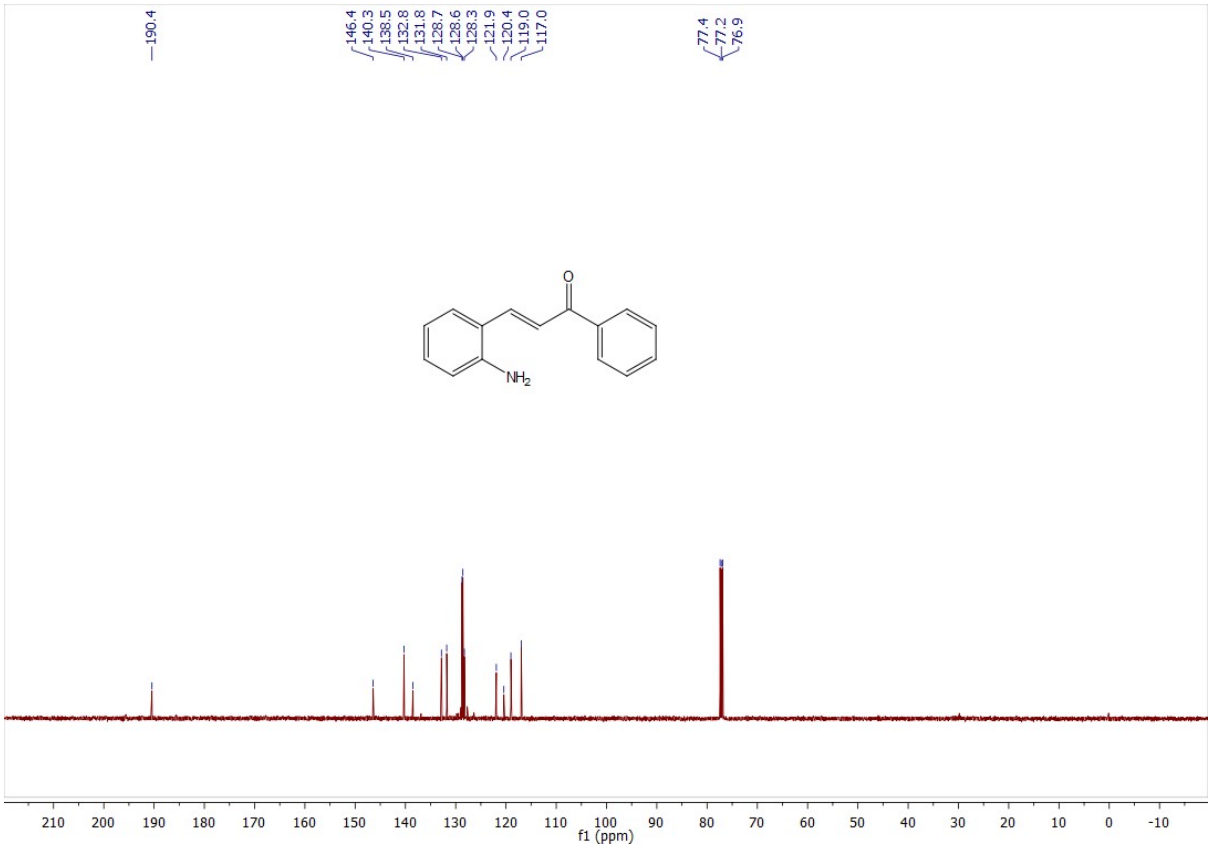


Figure S92: ^{13}C NMR Spectrum of **9** ($CDCl_3$, 126 MHz, 298 K).

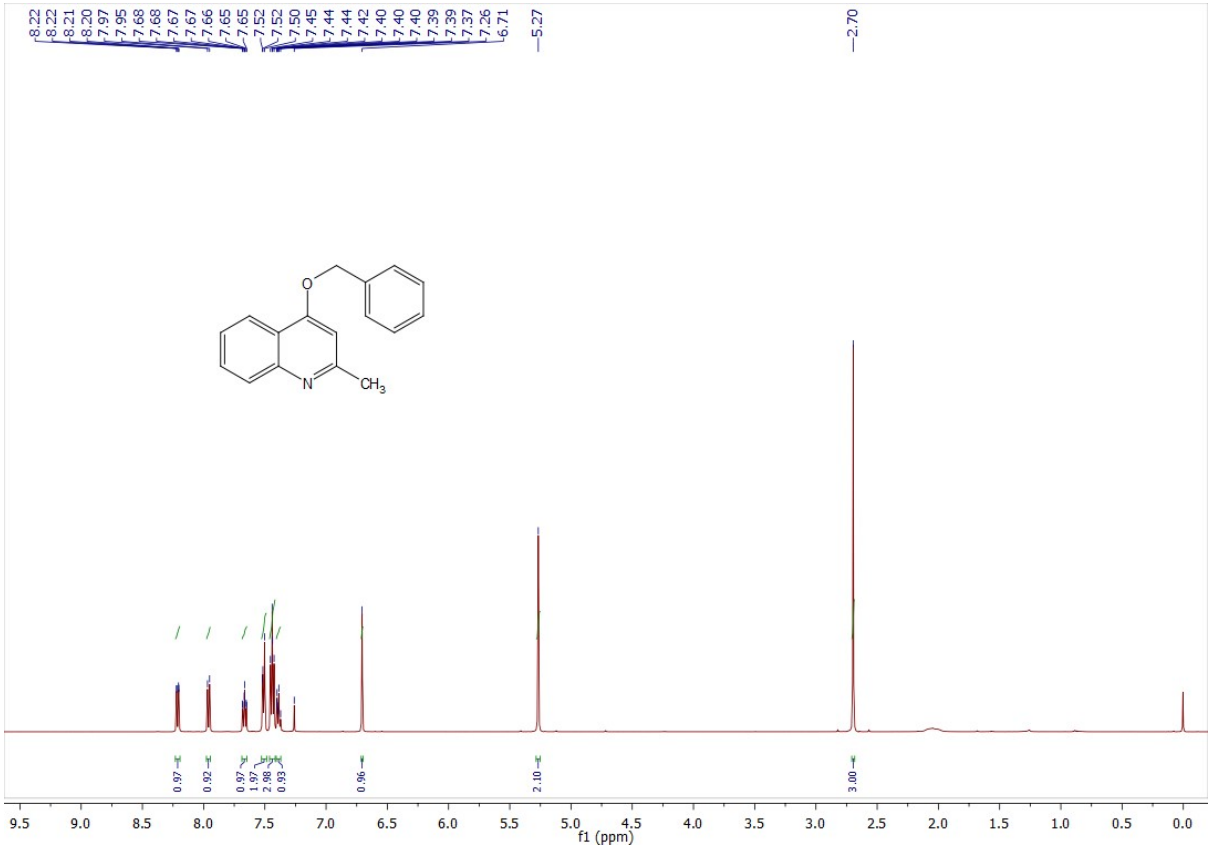


Figure S93: ^{1}H NMR Spectrum of **10** ($CDCl_3$, 500 MHz, 298 K).

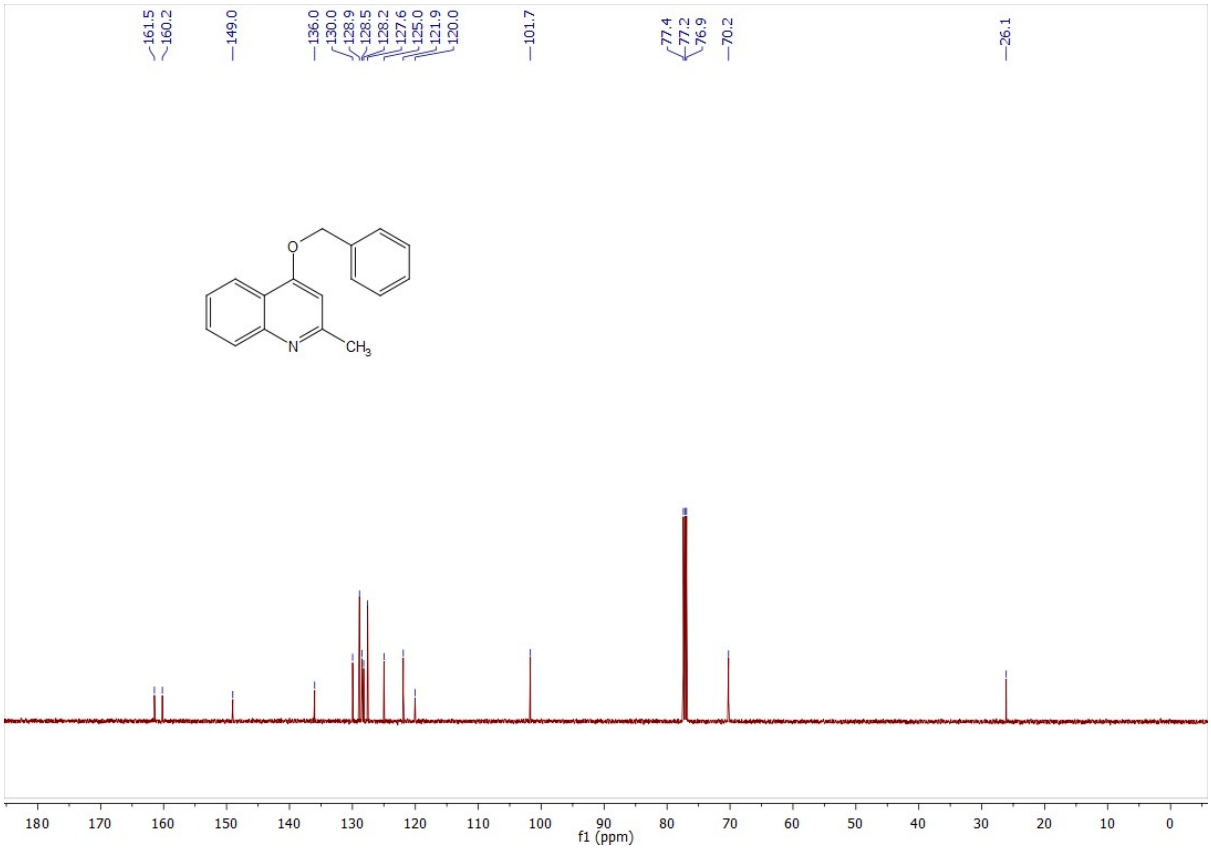


Figure S94: ^{13}C NMR Spectrum of **10** ($CDCl_3$, 126 MHz, 298 K).

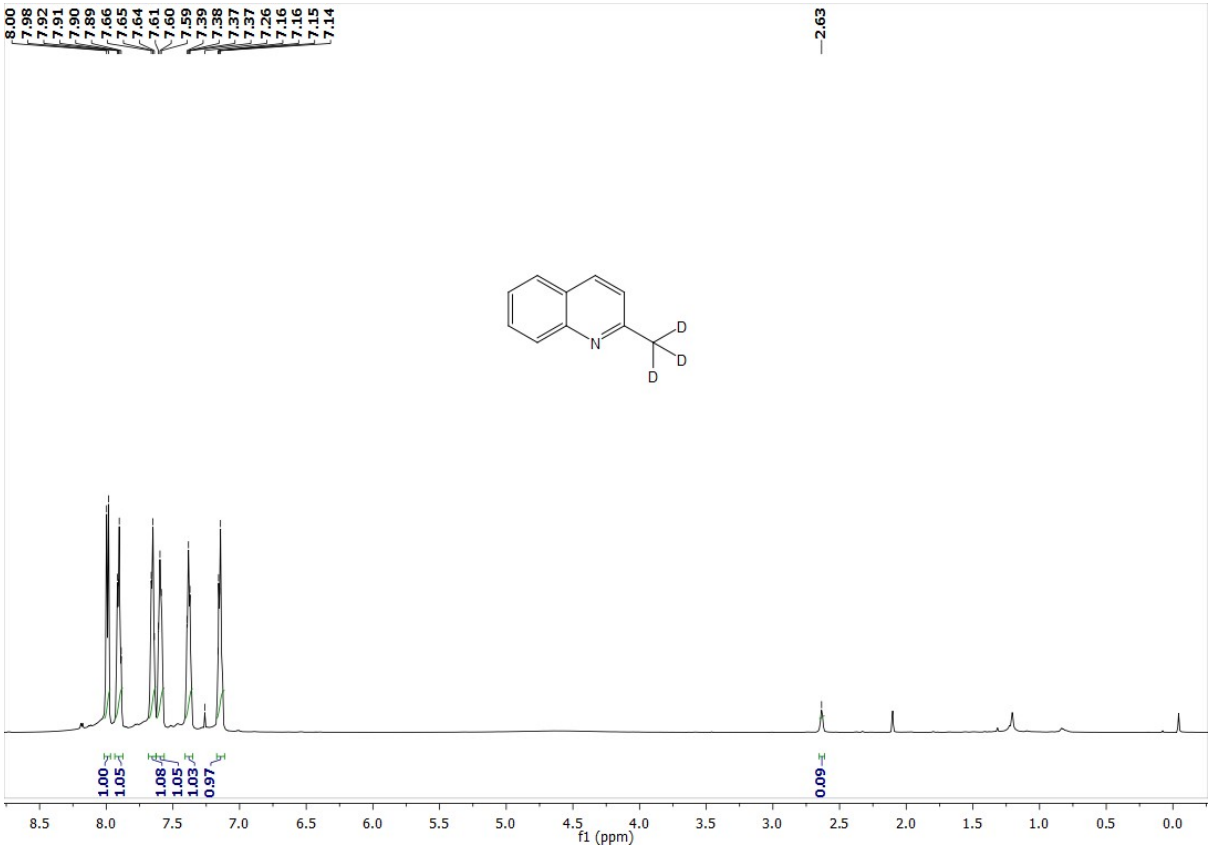


Figure S95: ^{1}H NMR Spectrum of **4q-d3** ($CDCl_3$, 600 MHz, 298 K).

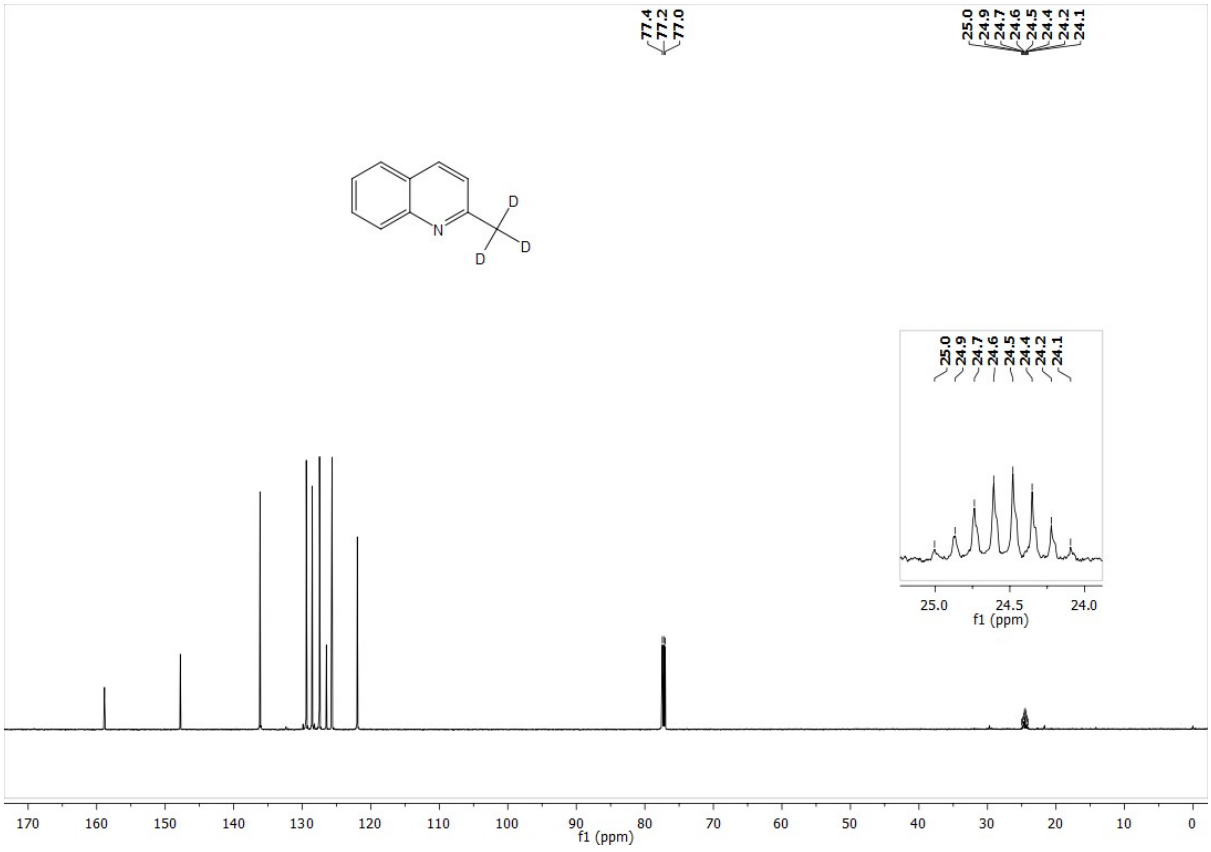


Figure S96: ^{13}C NMR Spectrum of **4q-d3** ($CDCl_3$, 151 MHz, 298 K).

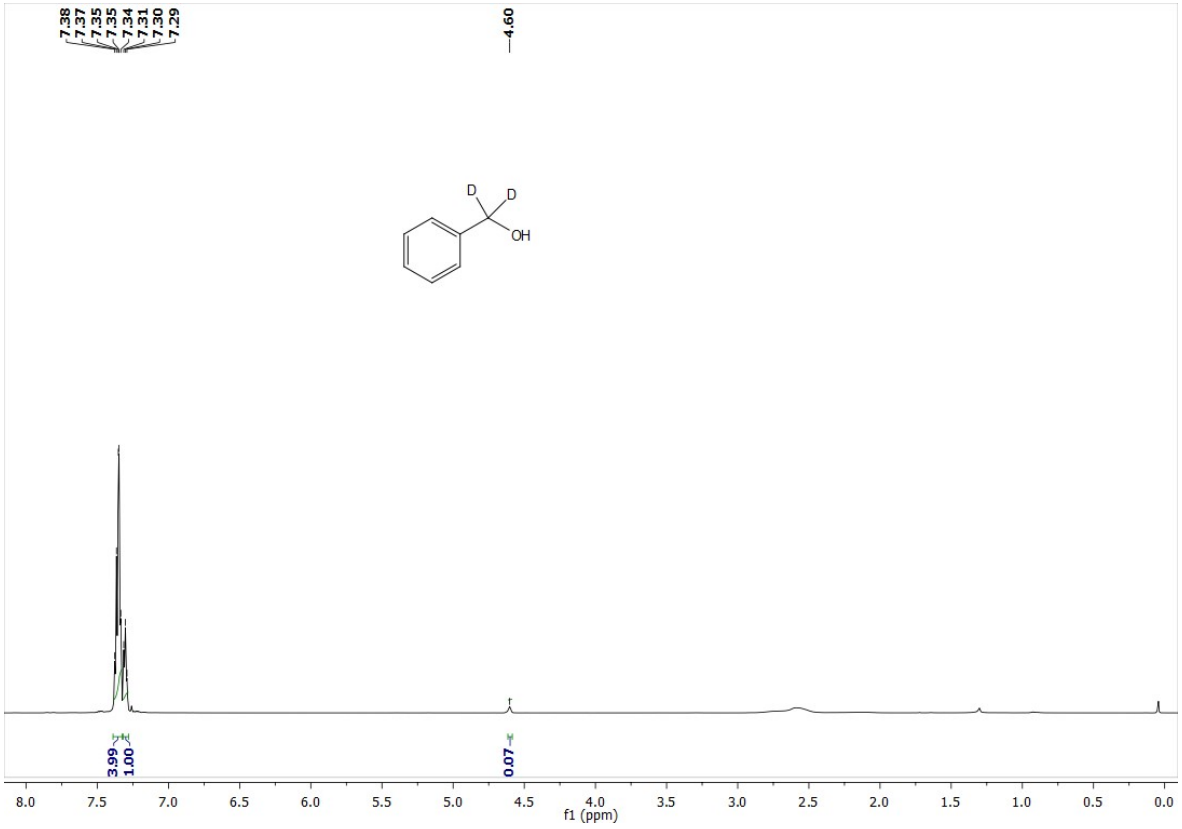


Figure S97: ^{1}H NMR Spectrum of **5a-d2** ($CDCl_3$, 600 MHz, 298 K).

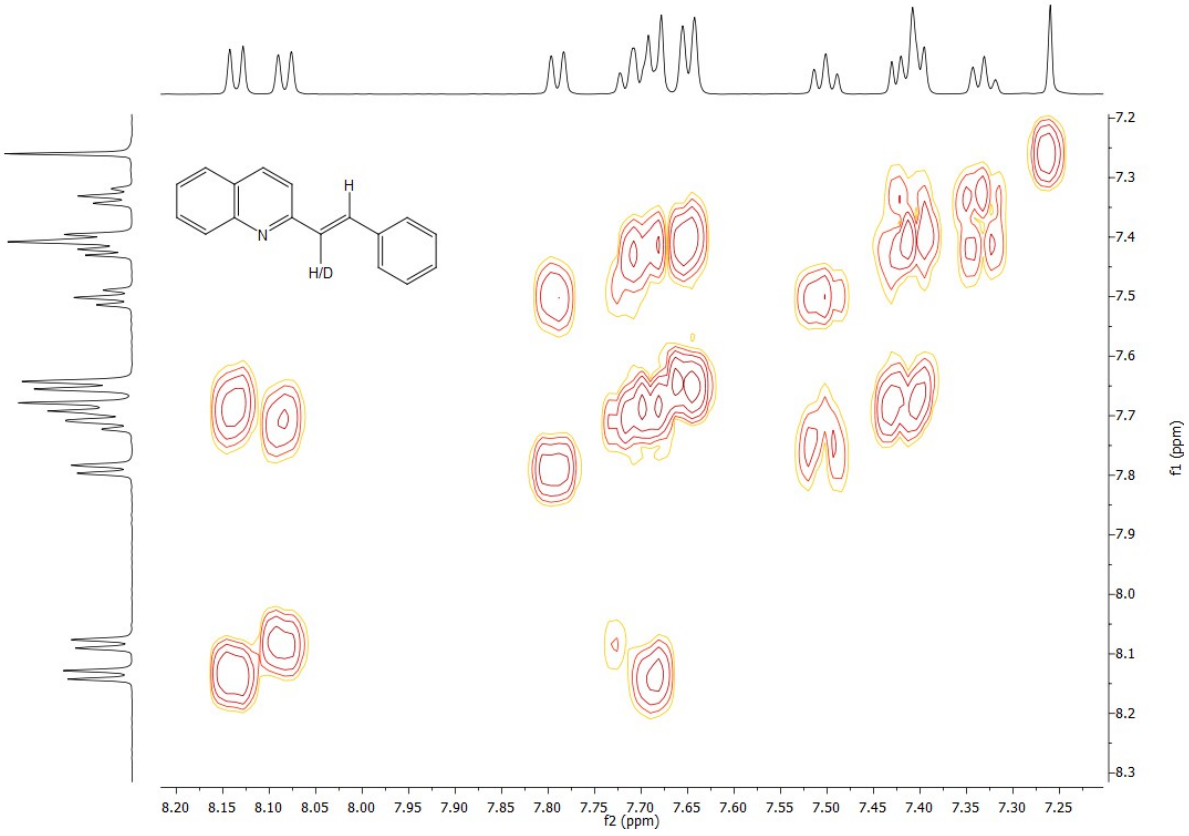


Figure S98: ^{1}H-^{1}H COSY NMR Spectrum of **6a-α-d1** ($CDCl_3$, 298 K).

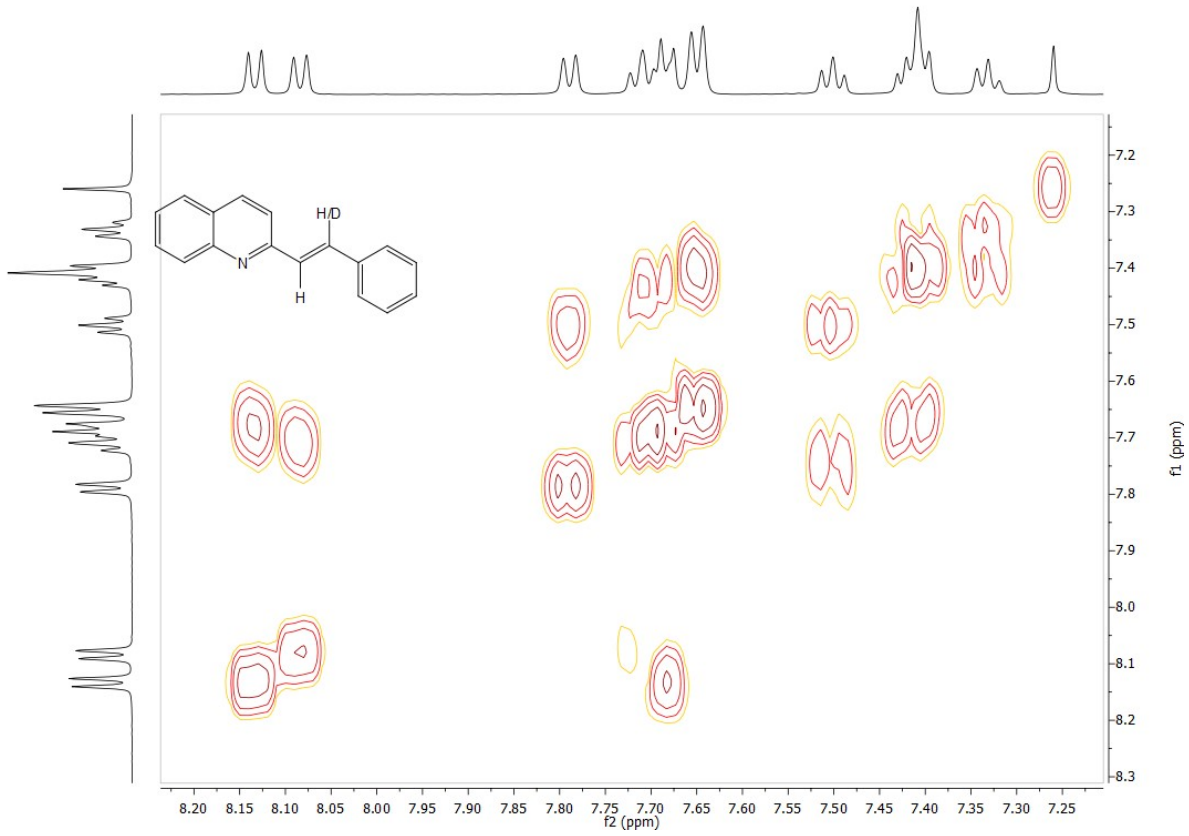


Figure S99: ^{1}H-^{1}H COSY NMR Spectrum of **6a-β-d1** ($CDCl_3$, 298 K).

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