Electronic Supplementary Information

Synthesis of 2-Subsitituted Quinazolines by CsOH-Mediated Direct Aerobic Oxidative Cyclocondensation of 2-Aminoarylmethanols with Nitriles in Air

Song Yao,[a,b] Kaijing Zhou,[b] Jiabing Wang,[a] Hongen Cao,[c] Lei Yu,[c] Jianzhang Wu,[a]* Peihong Qiu,[a]* Qing Xu[a,b,c]*

[a] *Chemical Biology Research Center, College of Pharmaceutical Sciences, Wenzhou Medical University, Wenzhou, Zhejiang 325035, China*

[b] *College of Chemistry and materials Engineering, Wenzhou University, Wenzhou, Zhejiang 325035, China*

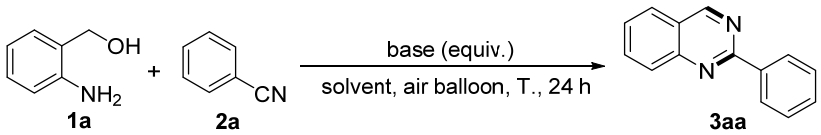
[c] *Institute of Pesticide, School of Horticulture and Plant Protection and School of Chemistry and Chemical Engineering, Yangzhou University, Yangzhou, Jiangsu 225002, China*

Emails: wjzwzmu@163.com, wzqph@163.com, qing-xu@wzu.edu.cn

Contents

1. Detailed Condition Screening Tables

1.1 Table S1. Detailed Base Screening and Condition Optimization for CsOH-Mediated Aerobic Oxidative Synthesis of 2-Subsitituted Quinazolines.[a]

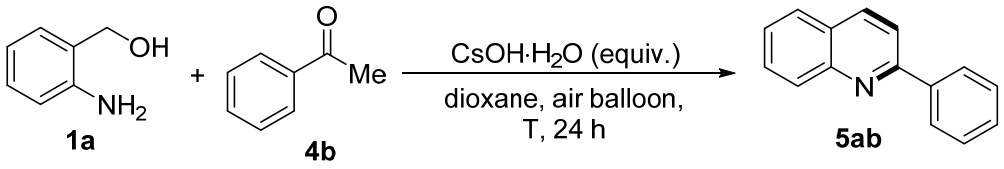


entry	base (equiv.)	solvent (mL)	additive (equiv.)	*T.*	**3aa**%[b]
1	CsOH·H_2O (0.5)	H_2O (3)	DMSO (2.0)	100 °C	0[c]
2	CsOH·H_2O (1.0)	H_2O (3)	--	100 °C	0[c]
3	CsOH·H_2O (0.5)	DMSO (3)	--	100 °C	trace[c,d]
4	CsOH·H_2O (1.0)	DMSO (3)	--	100 °C	trace[c,d]
5	CsOH·H_2O (1.0)	THF (3)	--	70 °C	10
6	CsOH·H_2O (1.0)	Toluene (3)	--	100 °C	67
7	CsOH·H_2O (1.0)	Pyridine (3)	--	100 °C	75
8	CsOH·H_2O (1.0)	(n-C_4H_9)$_2$O (3)	--	100 °C	17
9	CsOH·H_2O (1.0)	t-BuOH (3)	--	100 °C	20
10	***CsOH·H$_2$O (1.0)***	***Dioxane (3)***	--	***100 °C***	***80***
11	NaOH (1.0)	Dioxane (3)	--	100 °C	9
12	KOH (1.0)	Dioxane (3)	--	100 °C	26
13	t-BuONa (1.0)	Dioxane (3)	--	100 °C	6
14	t-PenONa (1.0)	Dioxane (3)	--	100 °C	18
15	$Ca(OH)_2$ (1.0)	Dioxane (3)	--	100 °C	0
16	CsOH·H_2O (1.0)	Dioxane (3)	H_2O (1.0)	100 °C	trace[c.d]
17	CsOH·H_2O (0.5)	Dioxane (3)	--	100 °C	21
18	CsOH·H_2O (2.0)	Dioxane (3)	--	100 °C	75
19	CsOH·H_2O (1.0)	Dioxane (3)	--	80 °C	26[c.d]
20	CsOH·H_2O (1.0)	Dioxane (3)	--	120 °C	10[c.d]
21[e]	CsOH·H_2O (1.0)	Dioxane (3)	--	100 °C	58[c.d]
21[f]	CsOH·H_2O (1.0)	Dioxane (3)	--	100 °C	trace[c]

22[g]	$CsOH·H_2O$ (1.0)	Dioxane (3)	--	100 °C	40[c.d]

[a] Unless otherwise noted, the mixture of **1a** (1.0 mmol), **2a** (1.2 equiv.), $CsOH·H_2O$, and the solvent in a 100 mL schlenk tube equipped with an air balloon was heated for 24 h. [b] Isolated yields based on **1a**. [c] Considerable amounts of $PhCONH_2$ and PhCOOH were observed. [d] Trace amount of 2-aminobenzaldehyde was observed. [e] Sealed without air balloon. [f] Under N_2. [g] With an O_2 balloon.

1.2 Table S2. Detailed Condition Screening for CsOH-Mediated Aerobic Oxidative Synthesis of Substituted Quinolines.[a]



Entry	**1a:4b** (mmol)	$CsOH·H_2O$	T	**5ab**%[b]
1	1:1.2	1.0 equiv.	100 °C	40
2	1:1.2	1.0 equiv.	120 °C	46
3	***1.2:1***	***2.0 equiv.***	***120 °C***	***72***
4	1.2:1	1.0 equiv.	150 °C	55[c]
5	1.2:1	2.0 equiv.	150 °C	45

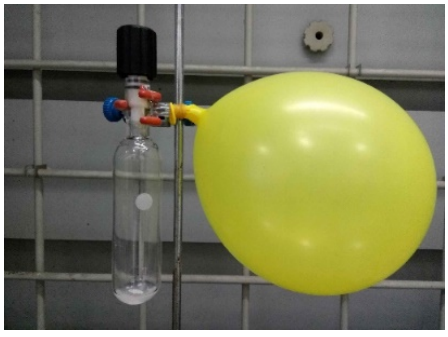
[a] The mixture of **1a**, **4b**, $CsOH·H_2O$, and dioxane (2.0 mL) in a Schlenk tube (100 mL) equipped with an air balloon was heated for 24 h and then monitored by TLC and/or GC-MS. [b] Isolated yields based on limiting **1a** or **4b**. [c] GC yield.

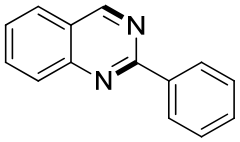
2. Experimental

Materials and Methods. Unless otherwise noted, substrates, bases, and solvents were all purchased and used without further purification. Dry dioxane and 2-aminobenzaldehyde (**4a**) used in the mechanistic studies were purchased from Aladdin Reagents Company. Most reactions were carried out in Schlenk tubes (100 mL) equipped with an air balloon using air as the oxidant and then monitored by TLC and/or GC-MS. Products were purified by column chromatography on silica gel using petroleum ether and ethyl acetate as the eluent. Unless otherwise noted, ^{1}H and ^{13}C NMR spectra were measured on a Bruker Avance-III 500 instrument (500 MHz for ^{1}H and 125.4 MHz for ^{13}C NMR spectroscopy) using $CDCl_3$ or d_6-DMSO as the solvent. Chemical shifts for ^{1}H and ^{13}C NMR were referred to Me_4Si (0 ppm) as the internal standard. Mass spectra were measured on a Shimadzu GC-MS-QP2010 Plus spectrometer (EI). HRMS (ESI) analysis was measured on a Bruker micrOTOF-Q II instrument. Melting points were measured using a SGW® X-4 micro melting point apparatus and were not corrected.

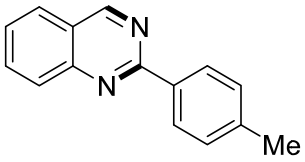
3. Reaction Procedures and Characterization of the Products

3.1 General Procedure for CsOH-Mediated Synthesis of 2-Subsitituted Quinazolines from 2-Aminoaryl Methanols and Nitriles. Unless otherwise noted, the mixture of 2-aminophenyl methanol **1** (1.0 mmol), nitriles **2** (1.2 mmol, 1.2 equiv.), and $CsOH·H_2O$ (0.1679 g, 1.0 equiv.) in dioxane (3.0 mL) in a Schlenk tube (100 mL) equipped with an air balloon (see the picture below) was stirred at 100 ^{o}C for 24 h and monitored by TLC and/or GC-MS. The reaction mixture was then concentrated under vacuum. The residue was purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate (PE:EA = 10:1) as the eluent. The target product **3** was obtained in up to 82% isolated yield.

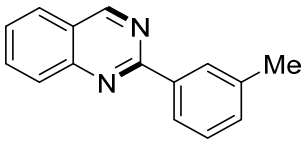




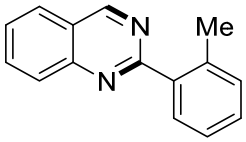
2-Phenylquinazoline (3aa). Light yellow solid, yield 165 mg (80%), mp 97-98 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.39 (s, 1H), 8.62-8.60 (m, 2H), 8.04 (d, J = 8.0 Hz, 1H), 7.83-7.81 (m, 2H), 7.53-7.48 (m, 4H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 161.0, 160.4, 150.7, 138.1, 134.0, 130.6, 128.6, 127.2, 127.0, 123.6. MS (EI): *m/z* (%) 207 (17), 206 (100), 205 (21), 179 (49), 152 (8), 151 (8), 103 (18), 77 (13), 76 (20), 50 (10). This compound was known: Chen, Z.; Chen, J.; Liu, M.; Ding, J.; Gao, W.; Huang, X.; Wu, H. *J. Org. Chem.* **2013**, *78*, 11342-11348.



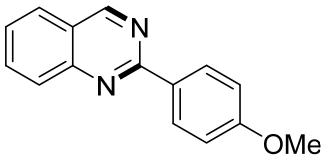
2-(*p*-Tolyl)quinazoline (3ab). Light yellow solid, yield 165 mg (82%), mp 121-122 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.44 (s, 1H), 8.51 (d, J = 8.0 Hz, 2H), 8.07-8.06 (m, 1H), 7.91-7.87 (m, 2H), 7.59-7.57 (m, 1H), 7.34 (d, J = 8.0 Hz, 2H), 2.44 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 161.1, 160.4, 150.8, 140.8, 135.3, 134.0, 129.4, 128.5, 127.1, 127.0, 123.5, 21.4. MS (EI): *m/z* (%) 220 (100), 219 (31), 193 (19), 192 (14), 165 (8), 116 (6), 109 (16), 91 (7), 76 (6), 50 (4). This compound was known: Han, B.; Yang, X.-L.; Wang, C.; Bai, Y.-W.; Pan, T.-C.; Chen, X.; Yu, W. *J. Org. Chem*. **2012**, *77*, 1136-1142.



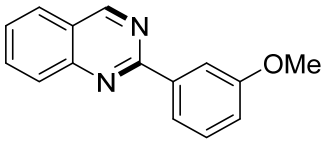
2-(*m*-Tolyl)quinazoline (3ac). Light yellow solid, yield 163 mg (74%), mp 101-102 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.45 (s, 1H), 8.43-8.40 (m, 2H), 8.09-8.08 (m, 1H), 7.92-7.88 (m, 2H), 7.60-7.58 (m, 1H), 7.44-7.41 (m, 1H), 7.33-7.31 (m, 1H), 2.49 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 161.2, 160.4, 150.8, 138.2, 137.9, 134.0, 131.4, 129.1, 128.6, 128.5, 127.2, 127.1, 125.8, 123.6, 21.5. MS (EI): *m/z* (%) 220 (100), 219 (36), 193 (21), 165 (14), 110 (13), 102 (4), 91 (9), 76 (10), 65 (4), 50 (7). This compound was known: M.A. Omar, M. A.; Conrad, J.; Beifuss, U. *Tetrahedron*, **2014**, *70*, 5682-5695.



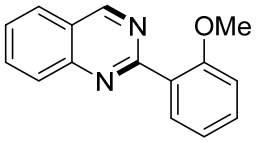
2-(*o*-Tolyl)quinazoline (3ad). Light yellow solid, yield 112 mg (51%), mp 109-110 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.59 (s, 1H), 8.10-8.09 (m, 1H), 7.97-7.89 (m, 3H), 7.67-7.64 (m, 1H), 7.38-7.33 (m, 3H), 2.60 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 164.0, 160.0, 150.4, 138.6, 137.3, 134.1, 131.3, 130.6, 129.3, 128.6, 127.5, 127.0, 125.9, 122.9, 21.0. MS (EI): *m/z* (%) 221 (9), 220 (68), 219 (100), 218 (14), 165 (11), 116 (13), 110 (6), 89 (18), 77 (11), 51 (12). This compound was known: Chen, Z.; Chen, J.; Liu, M.; Ding, J.; Gao, W.; Huang, X.; Wu, H. *J. Org. Chem.* **2013,** *78*, 11342-11348.



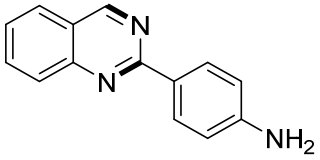
2-(*p*-Methoxyphenyl)quinazoline (3ae). Light yellow solid, yield 172 mg (73%), mp 93-94 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.42 (s, 1H), 8.57 (d, J = 8.0 Hz, 2H), 8.05-8.03 (m, 1H), 7.90-7.86 (m, 2H), 7.59-7.56 (m, 1H), 7.04 (d, J = 8.0 Hz, 2H), 3.90 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 161.8, 160.9, 160.3, 150.8, 134.0, 130.7, 130.2, 128.4, 127.1, 126.7, 123.3, 114.0, 55.3. MS (EI): *m/z* (%) 236 (100), 221 (18), 209 (9), 193 (10), 166 (8) 133 (5), 118 (6), 103 (5), 90 (4), 77 (3). This compound was known: Han, B.; Yang, X.-L.; Wang, C.; Bai, Y.-W.; Pan, T.-C.; Chen, X.; Yu, W. *J. Org. Chem*. **2012**, *77*, 1136-1142.



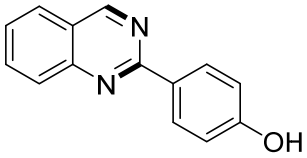
2-(*m*-Methoxyphenyl)quinazoline (3af). Light yellow solid, yield 180 mg (76%), mp 91-92 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.46 (s, 1H), 8.23-8.21 (m, 1H), 8.19-8.18 (m, 1H), 8.10-8.08 (m, 1H), 7.93-7.89 (m, 2H), 7.63-7.59 (m, 1H), 7.46-7.43 (m, 1H), 7.08-7.05 (m, 1H), 3.95 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.8, 160.4, 160.0, 150.7, 139.5, 134.0, 129.6, 128.6, 127.2, 127.1, 123.6, 121.2, 111.7, 113.1, 55.4. MS (EI): *m/z* (%) 236 (95), 235 (100), 207 (36), 192 (10), 179 (22), 166 (11), 129 (9), 103 (18), 76 (14), 50 (9). This compound was known: Wendlandt, A. E.; Stahl, S. S. *J. Am. Chem. Soc*. **2014**, *136*, 506−512.



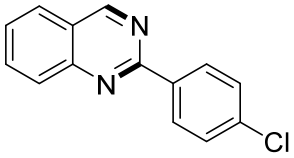
2-(*o*-Methoxyphenyl)quinazoline (3ag). Light yellow solid, yield 113 mg (48%), mp 118-119 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.50 (s, 1H), 8.12-8.10 (m, 1H), 7.95-7.89 (m, 2H), 7.79-7.77 (m, 1H), 7.65-7.62 (m, 1H), 7.46-7.43 (m, 1H), 7.12-7.05 (m, 2H), 3.87 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 162.4, 160.0, 157.7, 150.6, 134.0, 131.7, 130.8, 129.0, 128.5, 127.5, 127.0, 123.1, 120.8, 111.9, 56.0. MS (EI): *m/z* (%) 236 (100), 235 (41), 207 (44), 205 (14), 179 (35), 152 (8), 131 (12), 104 (23), 77 (18), 50 (10). This compound was known: C. Maheswari, C. U.; Kumar, G. S.; Venkateshwar, M.; Kumar, R. A.; Kantam, M. L.; Reddy, K. R. *Adv. Synth. Catal.* **2010**, *352*, 341-346.



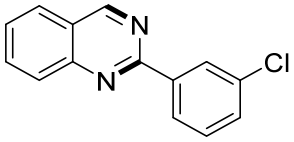
4-(Quinazolin-2-yl)aniline (3ah). Light yellow solid, yield 139 mg (63%), mp 177-178 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.37 (s, 1H), 8.44 (d, J = 9.0 Hz, 2H), 8.00-7.99 (m, 1H), 7.86-7.82 (m, 2H), 7.53-7.50 (m, 1H), 6.79 (d, J = 9.0 Hz, 2H), 3.97 (s, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 161.2, 160.3, 150.9, 149.0, 133.9, 130.2, 128.3, 128.2, 127.1, 126.3, 123.1, 114.7. MS (EI): *m/z* (%) 221 (100), 194 (22), 167 (7), 140 (2), 118 (27), 111 (11), 91 (12), 76 (6), 65 (7), 50 (6). This compound was known: Zhang, L.; Gao, Z.; Peng, C.; Bin, Z.-Y.; Zhao, D.; Wu, J.; Xu, Q.; Li, J.-X. *Mol. Divers.* **2012**, *16*, 579–590.



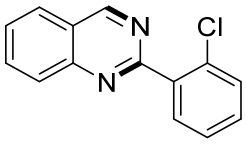
4-(Quinazolin-2-yl)phenol (3ai). Light yellow solid, yield 155 mg (70%), mp 154-155 ^{o}C. ^{1}H NMR (500 MHz, DMSO-d_6): δ 10.00 (s, 1H), 9.61 (s, 1H), 8.43 (d, J = 9.0 Hz, 2H), 8.12-8.10 (m, 1H), 7.99-7.98 (m, 2H), 7.68-7.65 (m, 1H), 6.93 (d, J = 9.0 Hz, 2H). ^{13}C NMR (125.4 MHz, DMSO-d_6): δ 161.0, 160.1, 159.9, 149.9, 134.5, 129.9, 128.4, 127.7, 127.5, 126.9, 122.9, 115.4. MS (EI): *m/z* (%) 223 (17), 222 (100), 195 (28), 167 (25), 140 (8), 119 (15), 91 (6), 76 (17), 65 (10), 50 (17). This compound was known: Peng, Y.-Y.; Zeng, Y.; Qiu, G.; Cai, L.; Pike, V. W. *J. Het. Chem.* **2010**, *47*, 1240-1245.



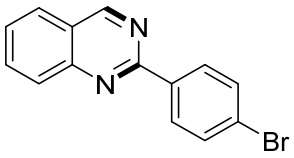
2-(*p*-Chlorophenyl)quinazoline (3aj). Light yellow solid, yield 180 mg (75%), mp 134-135 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.44 (s, 1H), 8.57 (d, J = 9.0 Hz, 2H), 8.06 (m, 1H), 7.93-7.89 (m, 2H), 7.64-7.61 (m, 1H), 7.50 (d, J = 9.0 Hz, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 160.0, 150.7, 136.8, 136.5, 134.2, 129.9, 128.8, 128.6, 127.4, 127.1, 123.6. MS (EI): *m/z* (%) 242 (33), 240 (100), 215 (8), 213 (26), 178 (22), 137 (4), 120 (10), 102 (17), 76 (16), 50 (10). This compound was known: Han, B.; Yang, X.-L.; Wang, C.; Bai, Y.-W.; Pan, T.-C.; Chen, X.; Yu, W. *J. Org. Chem*. **2012**, *77*, 1136-1142.



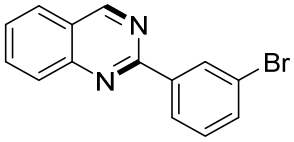
2-(*m*-Chlorophenyl)quinazoline (3ak). Light yellow solid, yield 152 mg (63%), mp 149-150 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.46 (s, 1H), 8.63 (s, 1H), 8.52-8.50 (m, 1H), 8.10-8.08 (m, 1H), 7.95-7.91 (m, 2H), 7.66-7.62 (m, 1H), 7.48-7.44 (m, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 159.7, 150.7, 139.9, 134.8, 134.3, 130.5, 129.8, 128.7, 128.6, 127.6, 127.1, 126.6, 123.7. MS (EI): *m/z* (%) 242 (32), 240 (100), 213 (24), 178 (32), 151 (12), 137 (4), 120 (11), 102 (20), 76 (24), 50 (18). This compound was known: Han, B.; Yang, X.-L.; Wang, C.; Bai, Y.-W.; Pan, T.-C.; Chen, X.; Yu, W. *J. Org. Chem*. **2012**, *77*, 1136-1142.



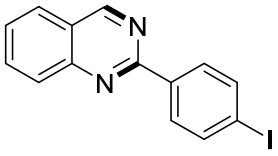
2-(*o*-Chlorophenyl)quinazoline (3al). Light yellow solid, yield 103 mg (44%), mp 70-71 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.52 (s, 1H), 8.13 (d, J = 7.5 Hz, 1H), 7.98-7.93 (m, 2H), 7.84-7.82 (m, 1H), 7.70-7.68 (m, 1H), 7.55-7.53 (m, 1H), 7.42-7.39 (m, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 161.9, 160.2, 150.3, 138.3, 134.3, 132.9, 131.8, 130.5, 130.3, 128.6, 128.0, 127.1, 126.8, 123.2. MS (EI): *m/z* (%) 241 (22), 240 (70), 206 (15), 205 (100), 178 (33), 151 (15), 120 (11), 102 (25), 76 (22), 50 (14). This compound was known: Han, B.; Yang, X.-L.; Wang, C.; Bai, Y.-W.; Pan, T.-C.; Chen, X.; Yu, W. *J. Org. Chem*. **2012**, *77*, 1136-1142.



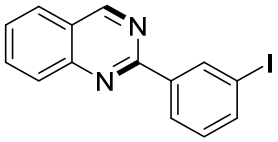
2-(*p*-Bromophenyl)quinazoline (3am). Light yellow solid, yield 182 mg (64%), mp 156-157 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.44 (s, 1H), 8.50 (d, J = 8.5 Hz, 2H), 8.06 (d, J = 8.5 Hz, 1H), 7.93-7.89 (m, 2H), 7.65 (d, J = 8.5 Hz, 2H), 7.64-7.62 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 160.0, 150.6, 136.9, 134.2, 131.7, 130.1, 128.6, 127.4, 127.1, 125.4, 123.6. MS (EI): *m/z* (%) 286 (95), 284 (100), 159 (20), 157 (21), 178 (37), 151 (21), 103 (12), 102 (36), 76 (28), 50 (19). This compound was known: Chen, Z.; Chen, J.; Liu, M.; Ding, J.; Gao, W.; Huang, X.; Wu, H. *J. Org. Chem.* **2013**, *78*, 11342-11348.



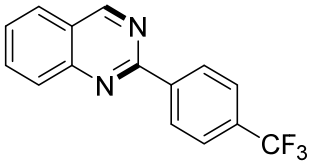
2-(*m*-Bromophenyl)quinazoline (3an). Light yellow solid, yield 191 mg (67%), mp 154-155 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.48 (s, 1H), 8.80 (s, 1H), 8.57 (d, J = 8.0 Hz, 1H), 8.11 (d, J = 8.0 Hz, 1H), 7.96-7.92 (m, 2H), 7.66-7.62 (m, 2H), 7.42-7.39 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 159.5, 150.6, 139.9, 134.4, 133.5, 131.6, 130.1, 128.6, 127.7, 127.1, 127.1, 123.7, 122.9. MS (EI): *m/z* (%) 286 (100), 284 (100), 259 (15), 257 (14), 205 (39), 178 (47), 151 (29), 103 (12), 76 (42), 50 (26). This compound was known: Han, B.; Yang, X.-L.; Wang, C.; Bai, Y.-W.; Pan, T.-C.; Chen, X.; Yu, W. *J. Org. Chem.* **2012**, *77*, 1136-1142.



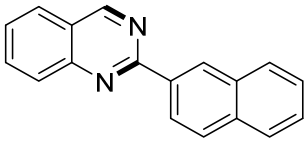
2-(*p*-Iodophenyl)quinazoline (3ao). Light yellow solid, yield 66 mg (20%), mp 123-124 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.44 (s, 1H), 8.35 (d, J = 8.5 Hz, 2H), 8.07 (d, J = 8.0 Hz, 1H), 7.93-7.90 (m, 2H), 7.87 (d, J = 8.5 Hz, 2H), 7.64-7.61 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 160.2, 150.7, 137.8, 137.6, 134.2, 130.2, 128.6, 127.5, 127.1, 123.7, 97.7. MS (EI): *m/z* (%) 333 (17), 332 (100), 305 (6), 205 (38), 178 (24), 166 (9), 151 (16), 102 (28), 76 (25), 50 (17). HRMS Calcd for $[C_{14}H_9IN_2+H]^+$: 332.9889; found: 332.9900.



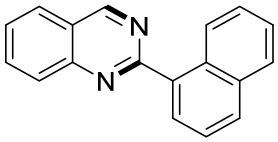
2-(*m*-Iodophenyl)quinazoline (3ap). Light yellow solid, yield 83 mg (25%), mp 138-139 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.45 (s, 1H), 8.99 (s, 1H), 8.59 (d, J = 8.0 Hz, 1H), 8.08 (d, J = 8.0 Hz, 1H), 7.94-7.90 (m, 2H), 7.83 (d, J = 7.5 Hz, 1H), 7.65-7.63 (m, 1H), 7.28-7.25 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 159.4, 150.6, 140.0, 139.4, 137.5, 134.3, 130.2, 128.7, 127.7, 127.6, 127.1, 123.7, 94.5. MS (EI): *m/z* (%) 333 (15), 332 (92), 206 (16), 205 (100), 178 (13), 177 (11), 151 (16), 102 (23), 76 (19), 50 (12). HRMS Calcd for $[C_{14}H_9IN_2+H]^+$: 332.9889; found: 332.9900.



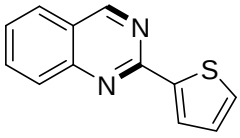
2-(*p*-Trifluoromethylphenyl)quinazoline (3aq). Light yellow solid, yield 191 mg (70%), mp 142-143 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.50 (s, 1H), 8.75 (d, J = 8.0 Hz, 2H), 8.13 (d, J = 8.5 Hz, 1H), 7.97-7.94 (m, 2H), 7.78 (d, J = 8.0 Hz, 2H), 7.68-7.65(m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 159.5, 150.6, 141.1, 134.4, 132.2 (q, $J_{C\text{-}F}$ = 32 Hz), 128.8, 128.7, 127.8, 127.1, 125.4 (q, $J_{C\text{-}F}$ = 3.75 Hz), 124.2 (q, $J_{C\text{-}F}$ = 271 Hz), 123.8. MS (EI): *m/z* (%) 274 (17), 273 (100), 246 (28), 225 (2), 195 (2), 176 (3), 126 (2), 101 (9), 75 (19), 49 (8). This compound was known: Chen, Z.; Chen, J.; Liu, M.; Ding, J.; Gao, W.; Huang, X.; Wu, H. *J. Org. Chem.* **2013**, *78*, 11342-11348.



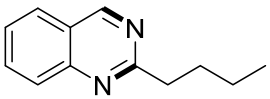
2-(Naphthalen-2-yl)quinazoline (3ar). Light yellow solid, yield 176 mg (69%), mp 130-131 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.51 (s, 1H), 9.16 (s, 1H), 8.73 (dd, J = 1.5 Hz, J = 8.5 Hz, 1H), 8.13 (dd, J = 0.5 Hz, J = 8.5 Hz, 1H), 8.05-8.03 (m, 1H), 7.99 (d, J = 9.0 Hz, 1H), 7.95-7.89 (m, 3H), 7.63-7.60 (m, 1H), 7.55-7.51 (m, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.9, 160.4, 150.8, 135.3, 134.6, 141.1, 133.4, 129.2, 128.9, 128.6, 128.2, 127.7, 127.2, 127.1, 127.0, 126.2, 125.4, 123.6. MS (EI): *m/z* (%) 256 (100), 229 (16), 228 (21), 202 (6), 153 (24), 128 (18), 127 (17), 102 (3), 76 (6), 50 (4). HRMS Calcd for $[C_{18}H_{12}N_2+H]^+$: 257.1078; found: 257.1077.



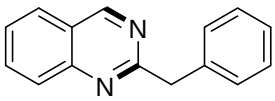
2-(Naphthalen-1-yl)quinazoline (3as). Light yellow solid, yield 164 mg (64%), mp 120-121 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.59 (s, 1H), 8.70 (d, J = 8.0 Hz, 1H), 8.18-8.16 (m, 2H), 8.01-7.92 (m, 4H) 7.70- 7.67 (m, 1H), 7.64-7.61 (m, 1H), 7.57-7.51 (m, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 163.5, 160.4, 150.6, 136.3, 134.3, 134.2, 131.2, 130.4, 129.6, 128.7, 128.5, 127.7, 127.1, 126.8, 125.9, 125.9, 125.3, 123.1. MS (EI): *m/z* (%) 256 (72), 255 (100), 228 (5), 201 (3), 152 (6), 100 (2), 127 (22), 113 (6), 77 (6), 51 (3). This compound was known: C. Maheswari, C. U.; Kumar, G. S.; Venkateshwar, M.; Kumar, R. A.; Kantam, M. L.; Reddy, K. R. *Adv. Synth. Catal.* **2010**, *352*, 341-346.



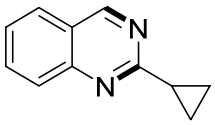
2-(Thiophen-2-yl)quinazoline (3at). Light yellow solid, yield 127 mg (60%), mp 133-134 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.31 (s, 1H), 8.14 (m, 1H), 7.99-7.97 (m, 1H), 7.85-7.81 (m, 2H), 7.53-7.49 (m, 2H), 7.18-7.16 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.4, 157.8, 150.6, 143.9, 134.2, 129.9, 129.2, 128.3, 128.1, 127.2, 126.9, 123.3. MS (EI): *m/z* (%) 213 (15), 212 (100), 211 (21), 185 (32), 153 (4), 106 (10), 76 (10), 58 (4), 50 (8). This compound was known: Chen, Z.; Chen, J.; Liu, M.; Ding, J.; Gao, W.; Huang, X.; Wu, H. *J. Org. Chem.* **2013**, *78*, 11342-11348.



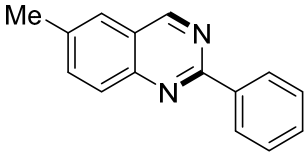
2-Butylquinazoline (3au). Light yellow solid, yield 52 mg (28%), yellow liquid. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.34 (s, 1H), 7.98-7.97 (m, 1H), 7.88-7.85 (m, 2H), 7.59-7.56 (m, 1H), 3.12 (t, J = 7.5 Hz, 2H), 1.94-1.88 (m, 2H), 1.50-1.43 (m, 2H), 0.97 (t, J = 7.5 Hz, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 167.9, 160.3, 150.3, 133.9, 127.8, 127.0, 126.8, 123.0, 39.7, 31.0, 22.6, 13.9. MS (EI): *m/z* (%) 186 (16), 171 (9), 157 (28), 144 (100), 129 (5), 116 (11), 102 (6), 89 (4), 77 (9), 50 (4). This compound was known: Chen, M.; Zhang, M.; Xiong, B.; Tan, Z.; Lv, W.; Jiang, H. *Org. Lett.* **2014**, *16*, 6028-6031.



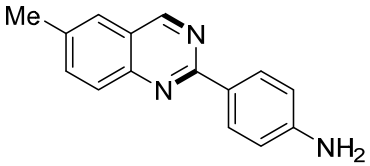
2-Benzylquinazoline (3av). Light yellow solid, yield 33 mg (15%), mp 52-53 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.32 (s, 1H), 8.00 (d, J = 8.5 Hz, 1H), 7.88-7.84 (m, 2H), 7.59-7.56 (m, 1H), 7.43-7.41 (m, 2H), 7.30-7.28 (m, 2H), 7.22-7.19 (m, 1H), 4.45 (s, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 166.1, 160.8, 150.4, 138.5, 134.0, 129.2, 128.5, 128.0, 127.2, 127.0, 126.5, 123.1, 46.3. MS (EI): *m/z* (%) 220 (51), 219 (100), 218 (15), 116 (2), 110 (4), 96 (3), 91 (17), 77 (3), 65 (8), 50 (3). HRMS Calcd for $[C_{15}H_{12}N_2+H]^+$: 221.1079; found: 221.1080.



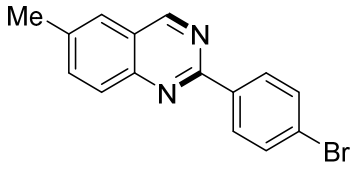
2-Cyclopropylquinazoline (3aw). Light yellow solid, yield 102 mg (60%), mp 38-39 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.21 (s, 1H), 7.89 (d, J = 8.5 Hz, 1H), 7.83-7.79 (m, 2H), 7.51-7.48 (m, 1H), 2.42-2.37 (m, 1H), 1.29-1.26 (m, 2H), 1.14-1.11 (m, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 168.3, 160.2, 150.3, 133.8, 127.4, 127.0, 125.2, 123.1, 18.5, 10.5. MS (EI): *m/z* (%) 170 (41), 169 (100), 168 (11), 144 (6), 117 (5), 115 (8), 102 (6), 84 (6), 76 (11), 50 (10). This compound was known: Cheng, C.; Fu, H.; Liu, Q.; Zhao, Y. *Synlett*, **2013**, *24*, 2089-2094.



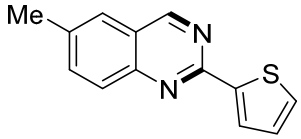
6-Methyl-2-phenylquinazoline (3ba). Light yellow solid, yield 114 mg (52%), mp 131-132 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.38 (s, 1H), 8.60 (d, J = 7.0 Hz, 2H), 8.00 (d, J = 8.5 Hz, 1H), 7.30 (d, J = 8.5 Hz, 1H), 7.68 (s, 1H), 7.54-7.49 (m, 3H), 2.56 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.3, 159.8, 149.3, 137.9, 137.5, 136.5, 130.4, 128.6, 128.5, 128.2, 125.8, 123.5, 21.6. MS (EI): *m/z* (%) 220 (17), 219 (100), 218 (48), 190 (14), 164 (8), 115 (4), 108 (6), 89 (9), 76 (10), 62 (8). This compound was known: Chen, M.; Zhang, M.; Xiong, B.; Tan, Z.; Lv, W.; Jiang, H. *Org. Lett.* **2014**, *16*, 6028-6031.



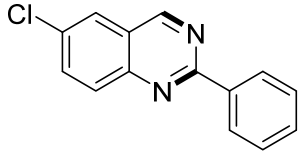
4-(6-Methylquinazolin-2-yl)aniline (3bh). Light yellow solid, yield 134 mg (57%), mp 177-178 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.28 (s, 1H), 8.41 (d, J = 8.0 Hz, 2H), 7.91 (d, J = 8.5 Hz, 1H), 7.66 (d, J = 8.5 Hz, 1H), 7.59 (s, 1H), 6.78 (d, J = 8.0 Hz, 2H), 2.39 (s, 2H), 2.51 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.5, 159.6, 149.3, 148.8, 136.4, 136.2, 130.0, 128.3, 127.8, 125.8, 123.1, 114.8, 21.5. MS (EI): *m/z* (%) 236 (16), 235 (100), 234 (21), 208 (17), 193 (5), 180 (3), 117 (4), 104 (5), 91 (8), 65 (6). HRMS Calcd for $[C_{15}H_{13}N_2+H]^+$: 236.1188; found: 236.1187.



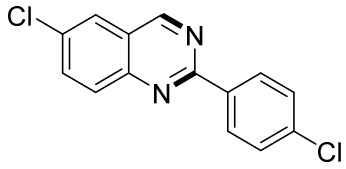
2-(*p*-Bromophenyl)-6-methylquinazoline (3bm). Light yellow solid yield 60 mg (20%), mp 185-186 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.37 (s, 1H), 8.48 (d, J = 8.5 Hz, 2H), 8.00 (d, J = 8.5 Hz, 1H), 7.75 (d, J = 8.5 Hz, 1H), 7.69 (s, 1H), 7.64 (d, J = 8.5 Hz, 2H), 2.57 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 159.9, 159.3, 149.2, 137.8, 136.9, 136.7, 131.7, 130.0, 128.2, 125.9, 125.2, 123.6, 21.7. MS (EI): *m/z* (%) 299 (96), 297 (100), 296 (38), 270 (17), 164 (6), 149 (5), 108 (13), 95 (7), 89 (10), 74 (4). This compound was known: Chen, M.; Zhang, M.; Xiong, B.; Tan, Z.; Lv, W.; Jiang, H. *Org. Lett.* **2014**, *16*, 6028-6031.



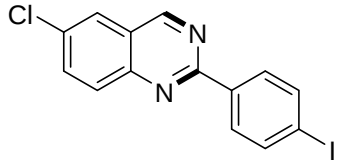
6-Methyl-2-(thiophen-2-yl)quinazoline (3bt). Light yellow solid, yield 34 mg (15%), mp 144-145 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.28 (s, 1H), 8.19 (s, 1H), 7.96 (d, J = 8.5 Hz, 1H), 7.72 (d, J = 8.5 Hz, 1H), 7.64 (s, 1H), 7.51 (d, J = 4.5 Hz, 1H), 7.20-7.18 (m, 1H). 2.55 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 159.9, 156.9, 148.8, 143.5, 137.3, 136.8, 129.9, 129.2, 128.4, 127.6, 126.0, 123.3, 21.5. MS (EI): *m/z* (%) 226 (17), 225 (100), 224 (53), 197 (17), 169 (3), 112 (8), 108 (3), 99 (12), 88 (30), 62 (8). HRMS Calcd for $[C_{13}H_{10}N_2S+H]^+$: 227.0643; found: 277.0641.



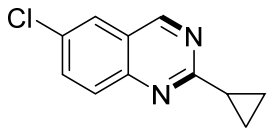
6-Chloro-2-phenylquinazoline (3ca). Light yellow solid, yield 161 mg (67%), mp 156-157 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.24 (s, 1H), 8.49-8.48 (m, 2H), 7.89 (d, J = 8.5 Hz, 1H), 7.74 (s, 1H), 7.68 (d, J = 8.5 Hz, 1H), 7.41 (m, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 161.2, 159.4, 149.1, 137.5, 135.0, 132.7, 130.8, 130.3, 128.6, 128.6, 125.8, 123.9. MS (EI): *m/z* (%) 241 (32), 239 (100), 212 (19), 176 (15), 150 (7), 119 (15), 109 (8), 101 (12), 88 (7), 76 (13). This compound was known: Chen, M.; Zhang, M.; Xiong, B.; Tan, Z.; Lv, W.; Jiang, H. *Org. Lett.* **2014**, *16*, 6028-6031.



6-Chloro-2-(*p*-chlorophenyl)quinazoline (3cj). Light yellow solid, yield 159 mg (58%), mp 206-207 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.37 (s, 1H), 8.54 (d, J = 8.0 Hz, 2H), 8.00 (d, J = 9.0 Hz, 1H), 7.90 (s, 1H), 7.83 (d, J = 9.0 Hz, 1H), 7.49 (d, J = 8.0 Hz, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.3, 159.5, 149.1, 137.1, 136.0, 135.2, 133.0, 130.3, 129.9, 128.8, 125.8, 124.0. MS (EI): *m/z* (%) 276 (63), 274 (100), 246 (17), 211 (8), 175 (9), 136 (11), 119 (7), 110 (7), 101 (10), 74 (18). This compound was known: Chen, M.; Zhang, M.; Xiong, B.; Tan, Z.; Lv, W.; Jiang, H. *Org. Lett.* **2014**, *16*, 6028-6031.

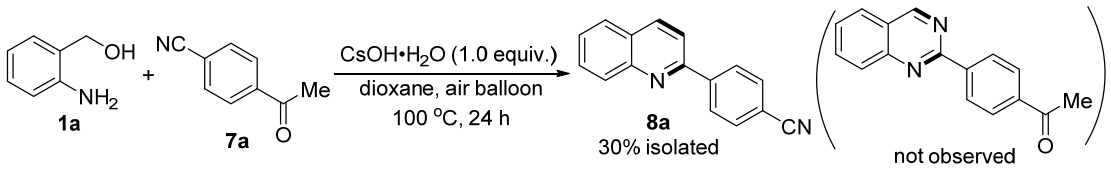


6-Chloro-2-(*p*-iodophenyl)quinazoline (3co). Light yellow solid, yield 110 mg (30%), mp 199-200 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.37 (s, 1H), 8.32 (d, J = 8.5 Hz, 2H), 8.02 (d, J = 9.0 Hz, 1H), 7.90 (s, 1H), 7.86 (d, J = 8.5 Hz, 2H), 7.84 (d, J = 9.0 Hz, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 159.5, 149.2, 137.8, 137.1, 135.2, 133.1, 130.3, 130.2, 125.8, 124.1, 98.0. MS (EI): *m/z* (%) 368 (30), 366 (100), 239 (31), 212 (15), 183 (6), 177 (18), 119 (8), 110 (5), 102 (24), 75 (23). HRMS Calcd for $[C_{14}H_8ClIN_2+H]^+$: 366.9499; found: 366.9499.



6-Chloro-2-cyclopropylquinazoline (3cw). Light yellow solid, yield 51 mg (25%), mp 79-80 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.17 (s, 1H), 7.87 (d, J = 9.0 Hz, 1H), 7.82 (s, 1H), 7.77 (d, J = 9.0 Hz, 1H), 2.43-2.38 (m, 1H), 1.27 (m, 2H), 1.74-1.59 (m, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 168.8, 159.4, 148.5, 134.9, 131.8, 129.0, 125.7, 123.5, 18.5, 10.9. MS (EI): *m/z* (%) 204 (33), 202 (100), 167 (31), 150 (5), 136 (6), 113 (5), 101 (14), 99 (8), 83 (11), 74 (22). HRMS Calcd for $[C_{11}H_9ClN_2+H]^+$: 205.0533; found: 205.0554.

3.2 Detailed Procedure for the Reaction of 2-Aminophenyl Methanol (**1a**) and *p*-Acetylbenzonitrile (7a) (eq. 1 in the text)



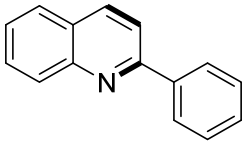
The mixture of 2-aminophenylmethanol (**1a**) (0.1231 g, 1 mmol), *p*-acetylbenzonitrile (**7a**) (0.1741 g, 1.2 mmol, 1.2 equiv.), $CsOH·H_2O$ (0.1679 g, 1.0 equiv.) and dioxane (3.0 mL) in a Schlenk tube (100 mL) equipped with an air balloon was stirred at 100 °C for 24 h. The mixture was then neutralized by 2 mL of aqueous HCl (1 M) and extracted with ethyl acetate. The organic phase was analyzed by TLC and/or GC-MS. The solvent was then evaporated under vacuum and the residue was purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate (PE:EA = 10:1) as the eluent, giving **8a** in 30% isolated yield..

4-(Quinolin-2-yl)benzonitrile (8a). White solid, yield 69 mg (30%), mp 128-129 °C. ^{1}H NMR (500 MHz, $CDCl_3$): 8.30-8.28 (m, 3H), 8.18 (d, J = 8.5 Hz, 1H), 7.89 (d, J = 8.5 Hz, 1H), 7.87 (d, J = 8.5 Hz, 1H), 7.82 (d, J = 8.5 Hz, 2H), 7.79-7.76 (m, 1H), 7.60-7.57 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 154.8, 147.7, 137.8, 132.6, 130.5, 129.4, 128.2, 127.5, 127.3, 118.7, 118.7, 113.0, 29.6. MS (EI): *m/z* (%) 231 (17), 230 (100), 229 (82), 201 (6), 200 (6), 175 (5), 115 (11), 101 (16), 88 (8), 75 (8), 51 (4). This compound was known: Iosub, A. V.; Stahl, S. S. *Org. Lett.* **2015**, *17*, 4404-4407.

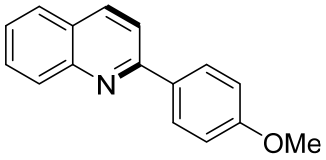
3.3 General Procedure for CsOH-Mediated Aerobic Oxidative Synthesis of 2-Substituted Quinolines from 2-Aminoaryl Methanols and Substituted Acetophenones.

Unless otherwise

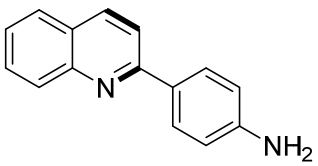
noted, the mixture of 2-aminophenyl methanol **1a** (0.1477 g, 1.2 mmol, 1.2 equiv.), substituted acetophenones **7** (1.0 mmol), and $CsOH·H_2O$ (0.3358 g, 2.0 equiv.) in dioxane (2.0 mL) was added into a Schlenk tube (100 mL) equipped with an air balloon was stirred at 120 ^oC for 24 h and monitored by TLC and/or GC-MS. The reaction mixture was then concentrated under vacuum. The residue was purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate (PE:EA = 10:1) as the eluent. The target product **8** was obtained in low to moderate isolated yields based on **7**.



2-Phenylquinoline (8b). Light yellow solid, yield 147 mg (72%), mp 83-84 ^oC. ^1H NMR (500 MHz, $CDCl_3$): 8.13 (d, J = 8.5 Hz, 1H), 8.11-8.07 (m, 3H), 7.79 (d, J = 8.5 Hz, 1H), 7.74 (d, J = 8.0 Hz, 1H), 7.66-7.63 (m, 1H), 7.46-7.43 (m, 3H), 7.40-7.37 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 157.4, 148.3, 139.7, 136.7, 129.7, 129.6, 129.3, 128.8, 127.6, 127.4, 127.2, 126.2, 119.0. MS (EI): *m/z* (%) 205 (100), 204 (90), 203 (15), 176 (10), 151 (5), 128 (4), 218 (23), 101 (12), 88 (8), 76 (9). This compound was known: Yu, J.; Li, Z.; Su, W. *Synth. Commun.* **2013**, *43*, 361-374.

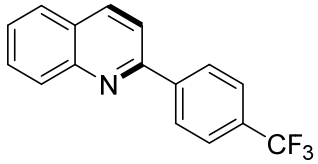


2-(*p*-Methoxyphenyl)quinoline (8c). White solid, yield 118 mg (54%), mp 117-118 ^oC. ^1H NMR (500 MHz, $CDCl_3$): δ 8.16-8.12 (m, 4H), 7.82-7.77 (m, 2H), 7.71-7.68 (m, 1H), 7.49-7.46 (m, 1H), 7.05 (d, J = 8.0 Hz, 2H), 3.87 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 160.8, 156.9, 148.3, 136,6 132.2, 129.5, 128.9, 127.4, 126.9, 125.9, 118.5, 114.2, 55.3. MS (EI): *m/z* (%) 236 (18), 235 (100), 234 (6), 220 (36), 204 (4), 192 (36), 191 (33), 190 (8), 165 (6), 128 (4), 117 (6), 95 (14), 75 (13). This compound was known: Tobisu, M.; Hyodo, I.; Chatani, N. *J. Am. Chem. Soc.* **2009,** *131*, 12070-12071.

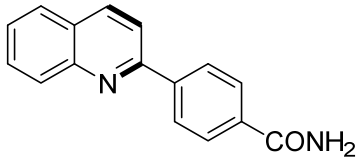


4-(Quinolin-2-yl)aniline (8d). White solid, yield 138 mg (63%), mp 194-195 ^oC. ^1H NMR (500

MHz, $CDCl_3$): δ 8.13-8.12 (m, 2H), 8.03 (d, J = 8.5 Hz, 2H), 7.80-7.76 (m, 2H), 7.70-7.67 (m, 1H), 7.48-7.45 (m, 1H), 6.79 (d, J = 8.5 Hz, 2H), 3.84 (s, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 157.2, 148.3, 147.8, 136.4, 129.8, 129.42, 129.40, 128.8, 127.3, 126.8, 125.5, 118.3, 115.1. MS (EI): *m/z* (%) 221 (16), 220 (100), 219 (41), 204 (10), 203 (5), 167 (5), 110 (15), 95 (7), 83 (6), 75 (3). This compound was known: Li, H.; Wang, C.; Huang, H.; Xu, X.; Li, Y. *Tetrahedron Lett.* **2011**, *52*, 1108-1111.

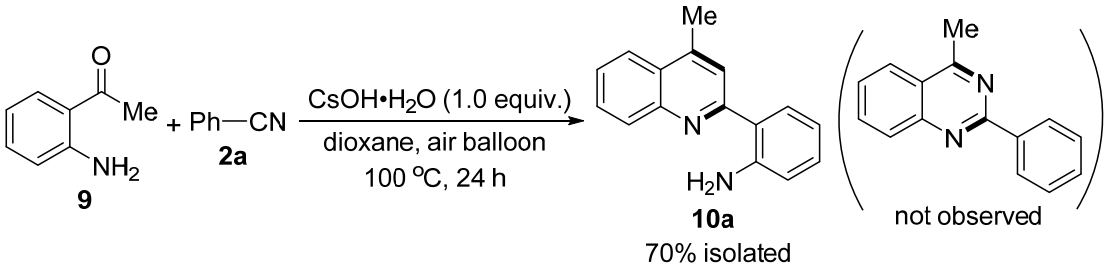


2-(*p*-Trifluoromethylphenyl)quinoline (8e). White solid, yield 109 mg (40%), mp 193-194 ^{o}C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.28 (d, J = 8.0 Hz, 2H), 8.25 (d, J = 8.0 Hz, 1H), 8.18 (d, J = 8.5 Hz, 1H), 7.88 (d, J = 8.5 Hz, 1H), 7.85 (d, J = 8.0 Hz, 1H), 7.78 (d, J = 8.0 Hz, 2H), 7.75 (d, J = 8.0 Hz, 1H), 7.58-7.55 (m, 1H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 155.6, 148.3, 142.9, 137.0, 129.9, 129.9, 127.8, 127.4, 127.4, 126.8, 125.7 (q, $J_{C\text{-}F}$ = 3.75 Hz), 125.3, 123.1, 118.7. MS (EI): *m/z* (%) 274 (18), 273 (100), 272 (48), 253 (7), 252 (9), 204 (7), 176 (4), 126 (6), 101 (7), 75 (6), 50 (3). This compound was known: Liu, Q.; Xing, R.-G.; Li, Y.-N.; Han, Y.-F.; Wei, X.; Li, J.; Zhou, B. *Synthesis* **2011,** *2011*, 2066-2072.



4-(Quinolin-2-yl)benzamide (8a'). White solid, yield 30 mg (12%), mp 235-236 ^{o}C. ^{1}H NMR (500 MHz, DMSO-d_6): δ 8.49 (d, J = 8.5 Hz, 1H), 8.35 (d, J = 8.0 Hz, 2H), 8.22 (d, J = 8.5 Hz, 1H), 8.09 (d, J = 8.0 Hz, 1H), 8.04 (d, J = 8.0 Hz, 2H), 8.01 (d, J = 8.5 Hz, 1H), 7.81-7.78 (m, 1H), 7.63-7.60 (m, 1H), 7.47 (s, 1H). ^{13}C NMR (125.4 MHz, DMSO-d_6): δ 167.4, 155.2, 147.5, 141.0, 137.3, 134.9, 130.0, 129.1, 128.0, 127.8, 127.1, 126.9, 126.7, 118.9. (EI): *m/z* (%) 248 (93), 232 (100), 204 (65), 177 (21), 153 (9), 118 (16), 104 (21), 90 (7), 77 (4). HRMS Calcd for $[C_{16}H_{13}N_2O+H]^+$: 249.1028; found: 249.1042.

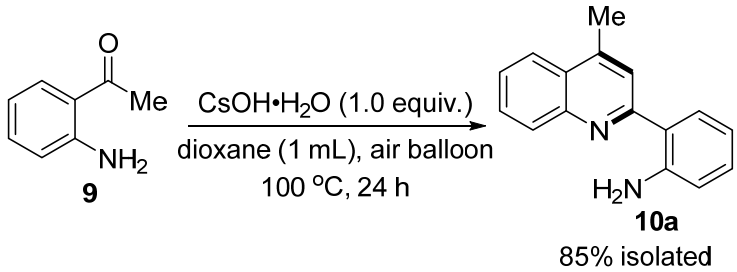
3.4 The Reaction of 2-Aminoacetophenone (9) and Benzonitrile (2a) (eq. 3 in the text)



The mixture of **9** (0.1351 g, 1 mmol), **2a** (0.1237 g, 1.2 mmol, 1.2 equiv.), $CsOH{\cdot}H_2O$ (0.1679 g, 1.0 equiv.) and dioxane (3.0 mL) in a Schlenk tube (100 mL) equipped with an air balloon was stirred at 100 °C for 24 h and then monitored by TLC and/or GC-MS. The reaction mixture was then concentrated under vacuum. The residue was purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate (PE:EA = 5:1) as the eluent, giving 70% isolated yield of **10a**.

2-(4-Methylquinolin-2-yl)aniline (10a). Light yellow solid, yield 164 mg (70%), mp 80-81 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.10 (d, J = 8.5 Hz, 1H), 7.98 (d, J = 8.0 Hz, 1H), 7.75-771 (m, 2H), 7.69 (s, 1H), 7.57-7.54 (m, 1H), 7.28-7.24 (m, 1H), 6.88-6.83 (m, 2H), 6.08 (s, 2H), 2.74 (s, 3H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 158.9, 147.4, 146.6, 144.7, 130.2, 129.8, 129.3, 129.3, 126.5, 125.9, 123.6, 121.7, 121.1, 117.4, 117.3, 19.0. MS (EI): *m/z* (%) 235 (13), 234 (79), 233 (100), 232 (8), 231 (7), 219 (83), 218 (23), 191 (3), 165 (4), 117 (8), 109 (17), 95 (4). This compound was known: Praveen, C.; Perumal, P. *Synthesis* **2016**, *48*, 855-864.

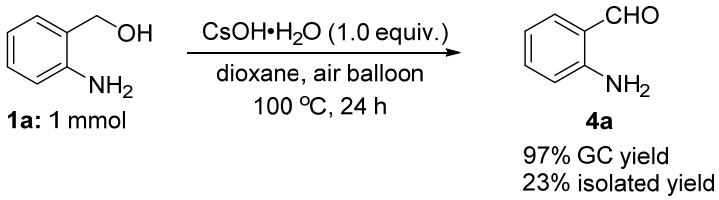
3.5 Self-Condensation of 2-Aminoacetophenone (9) (eq. 4 in the text)



The mixture of 2-aminoacetophenone (**9)** (0.1351 g, 1 mmol), $CsOH{\cdot}H_2O$ (0.1679 g, 1.0 equiv.), and dioxane (1.0 mL) in a Schlenk tube (100 mL) equipped with an air balloon was heated at 100 °C for 24 h and monitored by TLC and/or GC-MS. The reaction mixture was then concentrated under vacuum. The residue was purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate as the eluent, giving 85% isolated yield of **10a.**

4. Mechanistic Studies

4.1 CsOH-Mediated Aerobic Oxidation of 2-Aminophenylmethanol (1a) with Air under the Standard Reaction Conditions (eq. 5 in the text)



1a: 1 mmol

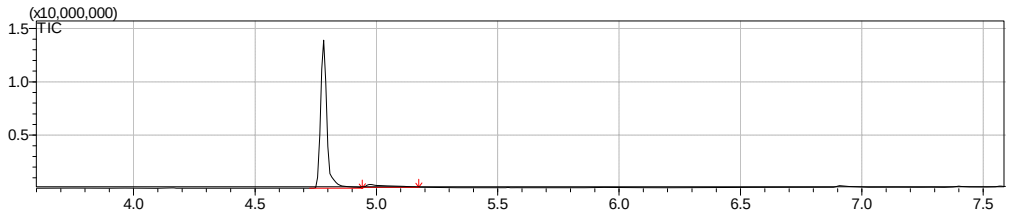
4a

97% GC yield

23% isolated yield

The mixture of 2-aminophenylmethanol **(1a)** (0.1231 g, 1 mmol), $CsOH·H_2O$ (0.1679 g, 1.0 equiv.) and dioxane (3.0 mL) in a Schlenk tube (100 mL) equipped with air balloon was heated at 100 °C for 24 h and then monitored by TLC and/or GC-MS, showing 93% GC yield of the product 2-aminobenzaldehyde (**4a**). The solvent was evaporated under vacuum and the residue purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate as the eluent (PE:EA = 10:1). However, due to its instability, **4a** was only isolated in 23% yield, and during the period of NMR measurement, **4a** decomposed again and gave no clear NMR spectra. See the following for GC and MS data of **4a**.

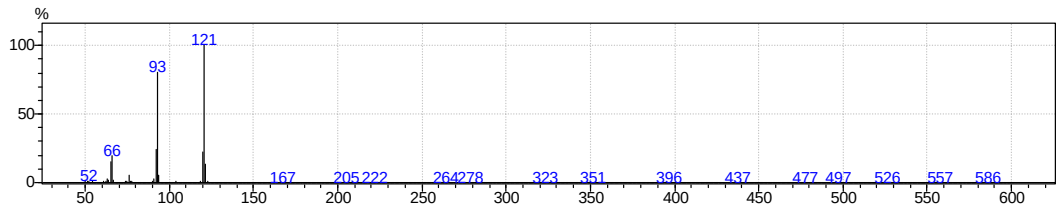
GC spectra of the reaction:



Peak	Ret.Time	Start Tm	End Tm	m/z	Area	Area%	Height	Height%	A/H
1	4.783	4.725	4.942	TIC	25305011	93.60	13870992	98.12	1.82
2	4.974	4.942	5.175	TIC	1729808	6.40	266378	1.88	6.49

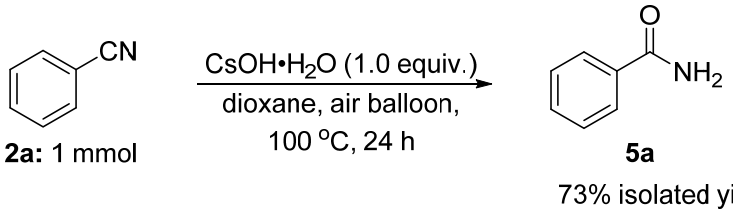
Mass spectra:

Ret. Time: 4.783, m/z = 121, **4a**



2-Aminobenzaldehyde (4a). MS (EI): *m/z* (%) 121 (79), 93 (100), 76 (12), 66 (48), 52 (7).

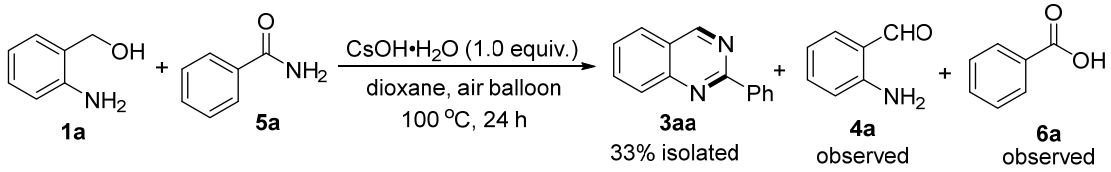
4.2 CsOH-Mediated Hydration of Benzonitrile (2a) under the Standard Reaction Conditions (eq. 6 in the text)



The mixture of benzonitrile **2a** (0.1031 g, 1 mmol), $CsOH \cdot H_2O$ (0.1679 g, 1.0 equiv.), and dioxane (3.0 mL) in a Schlenk tube (100 mL) equipped with an air balloon was heated at 100 °C for 24 h. The mixture was then neutralized by adding 2 mL aqueous HCl (1 M) and extracted with ethyl acetate. The solvent was evaporated under vacuum and the residue purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate as the eluent (PE:EA = 2:1), giving 73% isolated yield of benzamide **5a**.

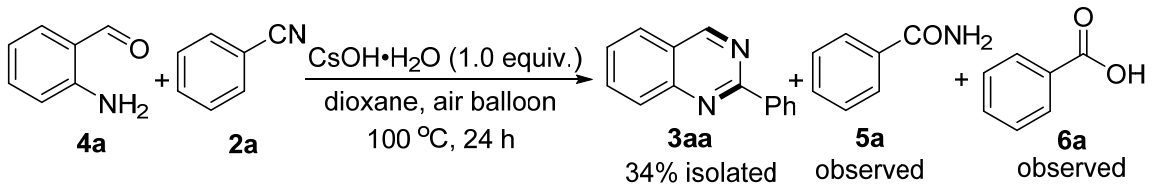
Benzamide (5a). White solid, yield 88 mg (73%), mp 132-133 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 7.83 (d, J = 7.5 Hz, 2H), 7.53 (t, J = 7.5 Hz, 1H) 7.44 (t, J = 7.5 Hz, 2H), 6.37 (s, 2H). ^{13}C NMR (125.4 MHz, $CDCl_3$): δ 169.8, 133.3, 132.0, 128.6, 127.3. MS (EI): *m/z* (%) 122 (6), 121 (80), 106 (7), 105 (100), 78 (11),77 (98), 51 (37), 50 (16). This compound was known: Battilocchio, C.; Hawkins, J. M.; Ley, S. V. *Org. Lett.* **2014,** *16*, 1060-1063.

4.3 CsOH-Mediated Cyclocondensation of 2-Aminophenylmethanol (1a) and Benzamide (5a) (eq. 7 in the text)



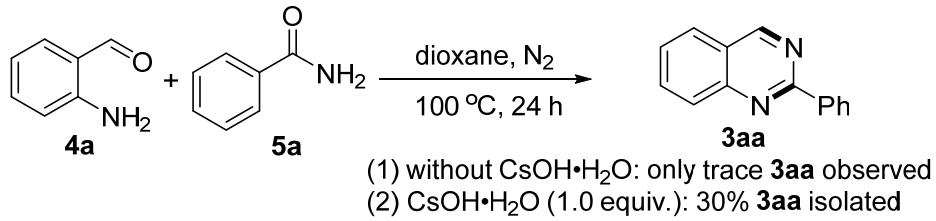
The mixture of **1a** (0.1231 g, 1 mmol), **5a** (0.2421 g, 2.0 mmol, 2.0 equiv.), $CsOH \cdot H_2O$ (0.1679 g, 1.0 equiv.), and dioxane (3.0 mL) in a Schlenk tube (100 mL) equipped with an air balloon was heated at 100 °C for 24 h. The mixture was then neutralized by 2 mL aqueous HCl (1 M) and extracted with ethyl acetate. The solvent was then evaporated under vacuum and the residue purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate as the eluent (PE:EA = 10:1), giving **3aa** in 33% isolated yield.

4.4 CsOH-Mediated Cyclocondensation of 2-Aminobenzaldehyde (4a) and Benzonitrile (2a) (eq. 8 in the text)



The mixture of 2-aminobenzaldehyde (**4a**, 0.1211 g, 1 mmol), benzonitrile (**2a**, 0.1237 g, 1.2 mmol, 1.2 equiv.), and $CsOH·H_2O$ (0.1679 g, 1.0 equiv.) in dioxane (3.0 mL) was sealed under N_2 in a Schlenk tube (100 mL) and then stirred at 100 °C for 24 h. After completion of the reaction, the mixture was neutralized with 2 mL of aqueous HCl (1 M) and extracted with EtOAc. The organic phase was analyzed by TLC and/or GC-MS. The solvent was then evaporated under vacuum and the residue purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate (PE:EA = 10:1) as the eluent, giving **3aa** in 34% isolated yield.

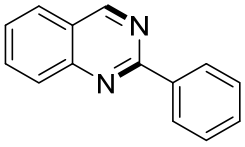
4.4 CsOH-Mediated Cyclocondensation of 2-Aminobenzaldehyde (4a) and Benzonitrile (2a) (eq. 8 in the text)



The blank mixture of 2-aminobenzaldehyde (**4a**, 0.1211 g, 1 mmol) and benzamide (**5a**, 0.1453 g, 1.2 mmol, 1.2 equiv.) in dioxane (3.0 mL) was sealed under N_2 in a Schlenk tube (100 mL) and then stirred at 100 °C for 24 h. After completion of the reaction, the mixture was analyzed by TLC and/or GC-MS, showing that only trace amount of **3aa** was generated and no product could be obtained by flash column chromatography (run 1).

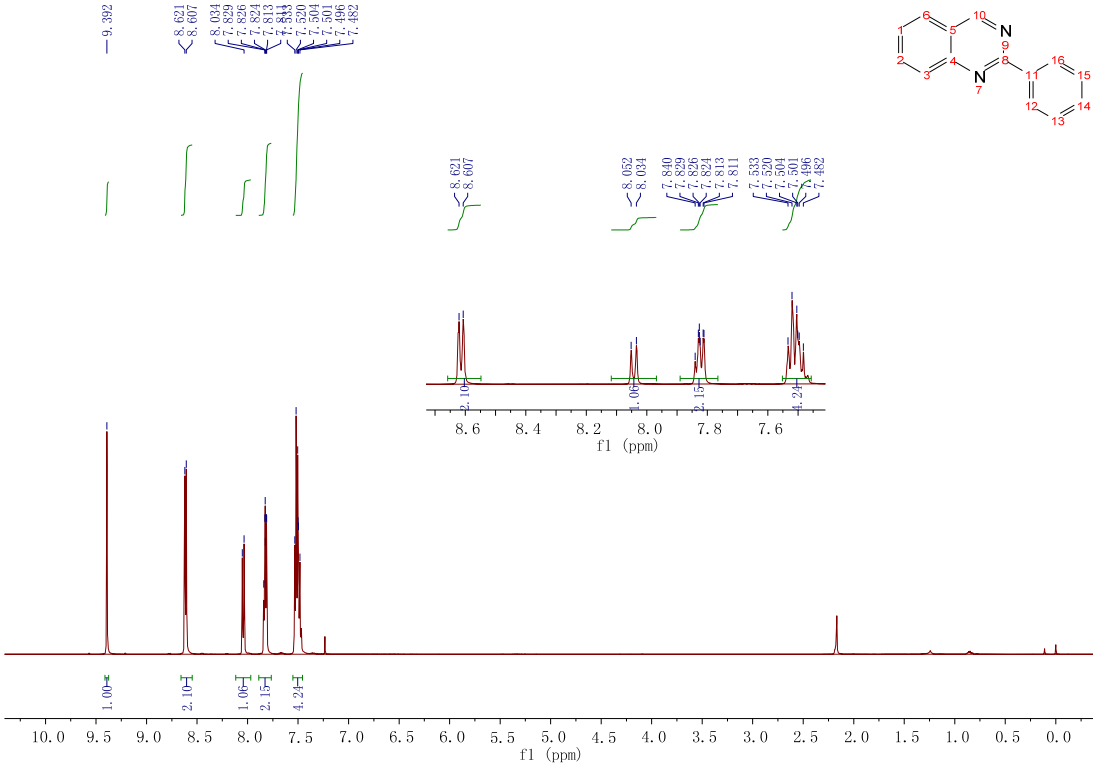
In the case of the control reaction with $CsOH·H_2O$ (0.1679 g, 1.0 equiv.) added, after completion of the reaction, the mixture was neutralized by 2 mL of aqueous HCl (1 M) and extracted with EtOAc. The organic phase was then analyzed by TLC and/or GC-MS. The solvent was evaporated under vacuum and the residue purified by flash column chromatography on silica gel using petroleum ether and ethyl acetate (PE:EA = 10:1) as the eluent, giving **3aa** in 30% isolated yield.

5. Copies of ^{1}H, ^{13}C NMR and HRMS Spectra of the Products

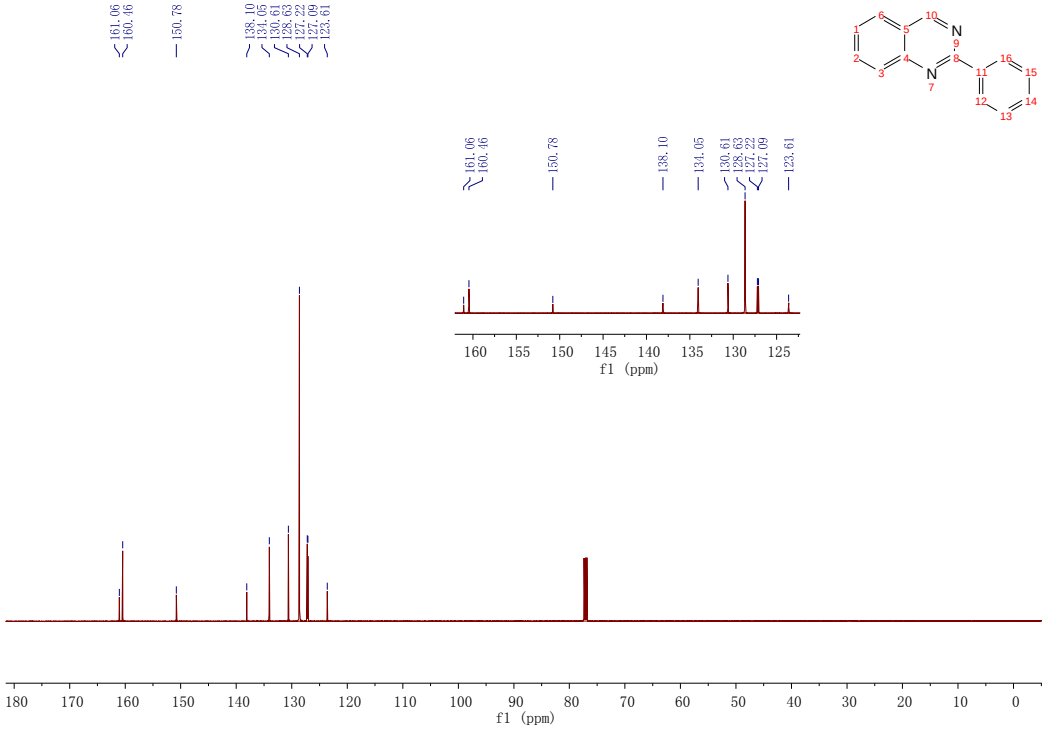


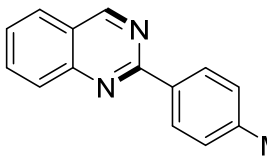
(**3aa**)

^{1}H NMR



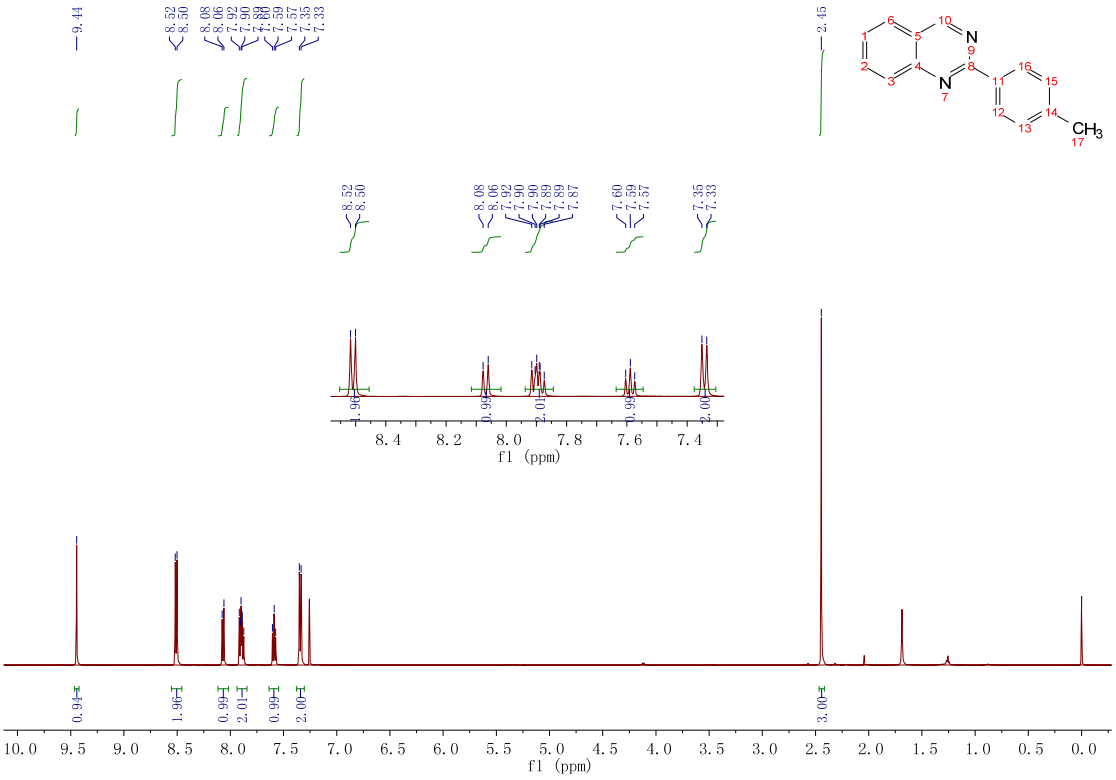
^{13}C NMR



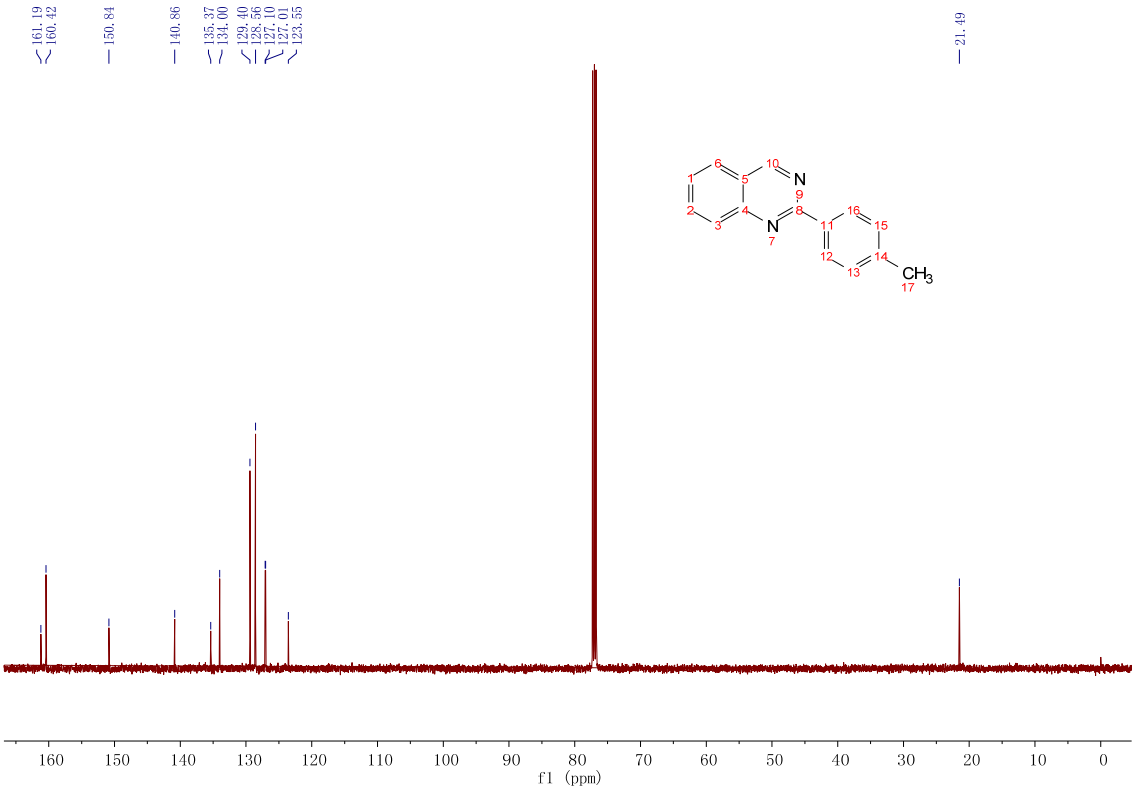


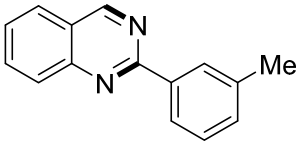
(3ab)

^{1}H NMR



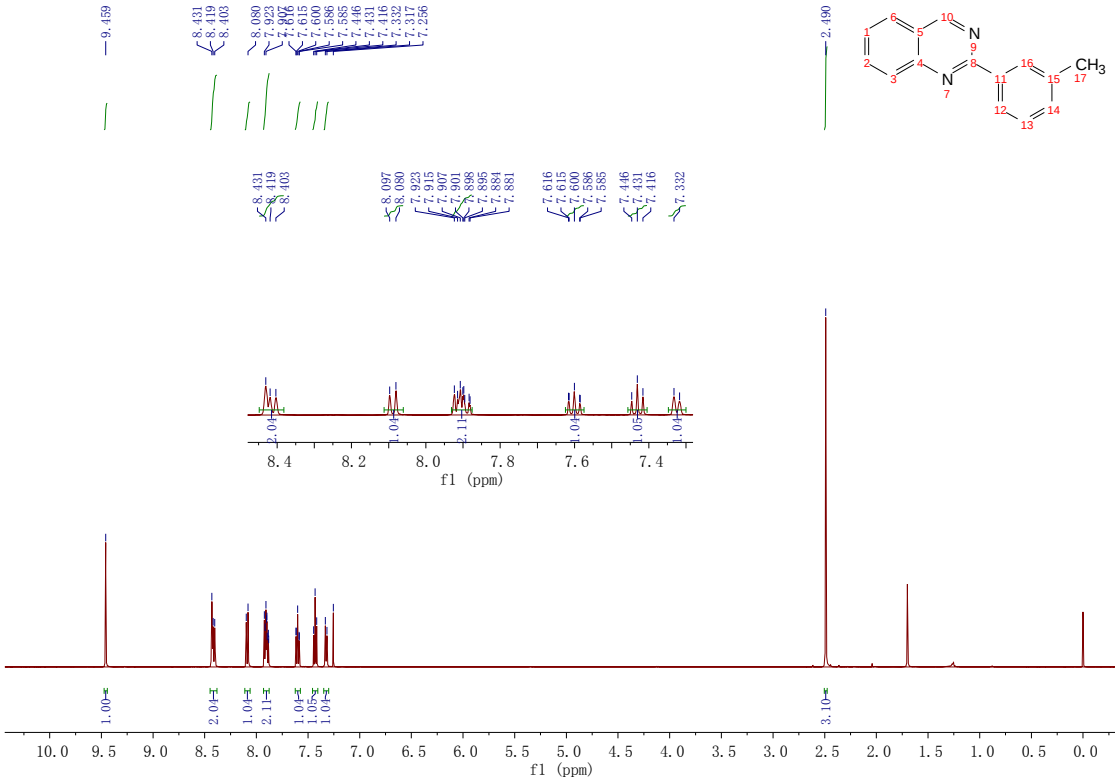
^{13}C NMR



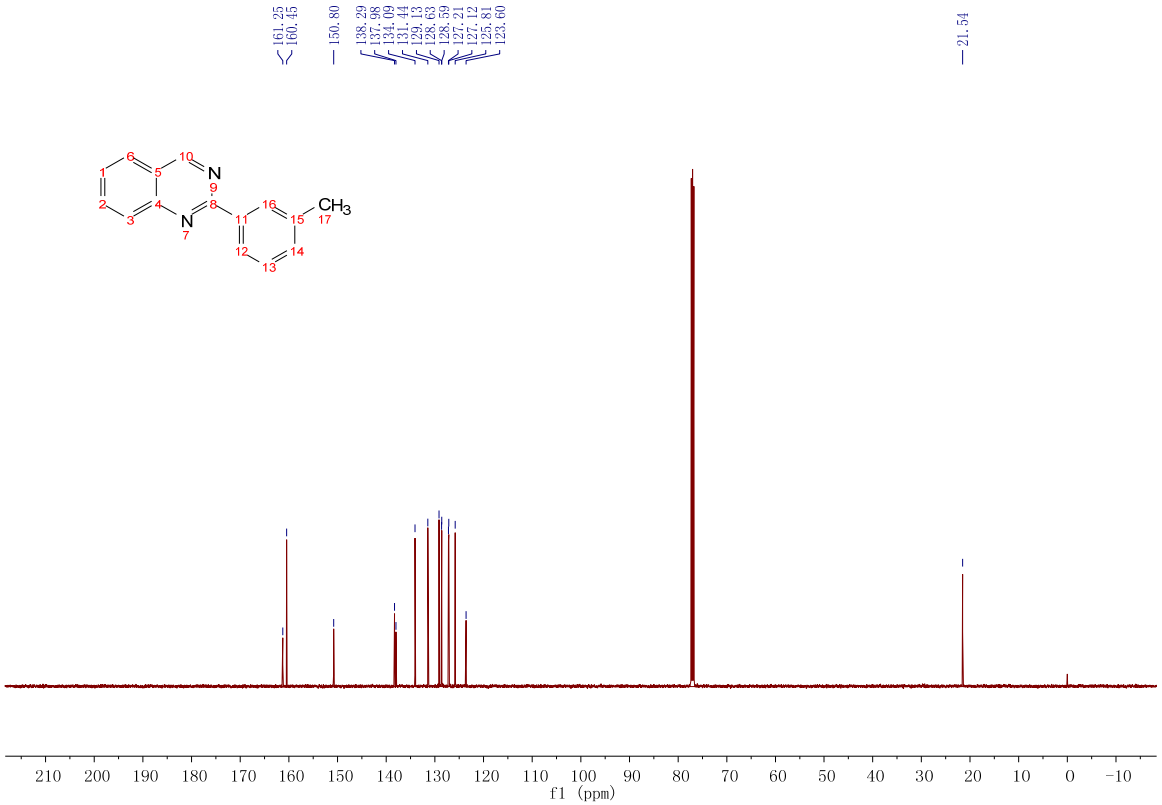


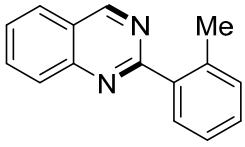
(**3ac**)

^{1}H NMR



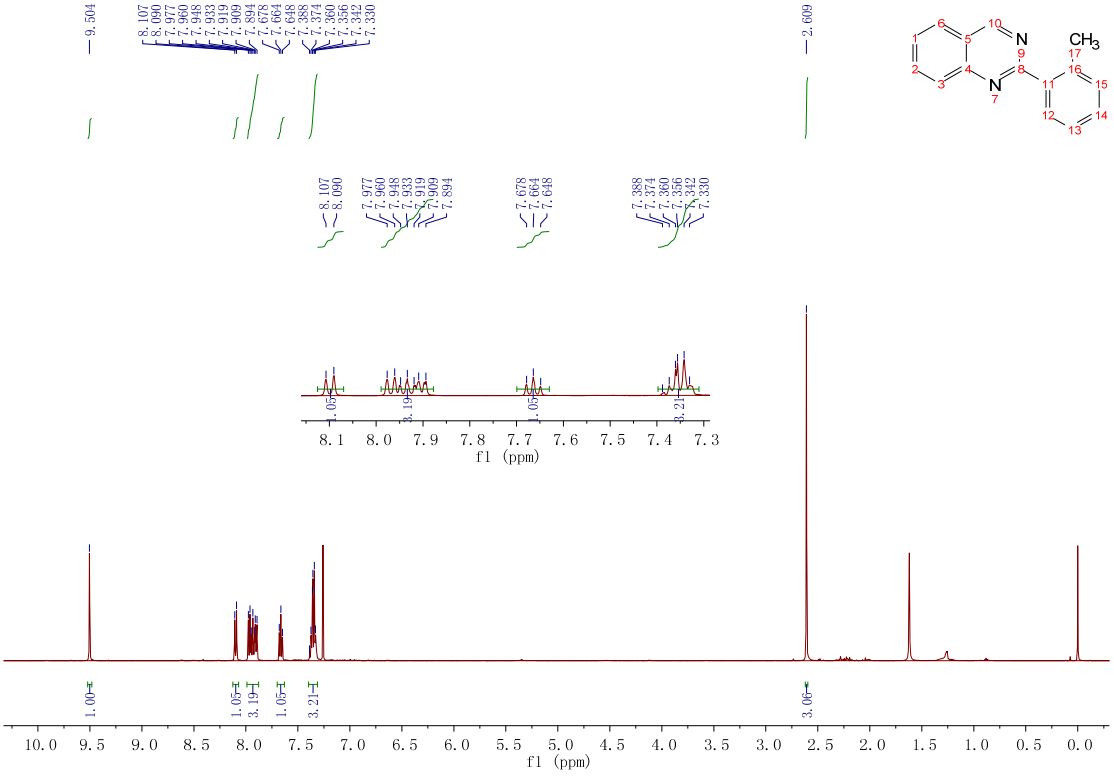
^{13}C NMR



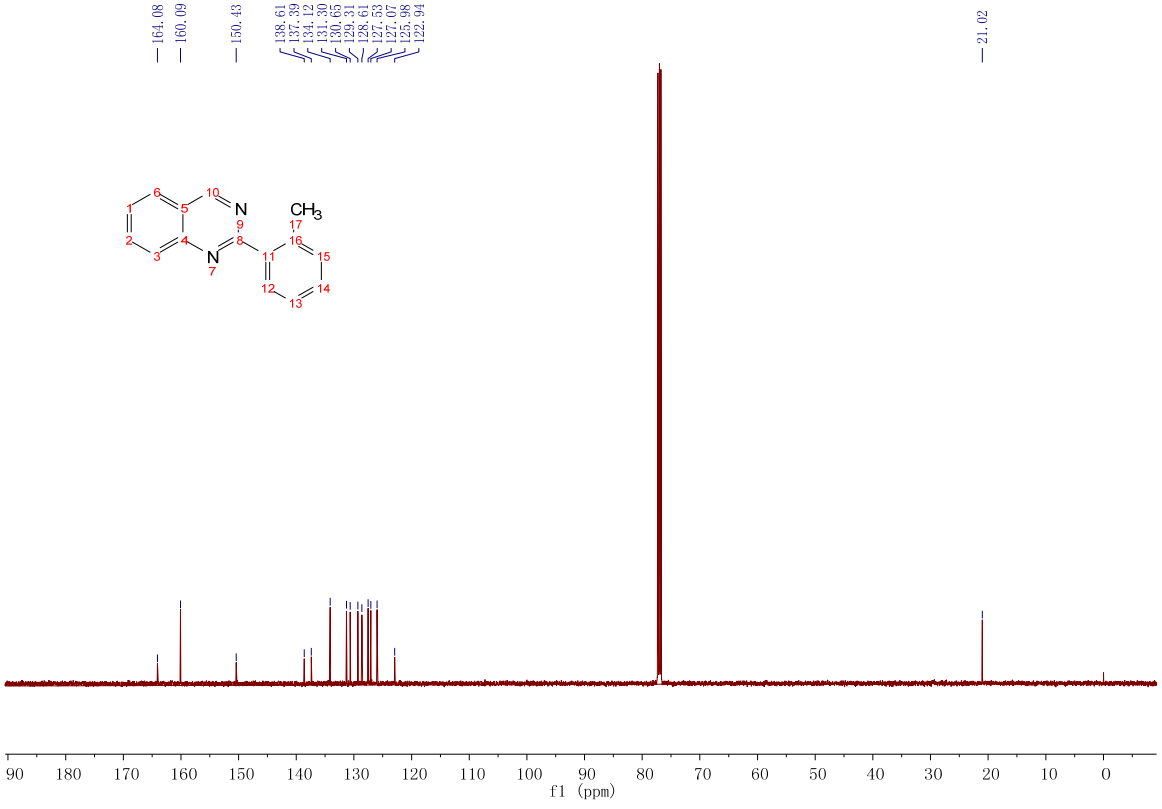


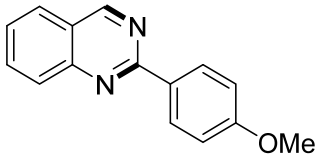
(**3ad**)

^{1}H NMR



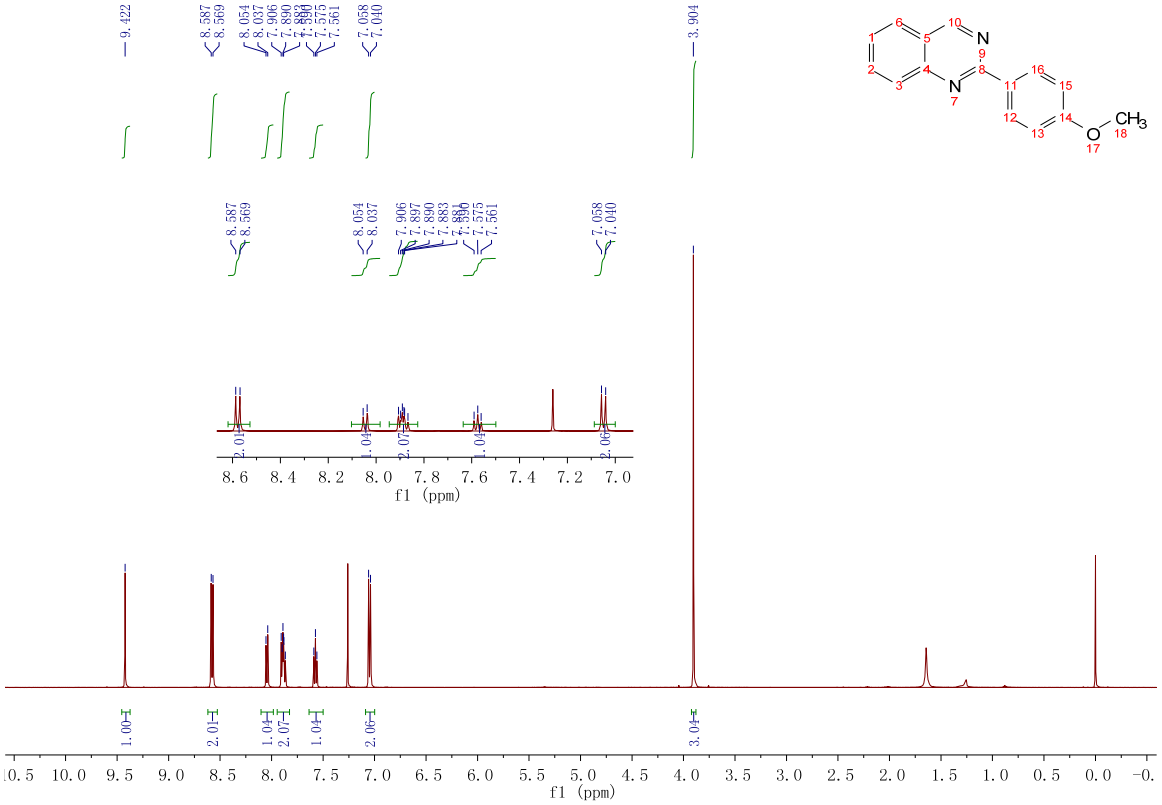
^{13}C NMR



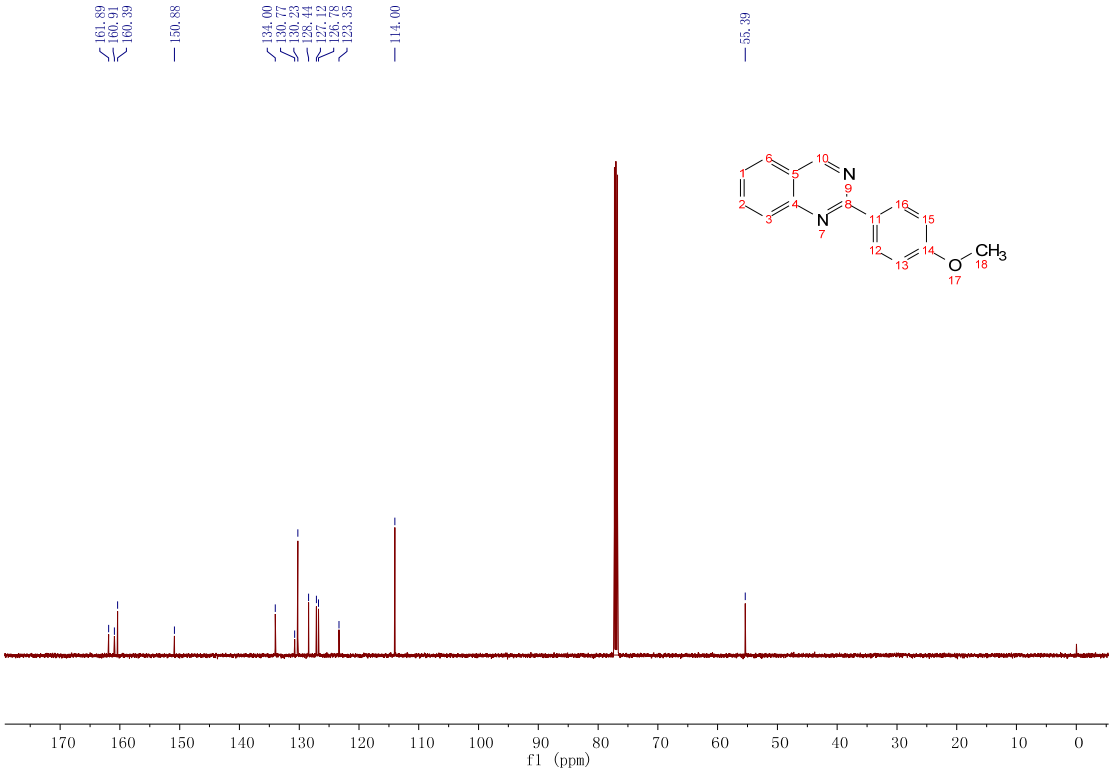


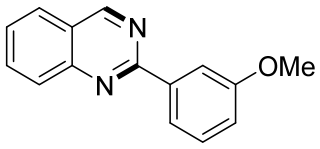
(3ae)

^{1}H NMR



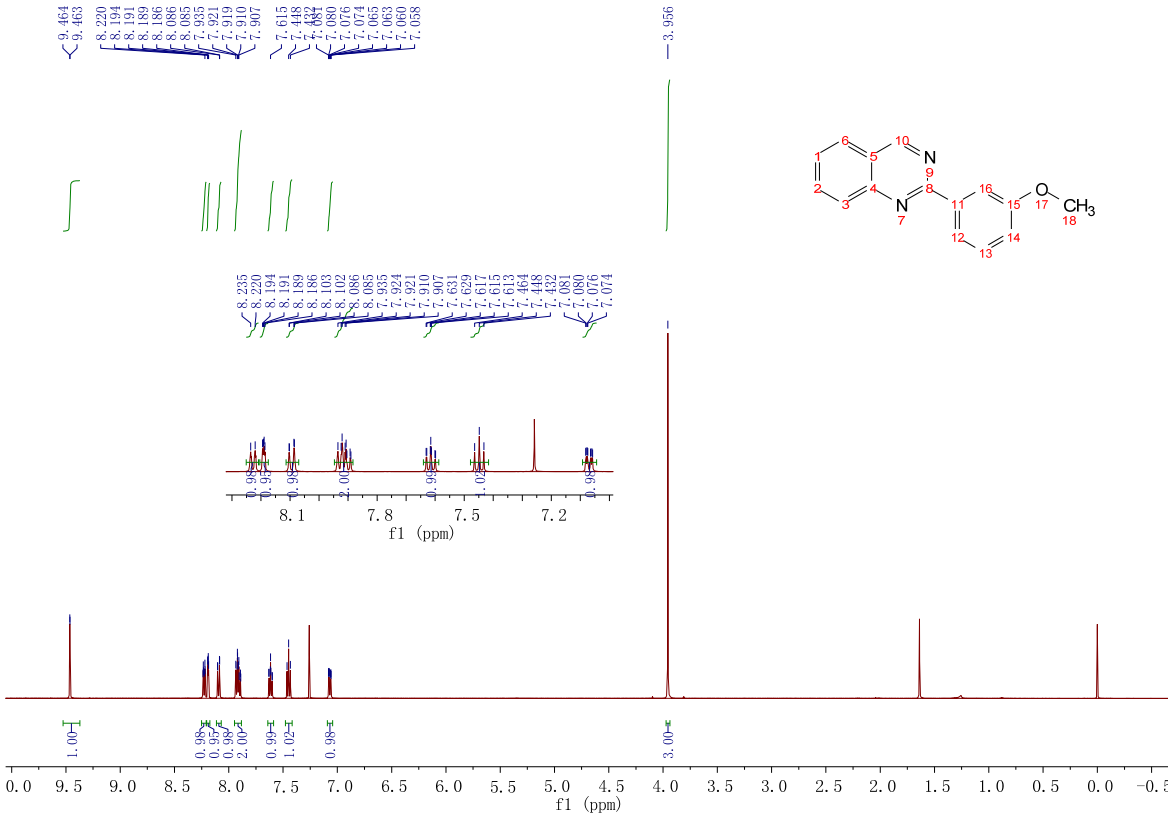
^{13}C NMR



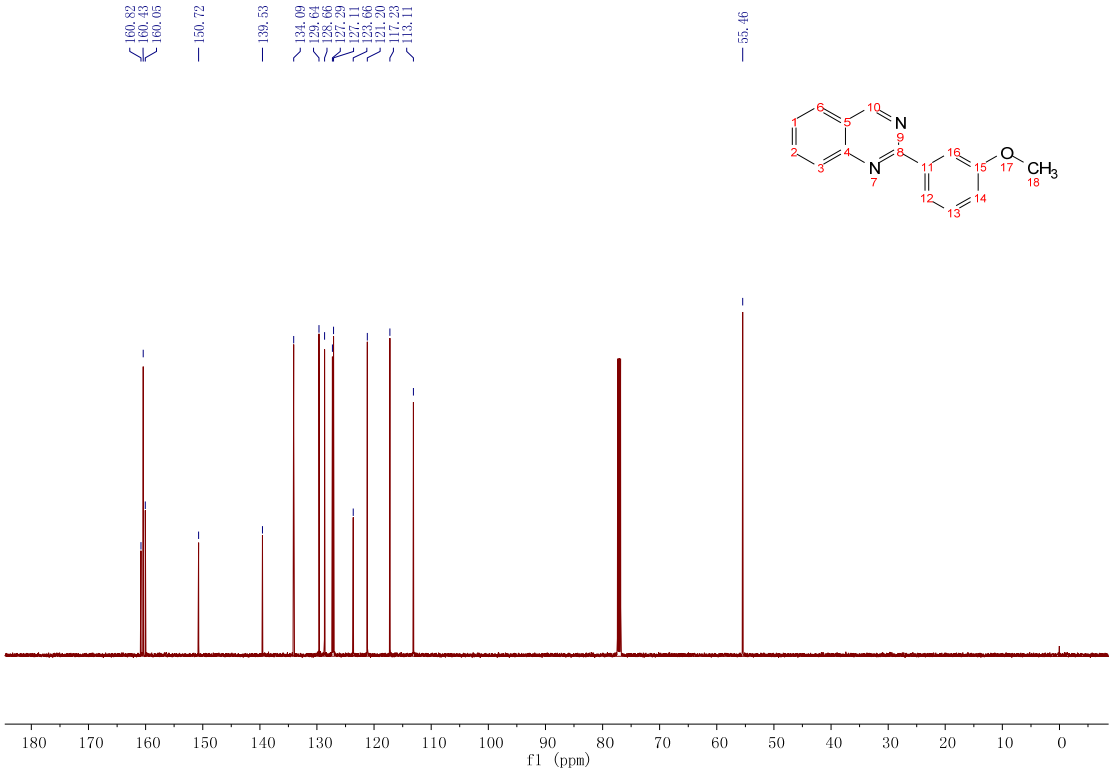


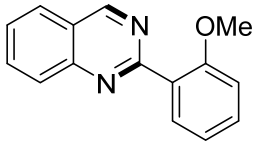
(**3af**)

^{1}H NMR



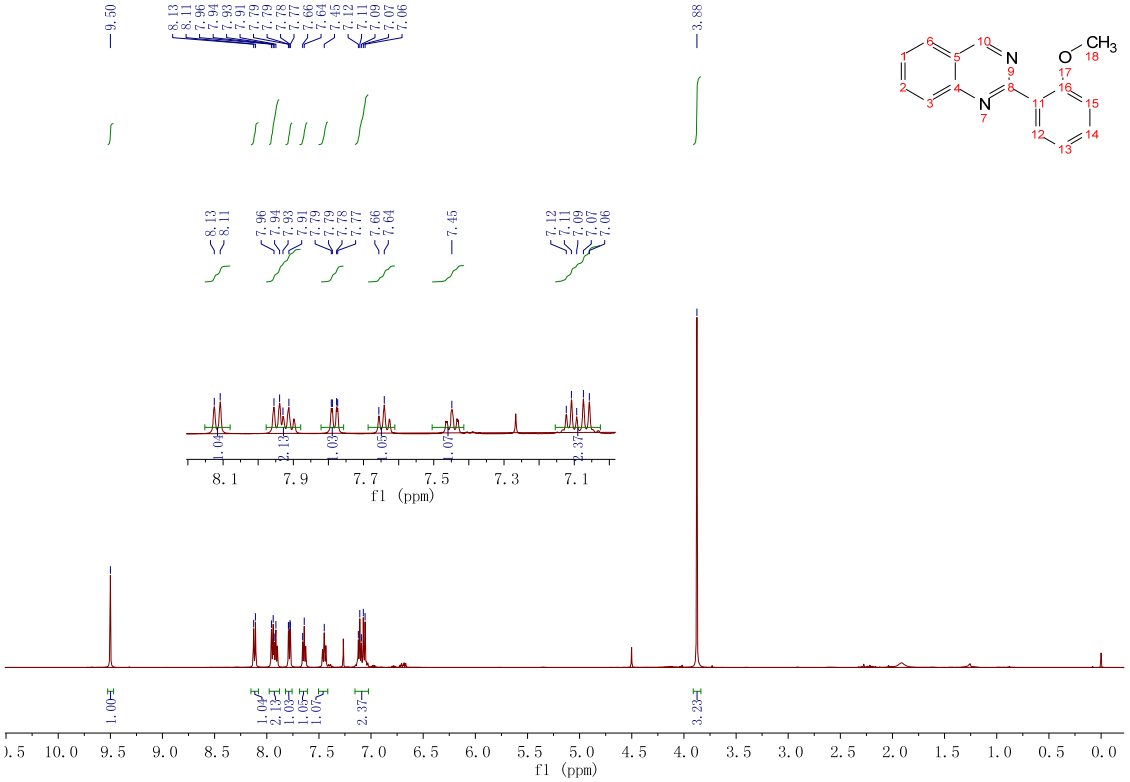
^{13}C NMR



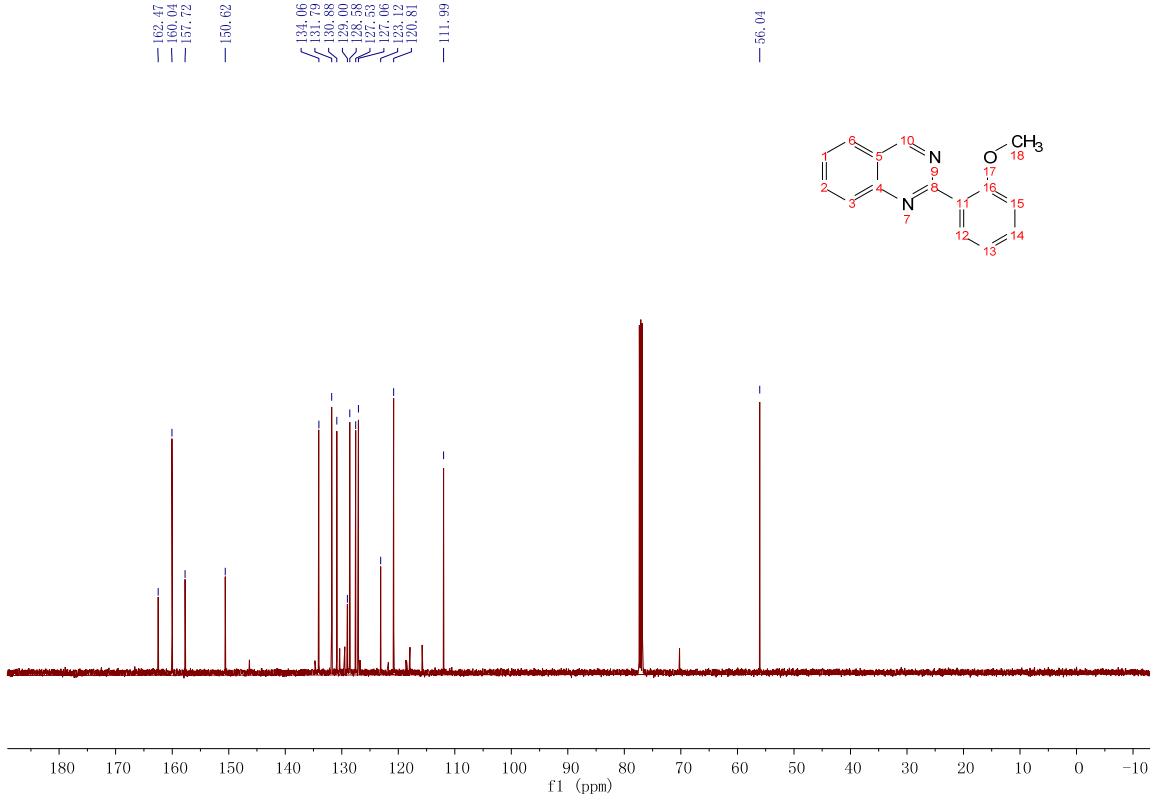


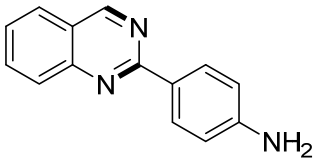
(3ag)

^{1}H NMR



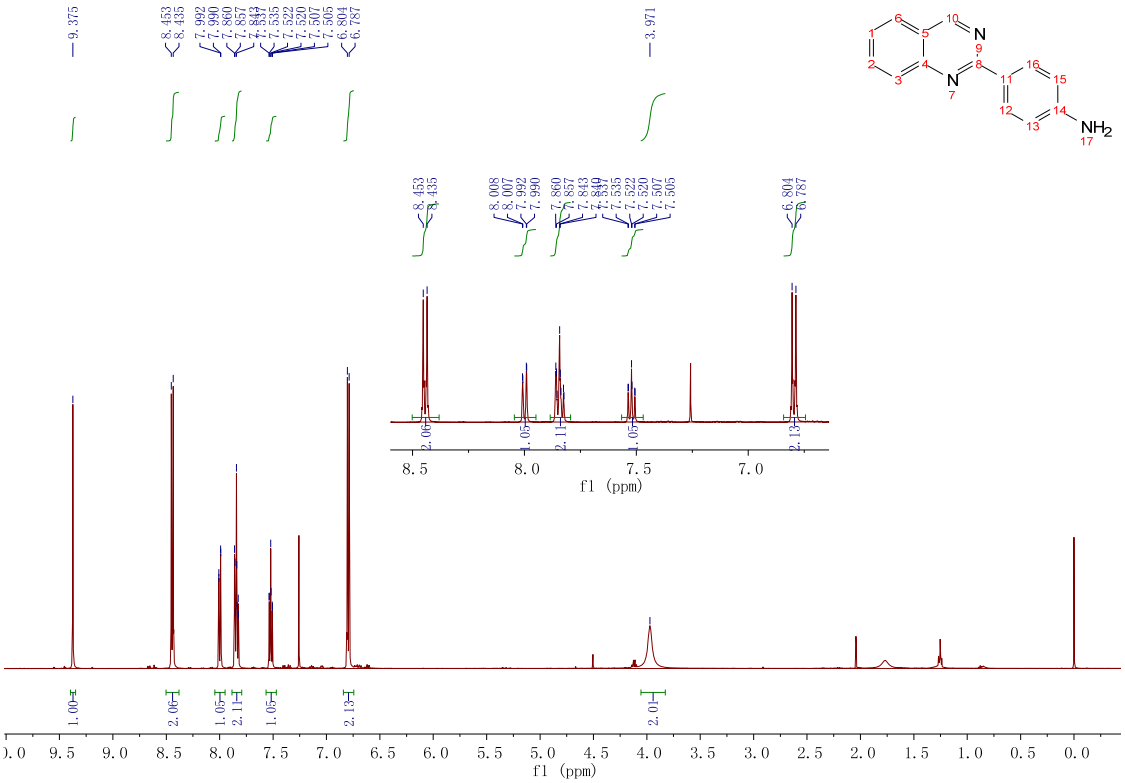
^{13}C NMR



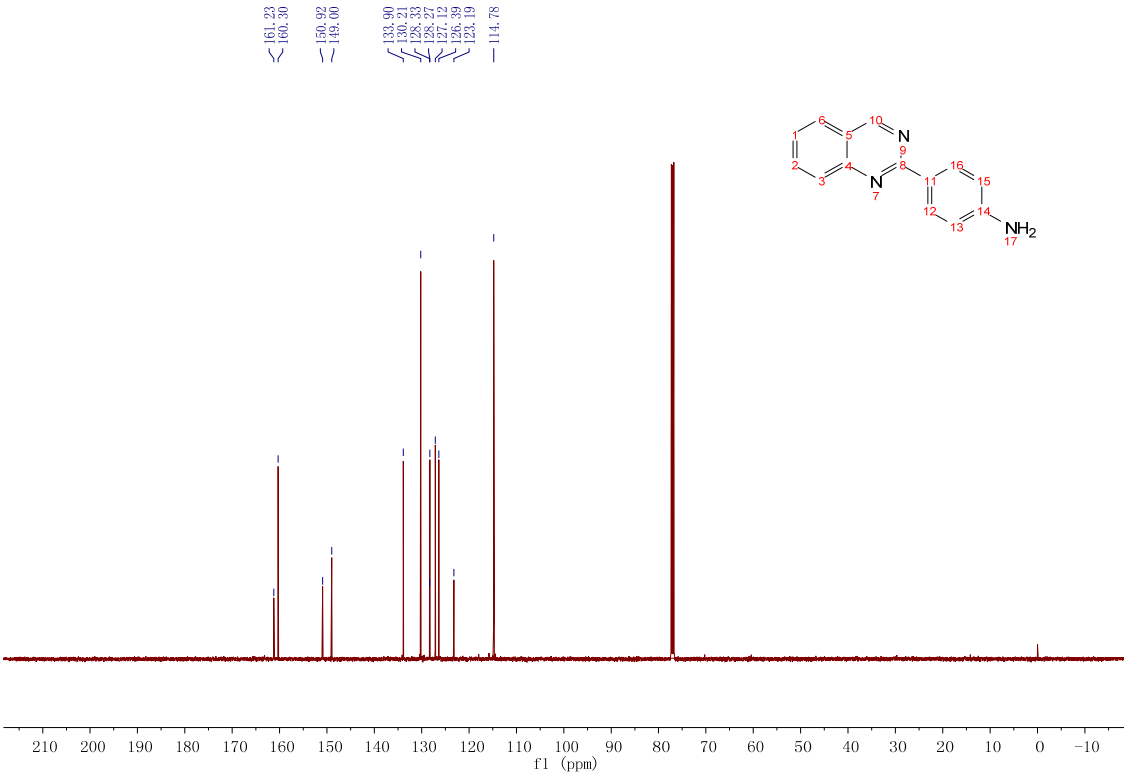


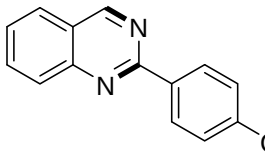
(3ah)

^{1}H NMR



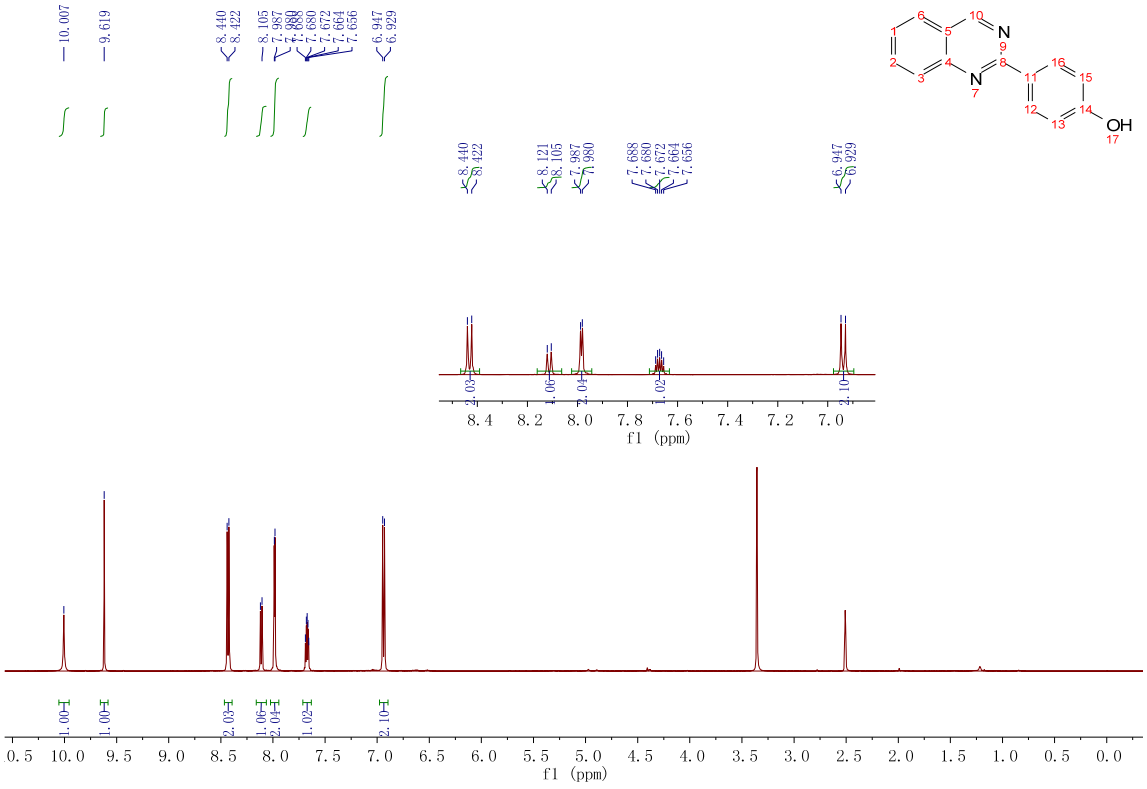
^{13}C NMR



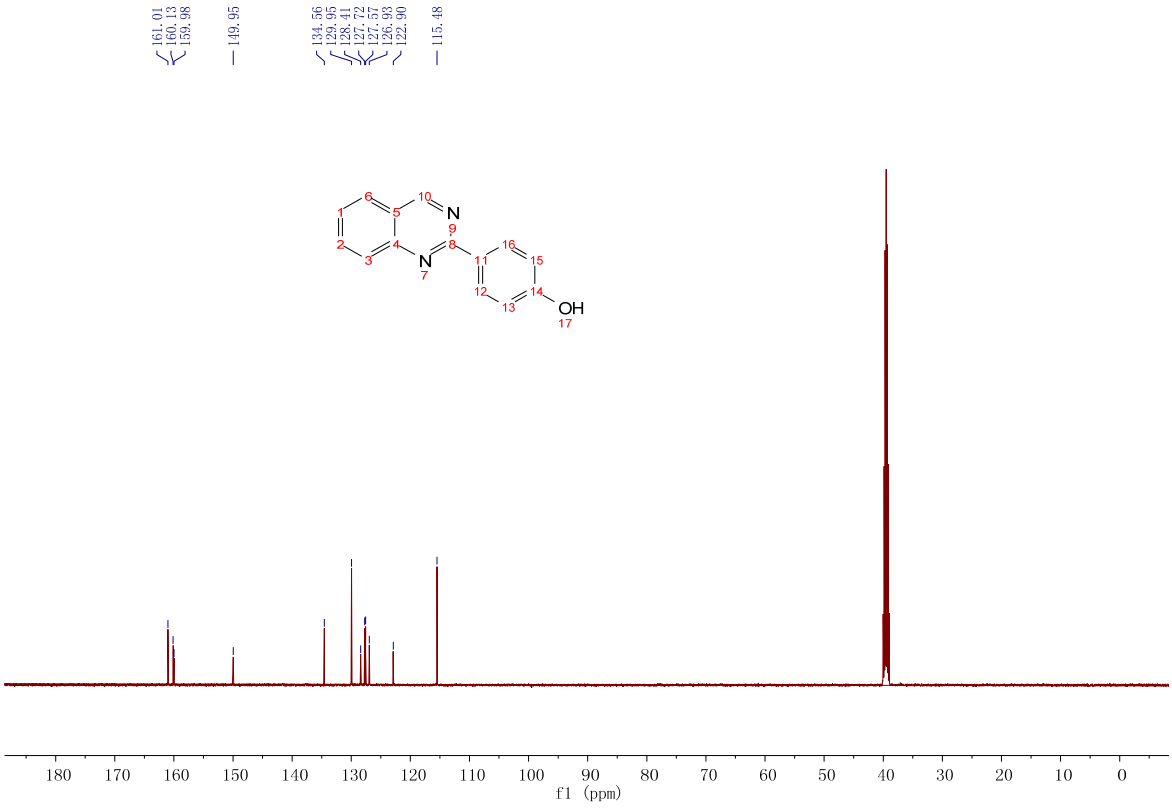


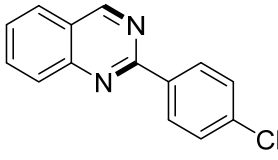
(3ai)

^{1}H NMR



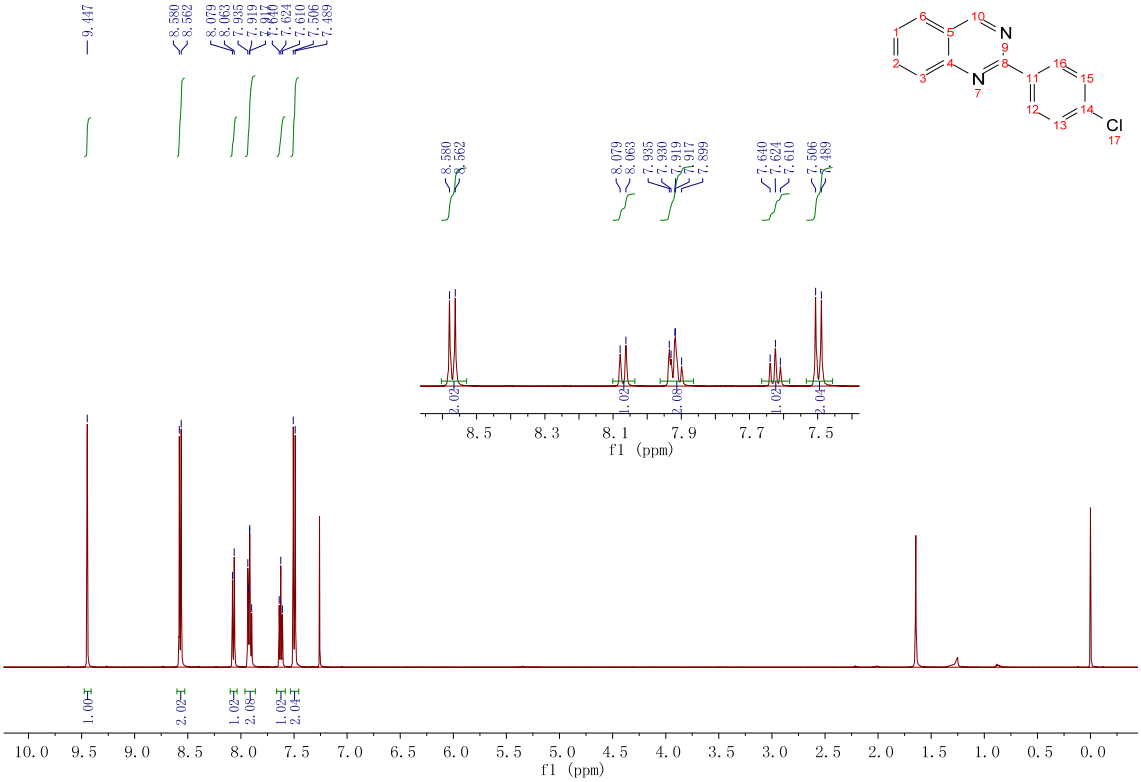
^{13}C NMR



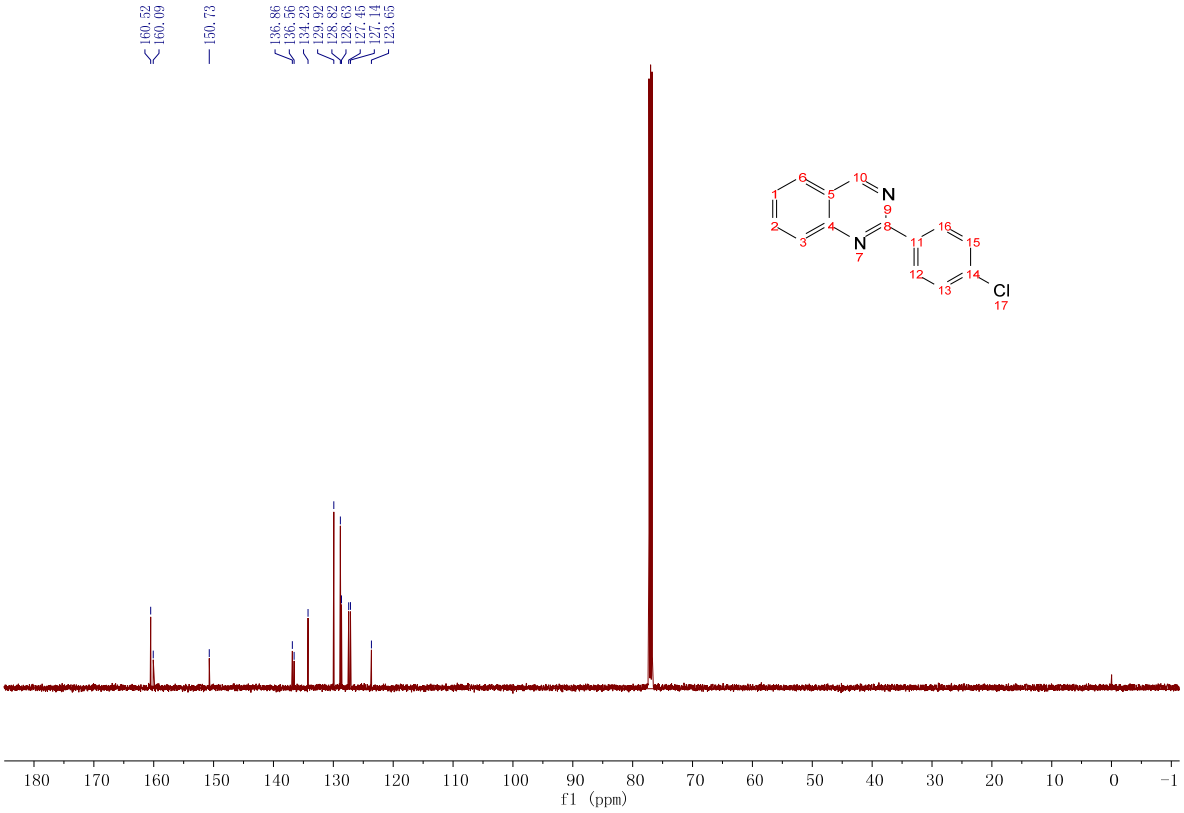


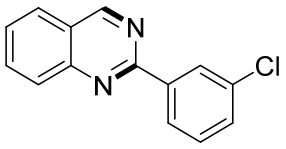
(3aj)

^{1}H NMR



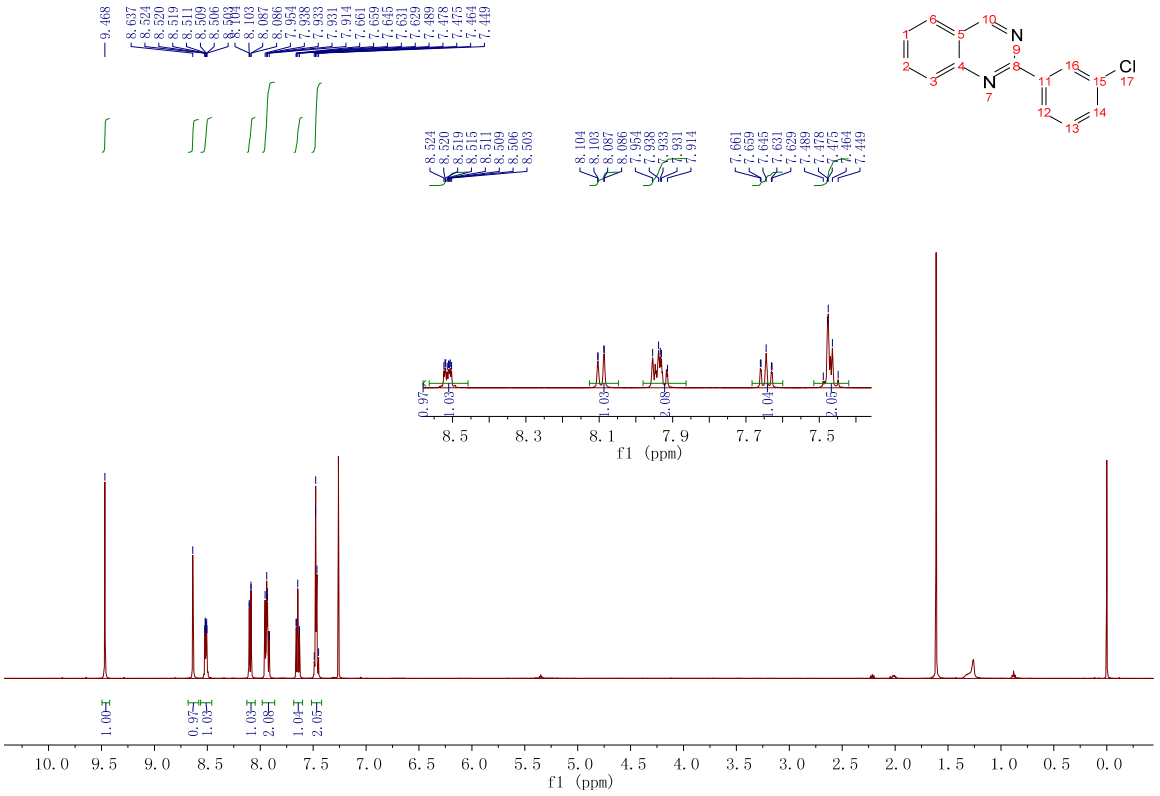
^{13}C NMR



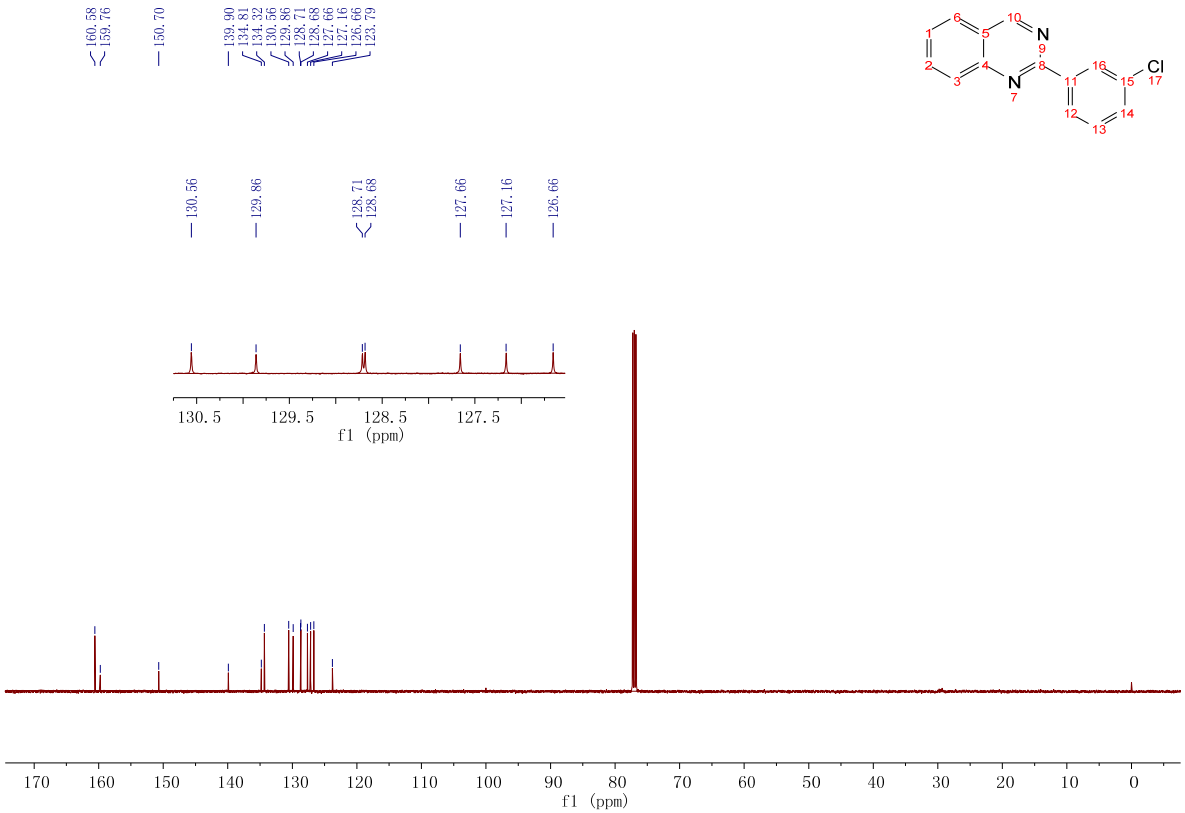


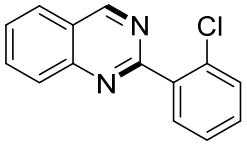
(3ak)

^{1}H NMR



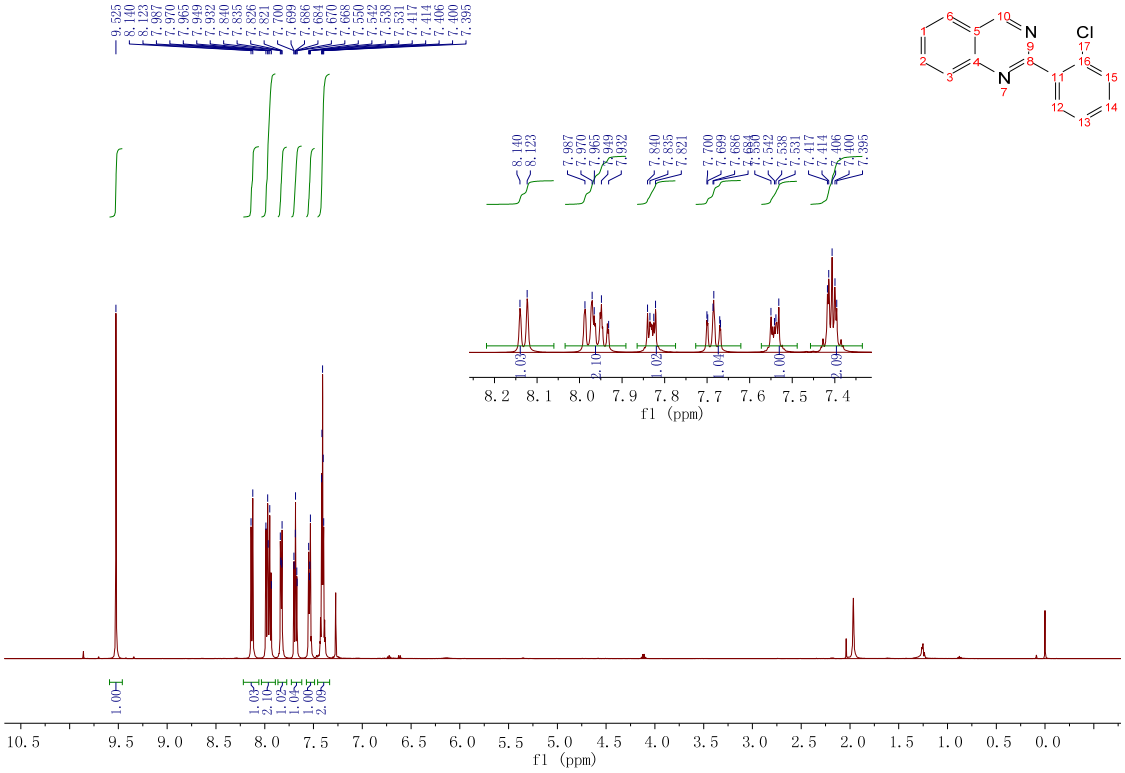
^{13}C NMR



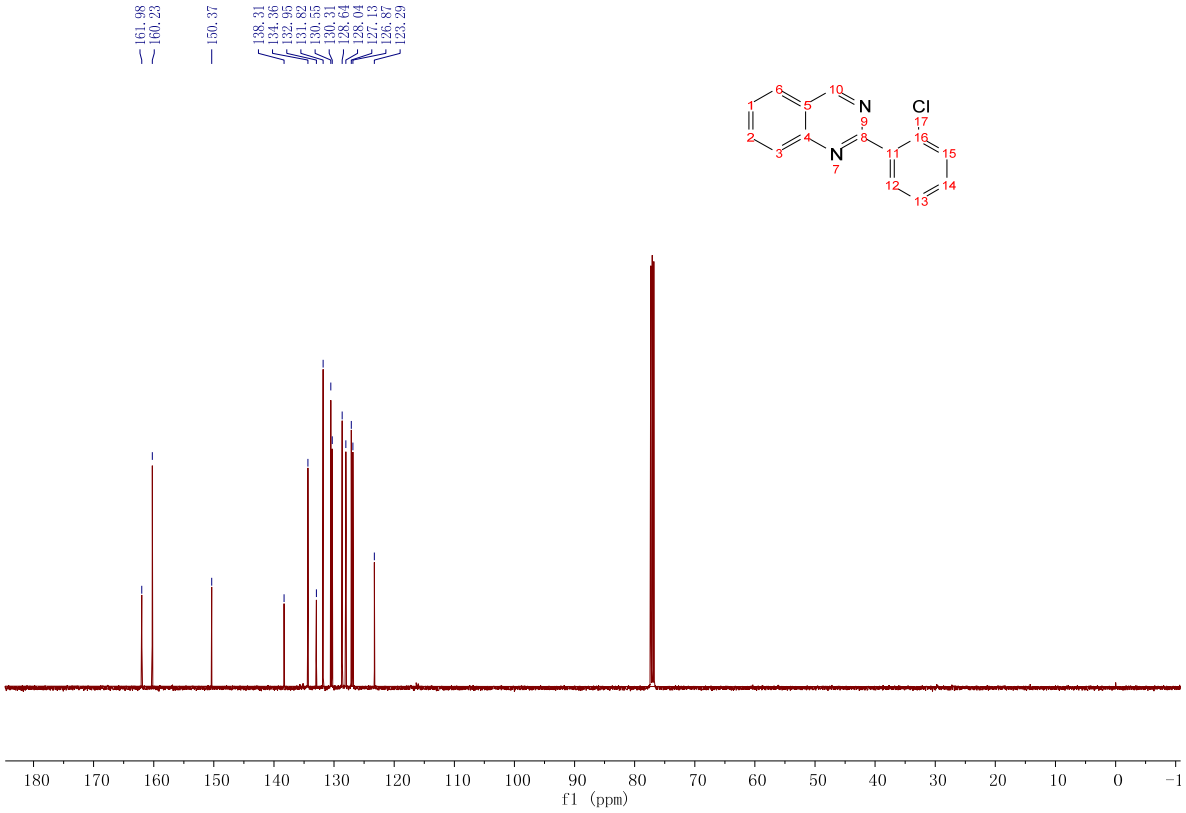


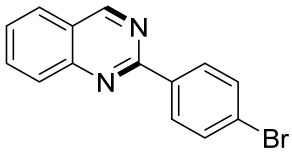
(3al)

^{1}H NMR



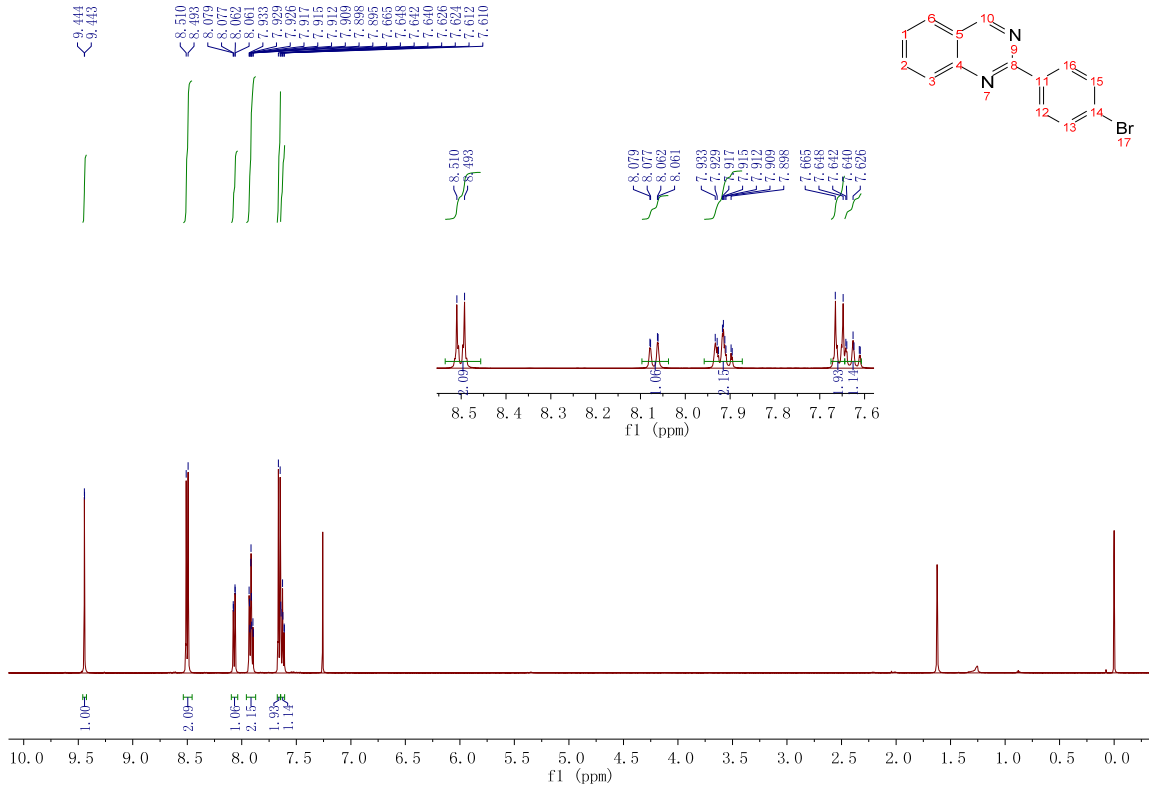
^{13}C NMR



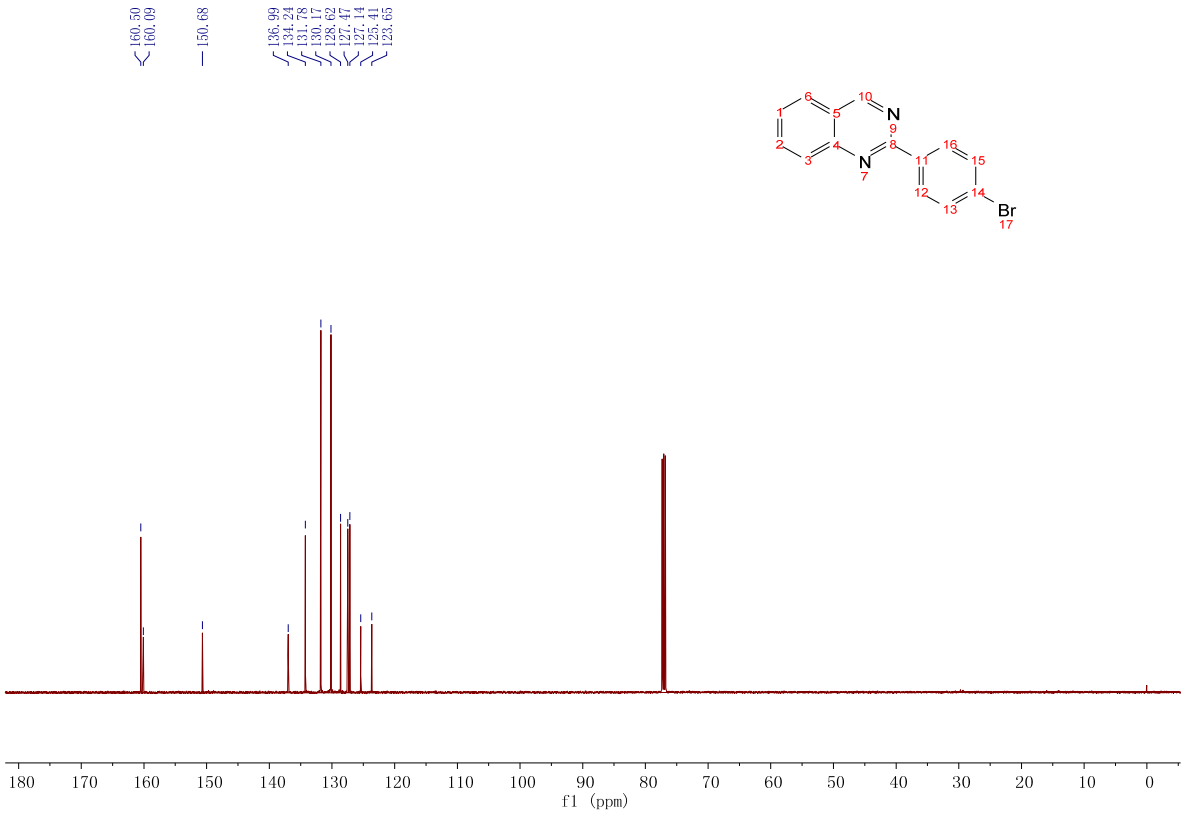


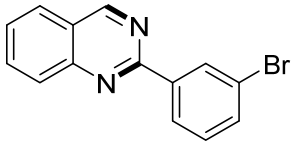
(3am)

^{1}H NMR



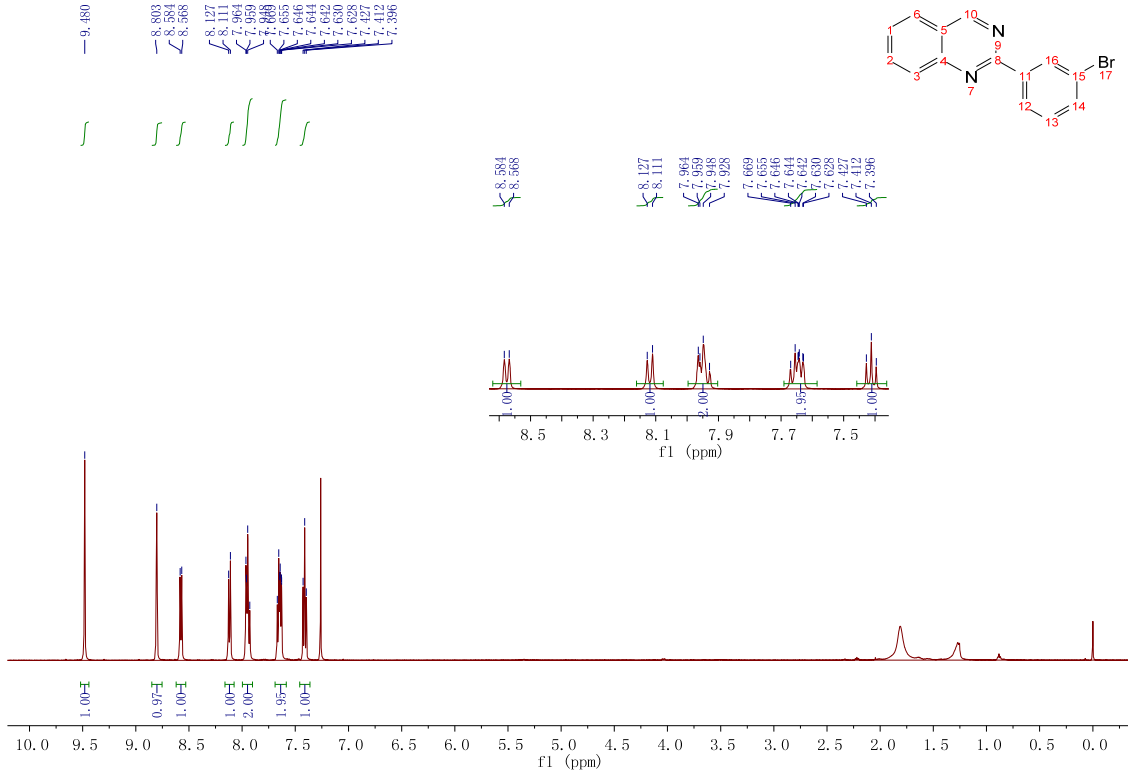
^{13}C NMR



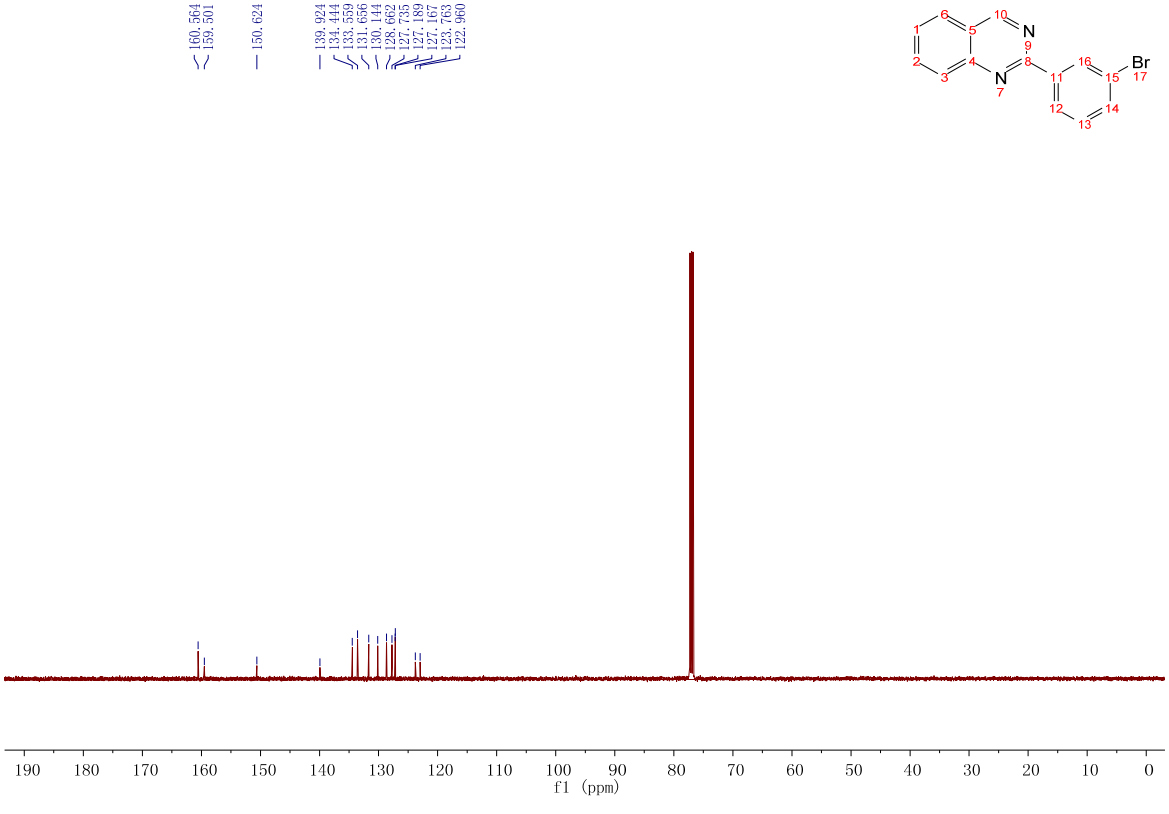


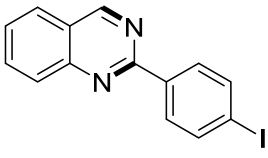
(**3an**)

^{1}H NMR



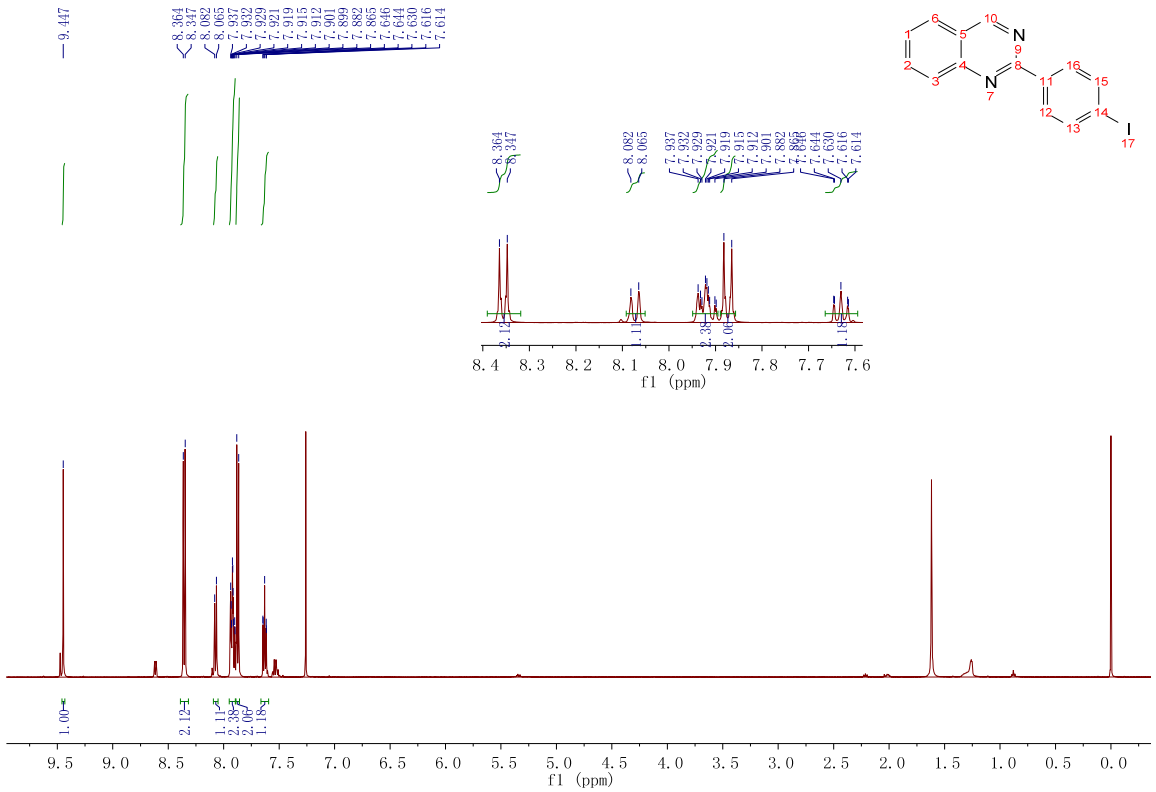
^{13}C NMR



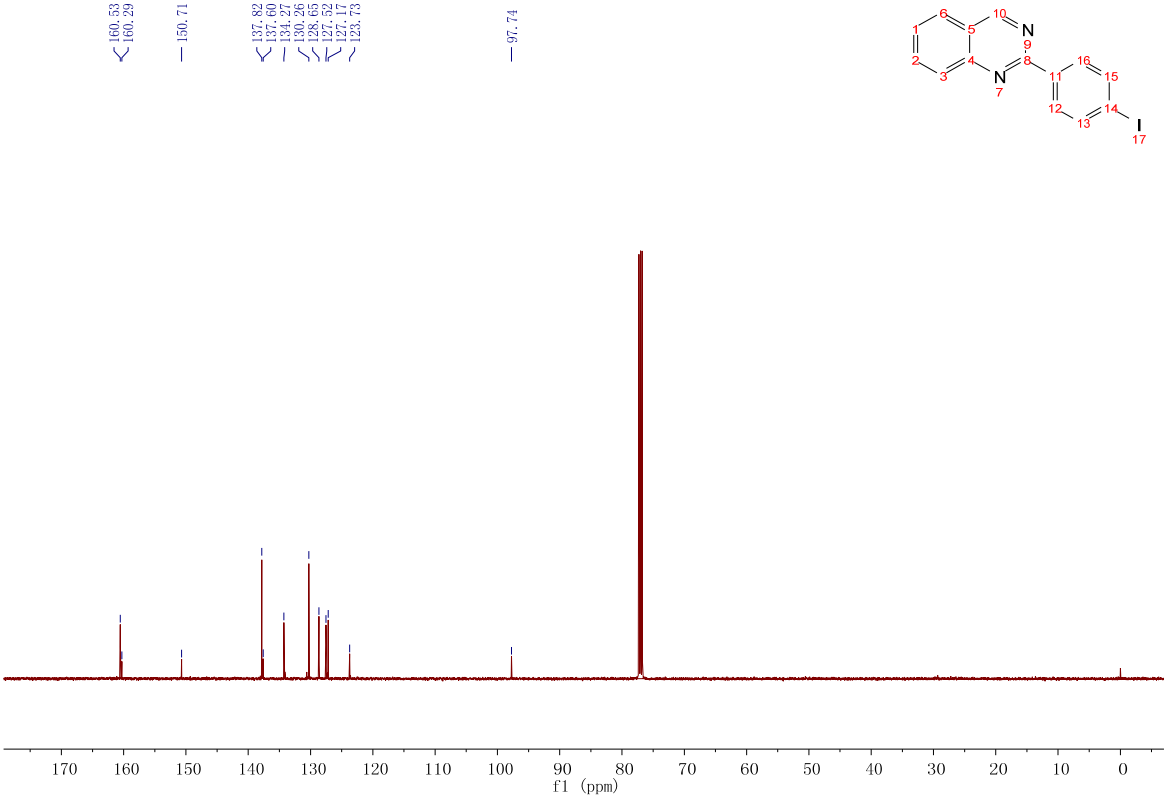


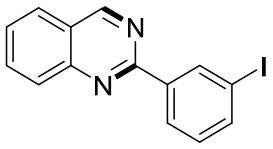
(3ao)

^{1}H NMR



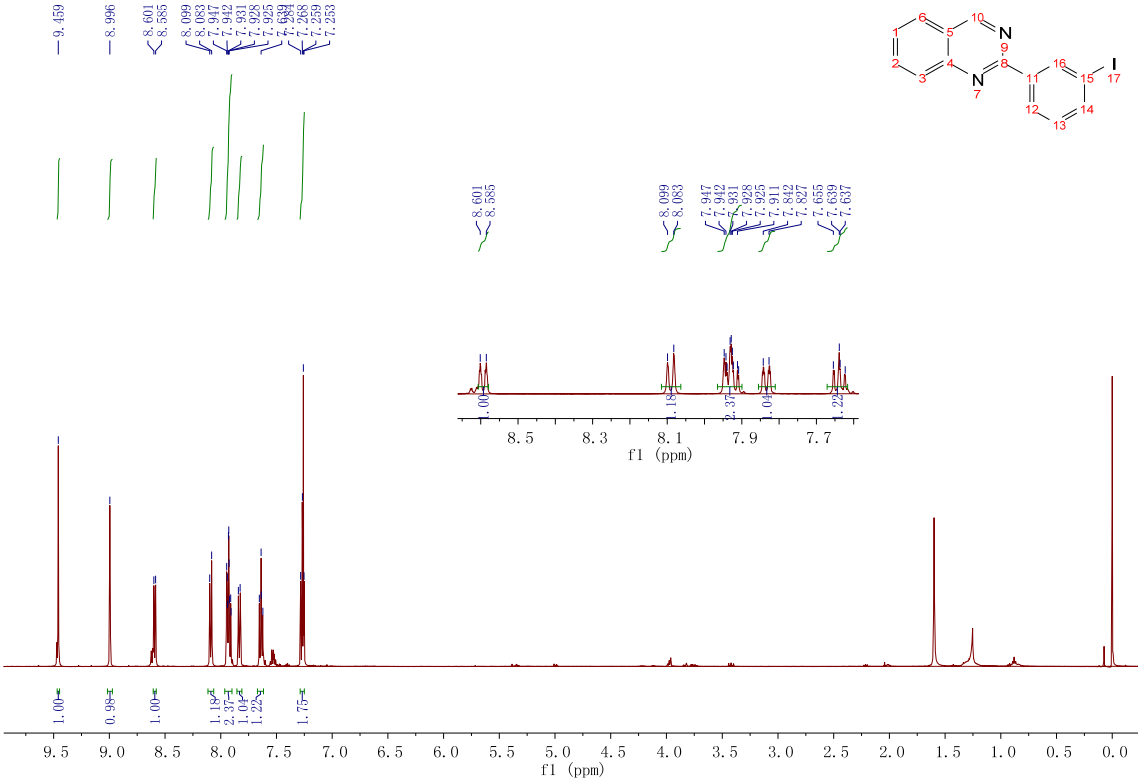
^{13}C NMR



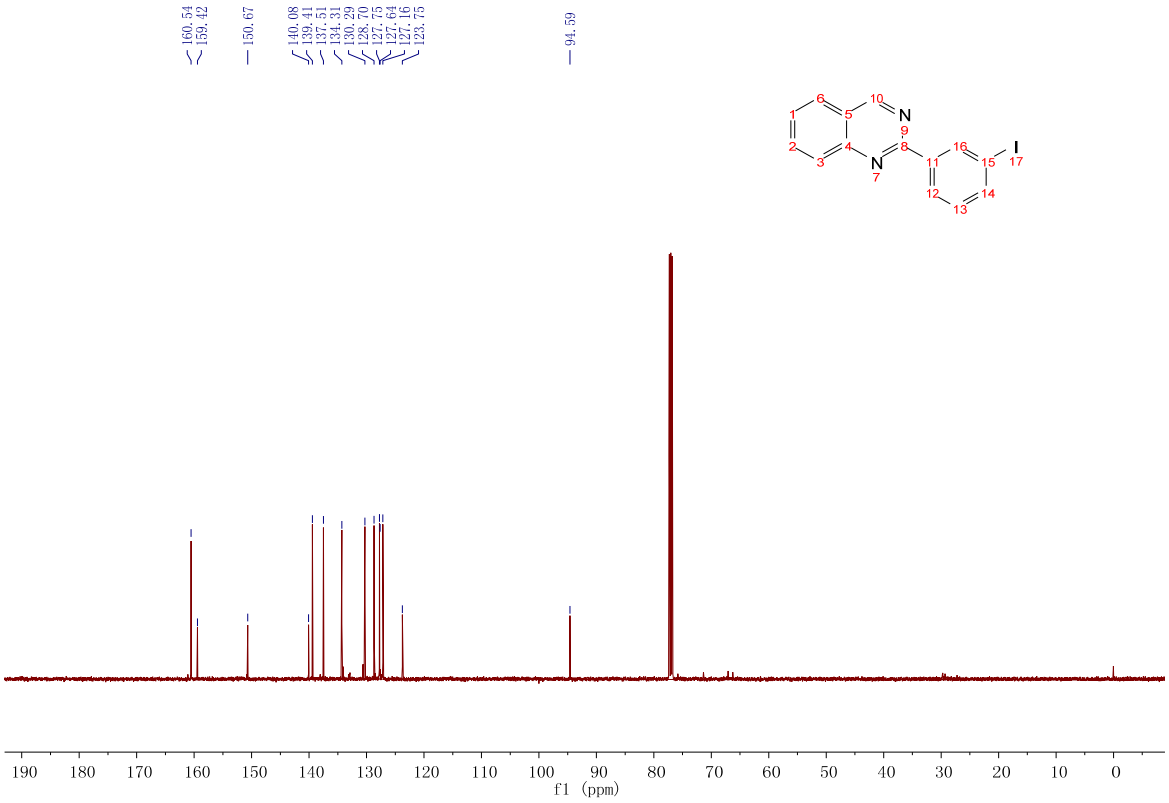


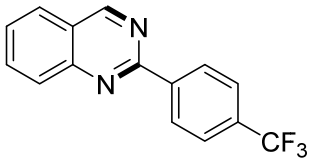
(**3ap**)

^{1}H NMR



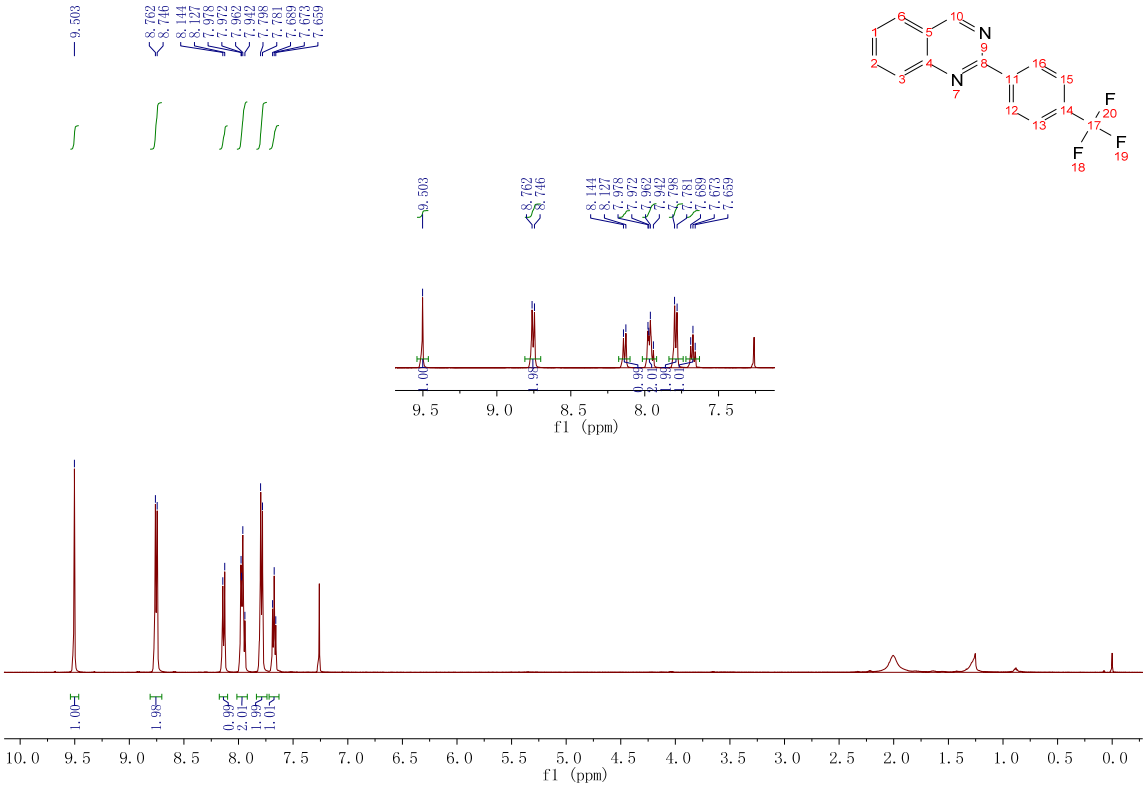
^{13}C NMR



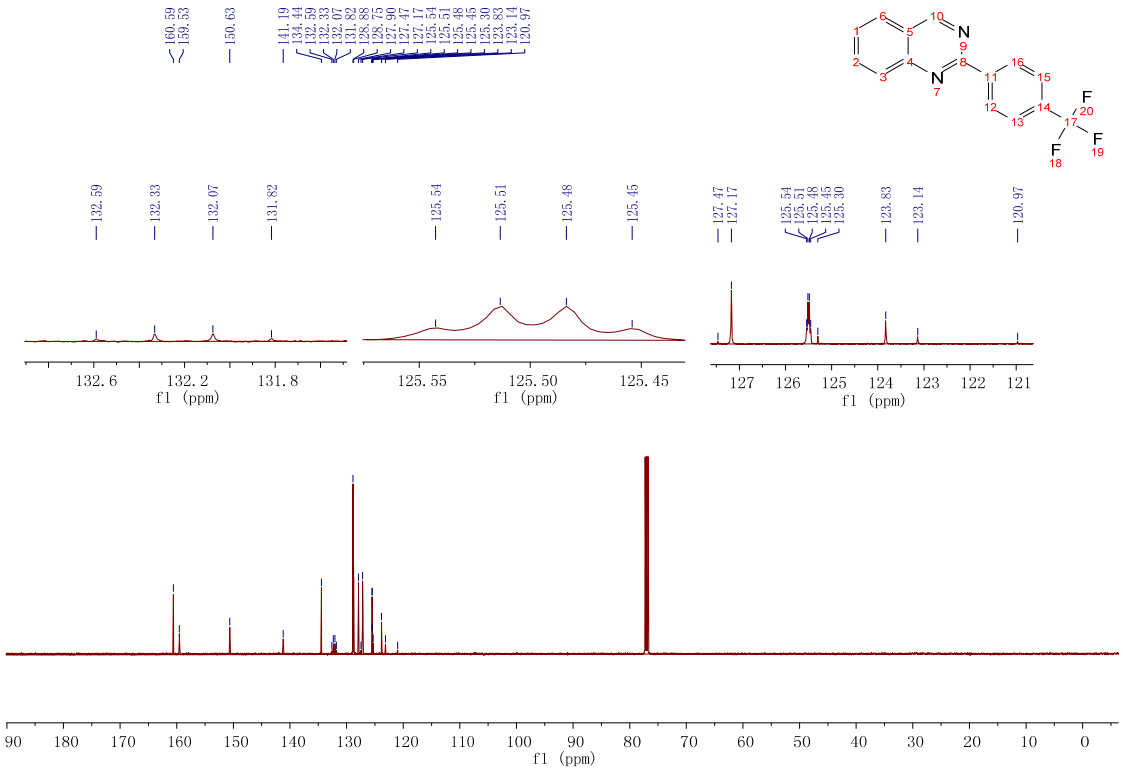


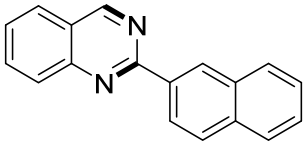
(3aq)

^{1}H NMR



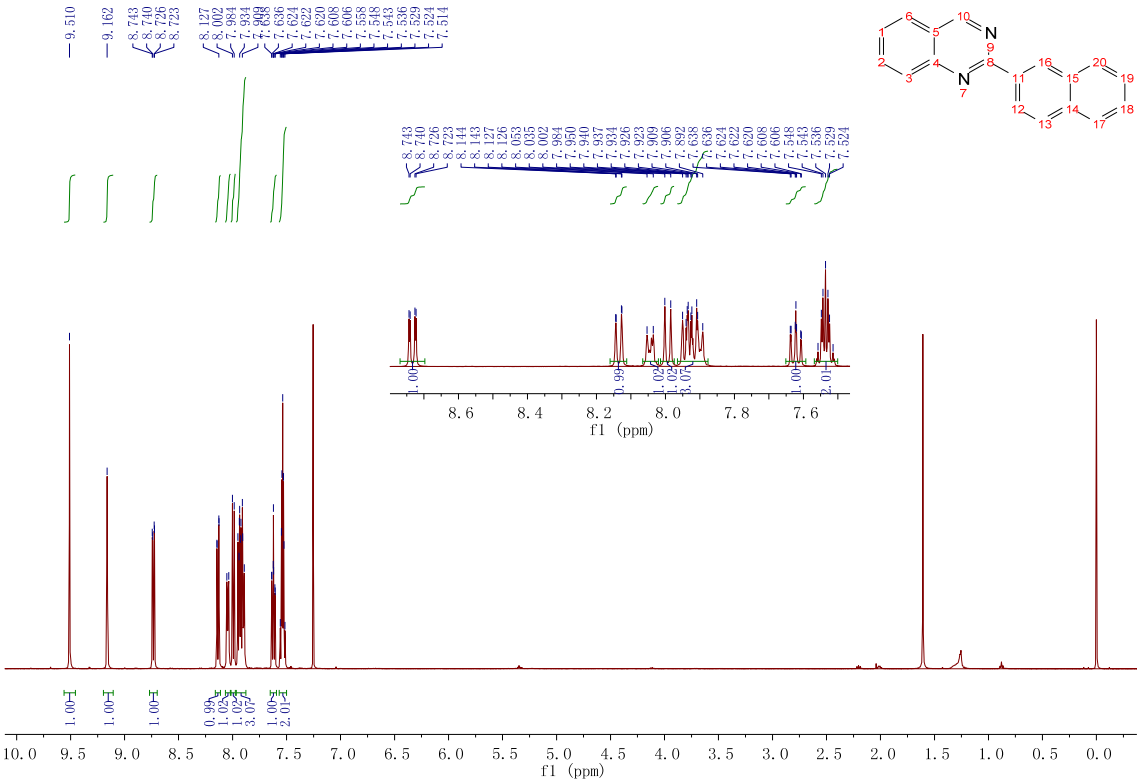
^{13}C NMR



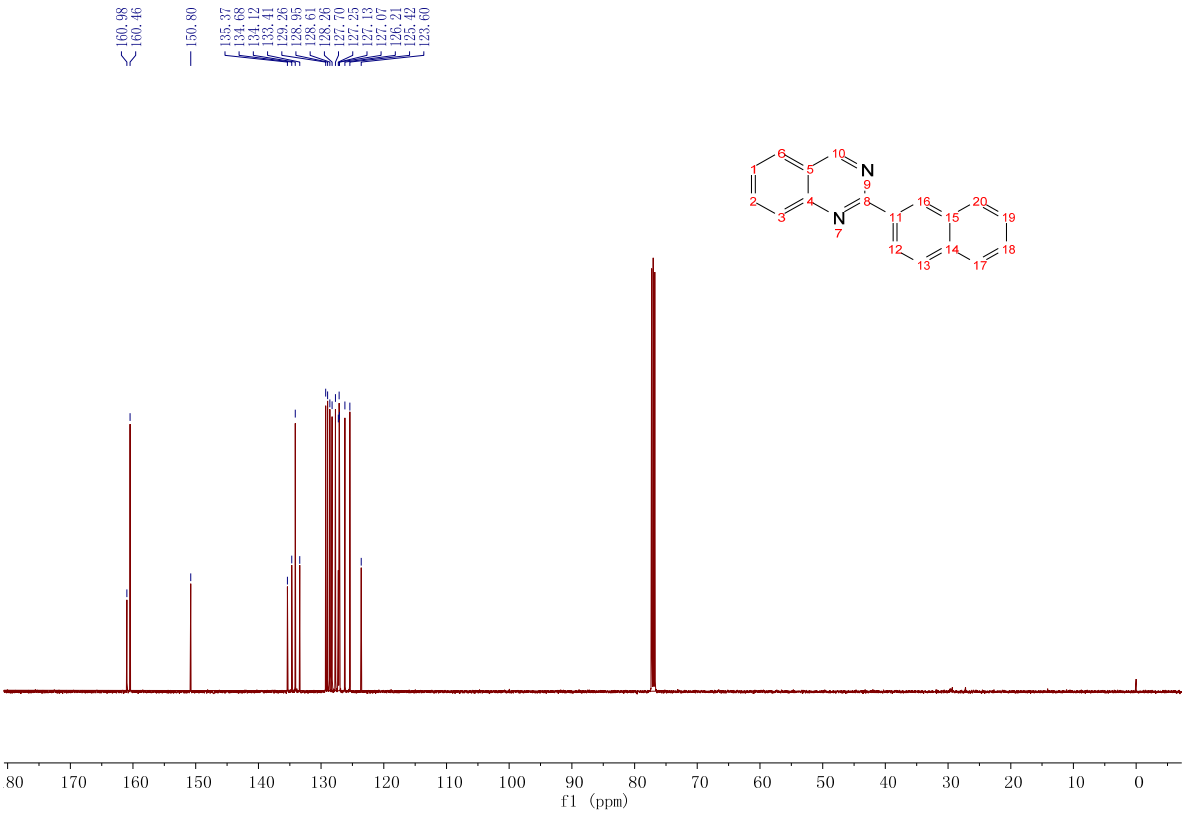


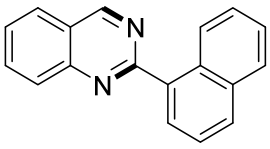
(3ar)

^{1}H NMR



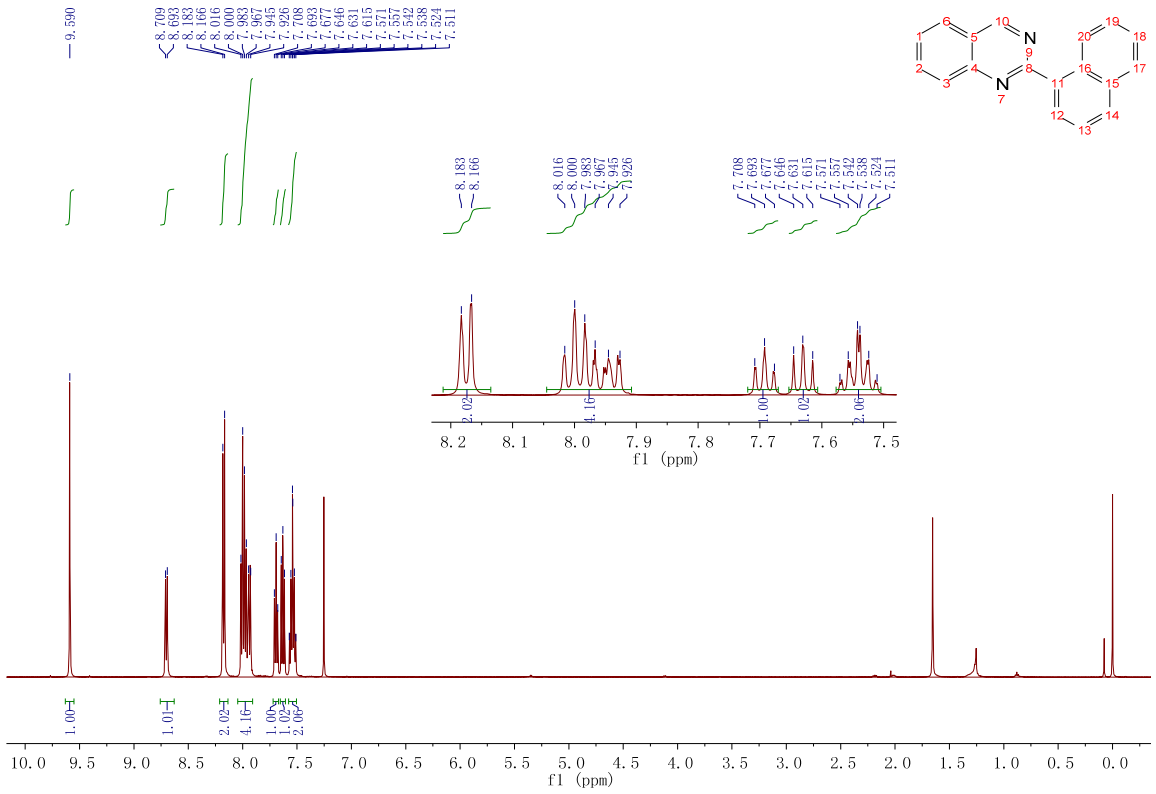
^{13}C NMR



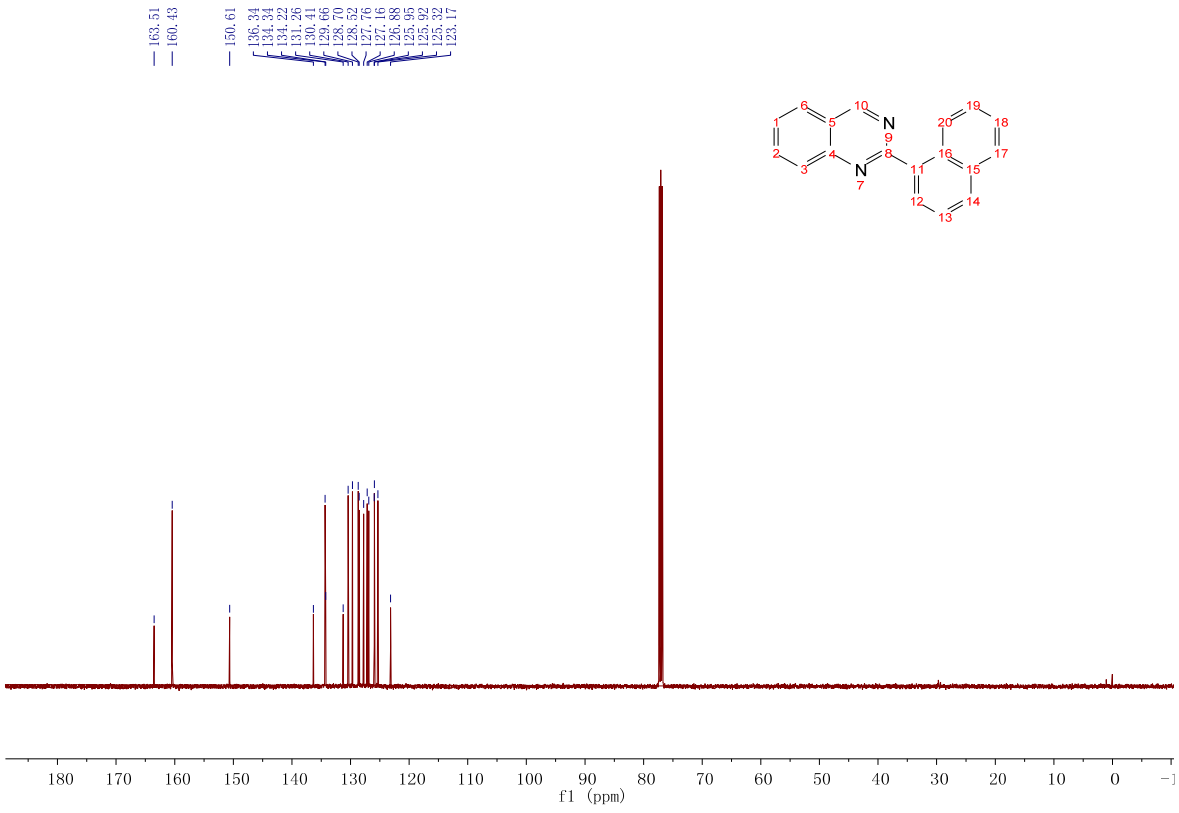


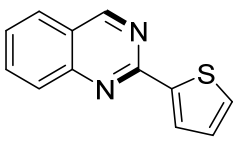
(**3as**)

^{1}H NMR



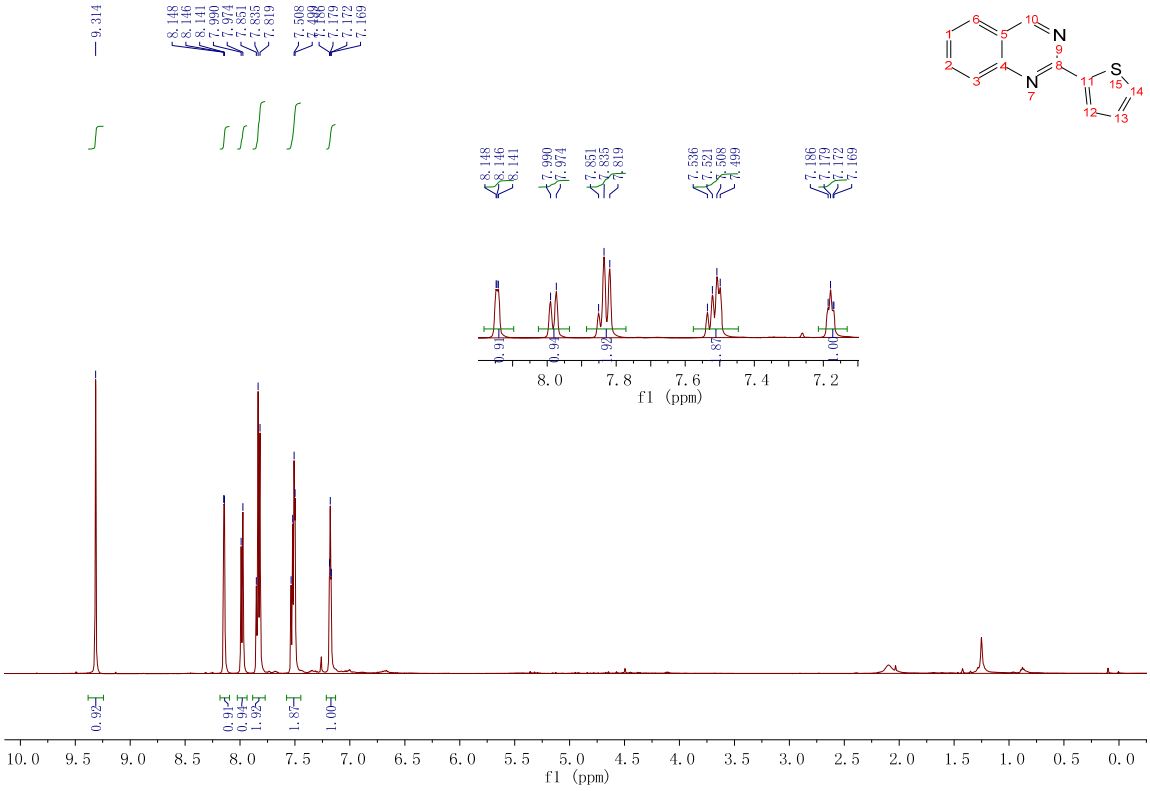
^{13}C NMR



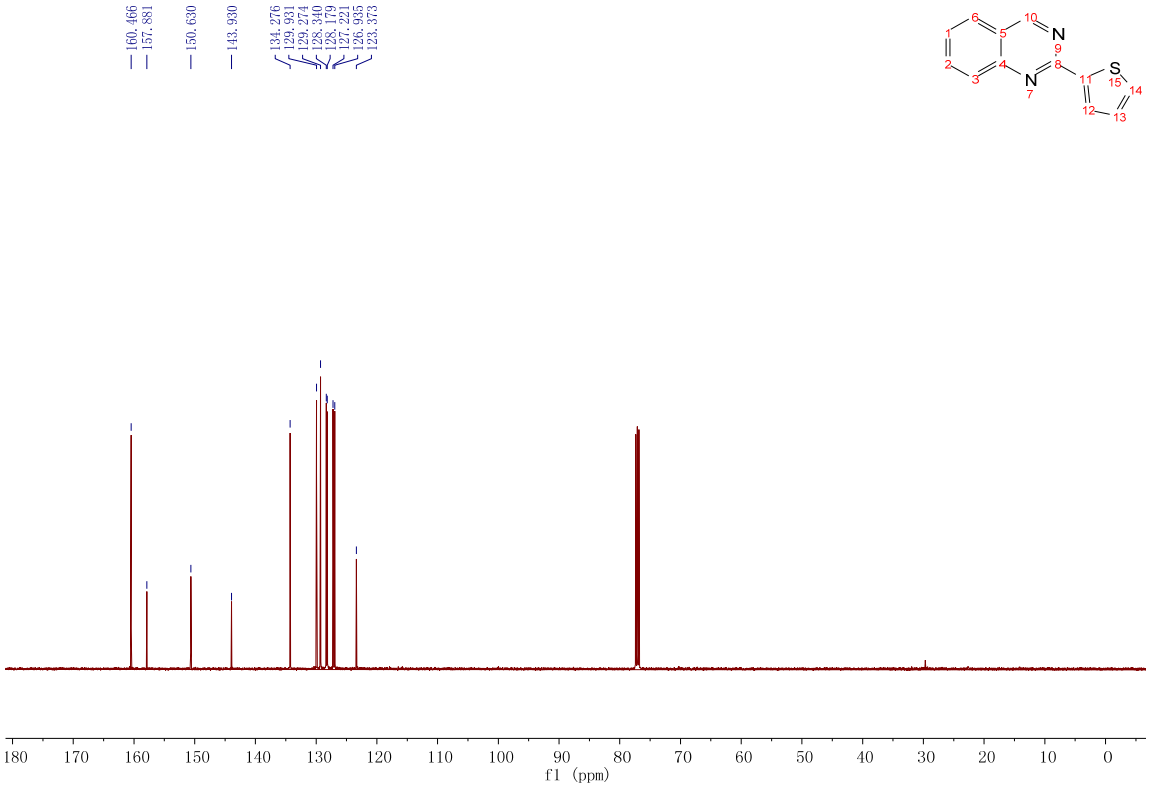


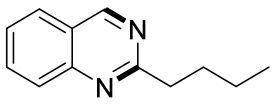
(3at)

^{1}H NMR



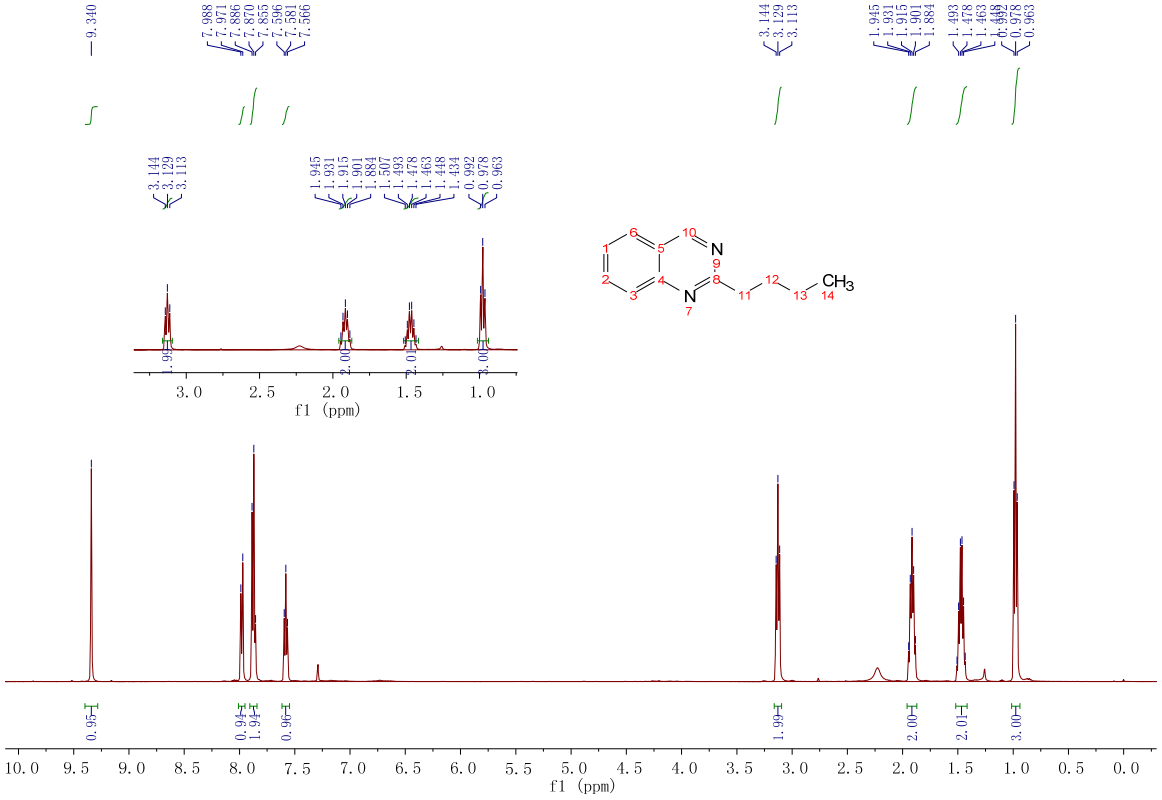
^{13}C NMR



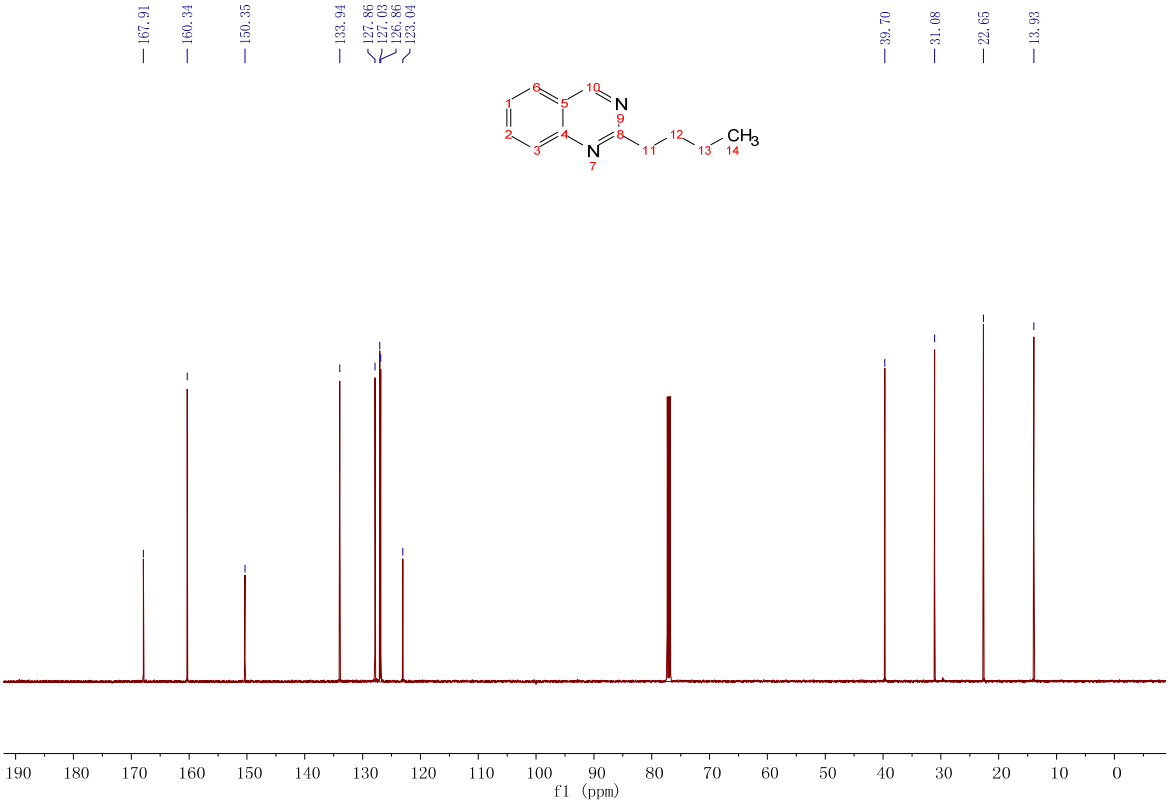


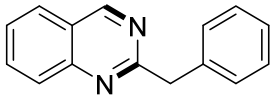
(**3au**)

^{1}H NMR



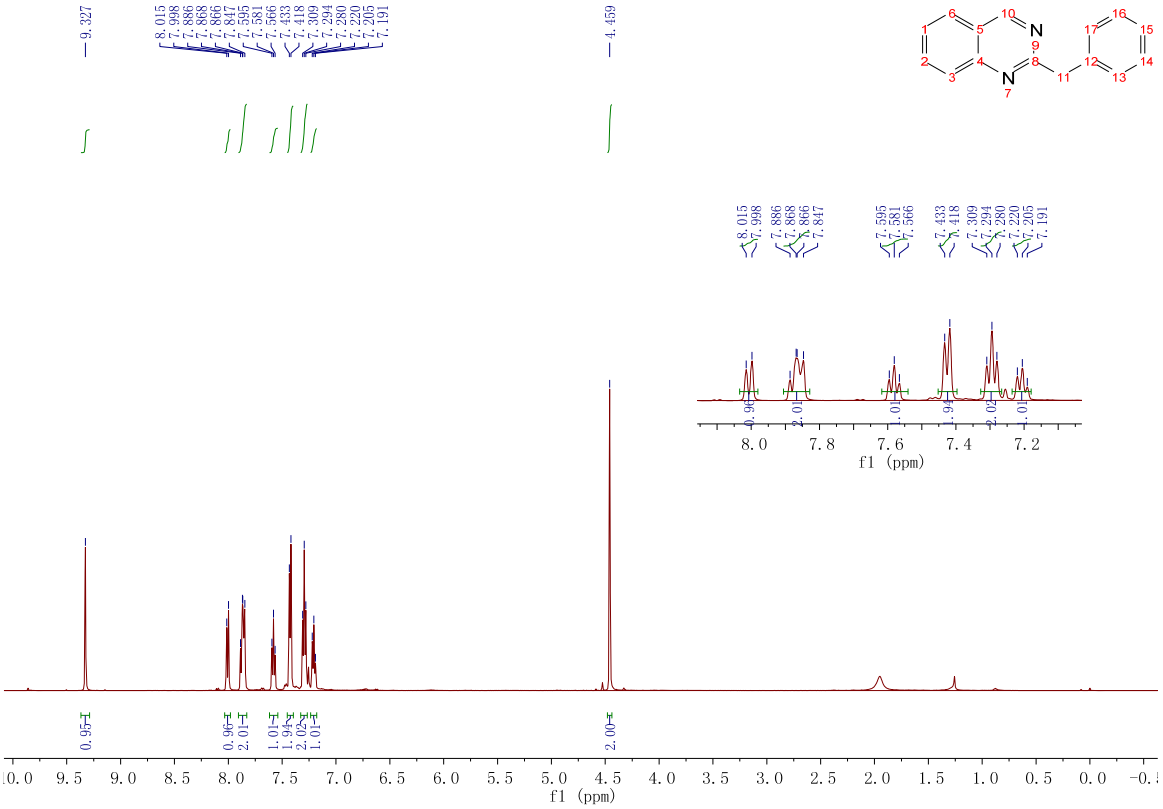
^{13}C NMR



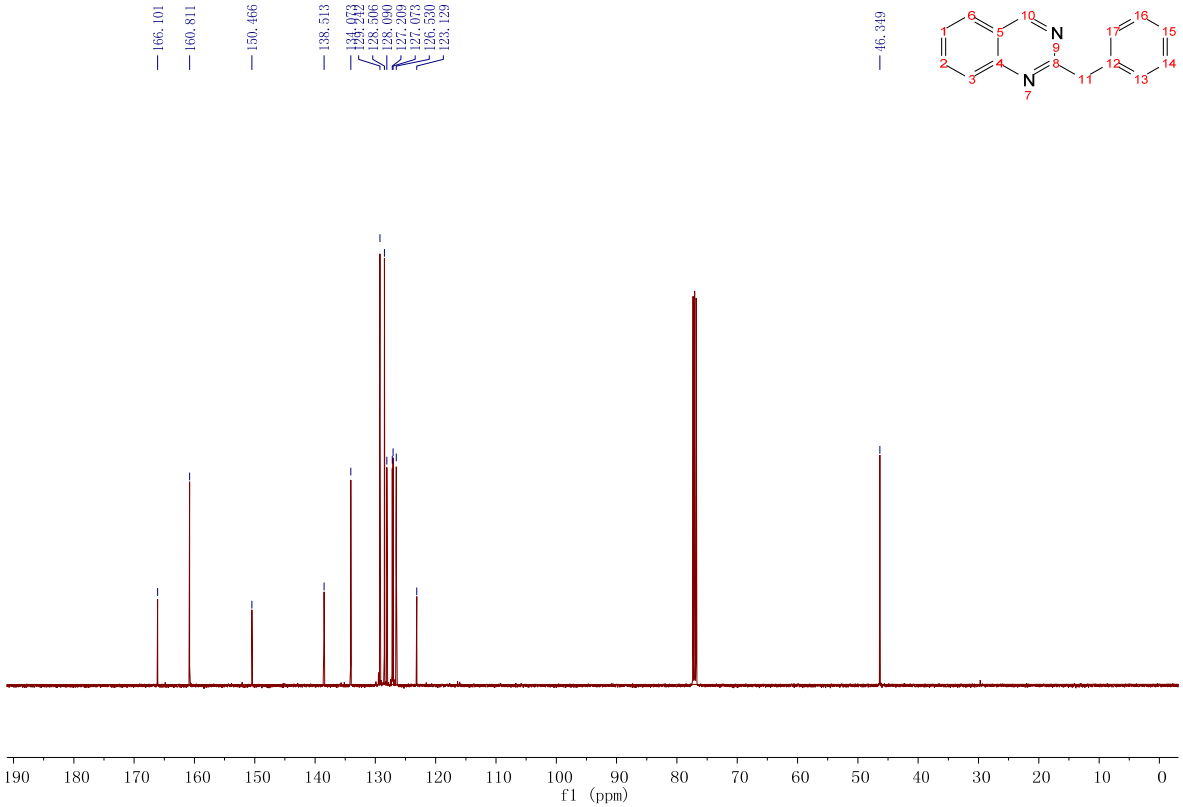


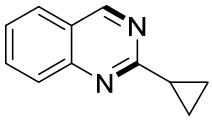
(**3av**)

^{1}H NMR



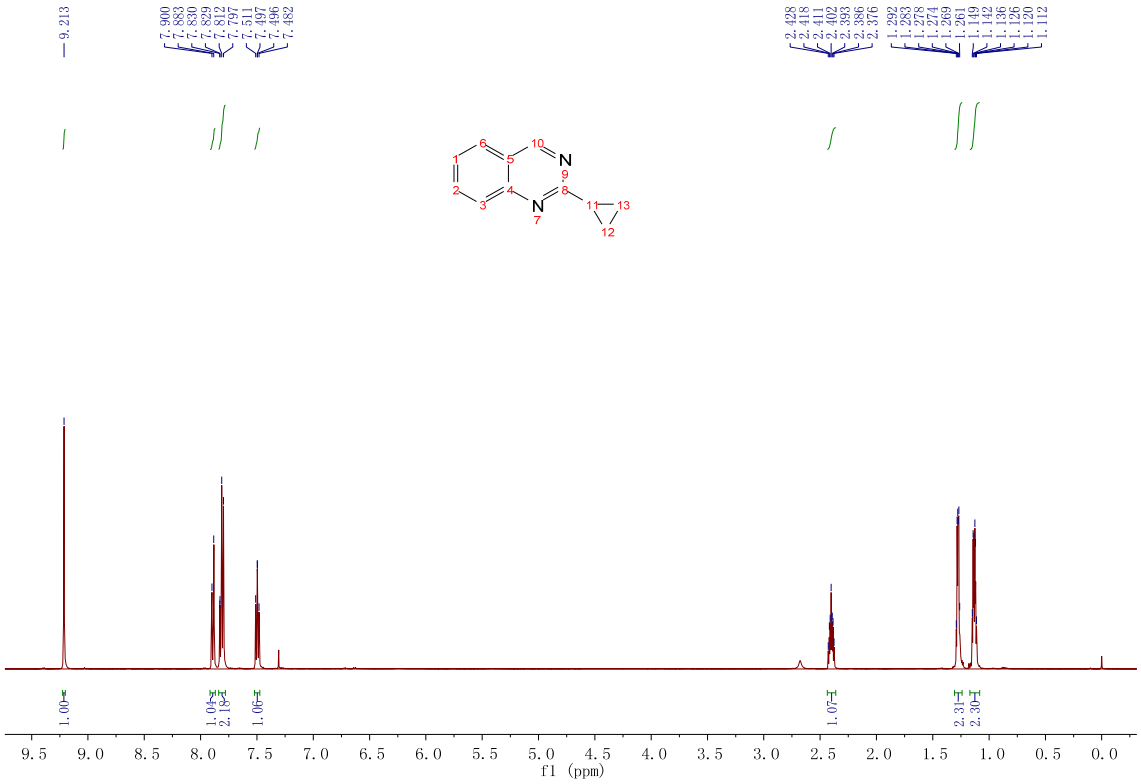
^{13}C NMR



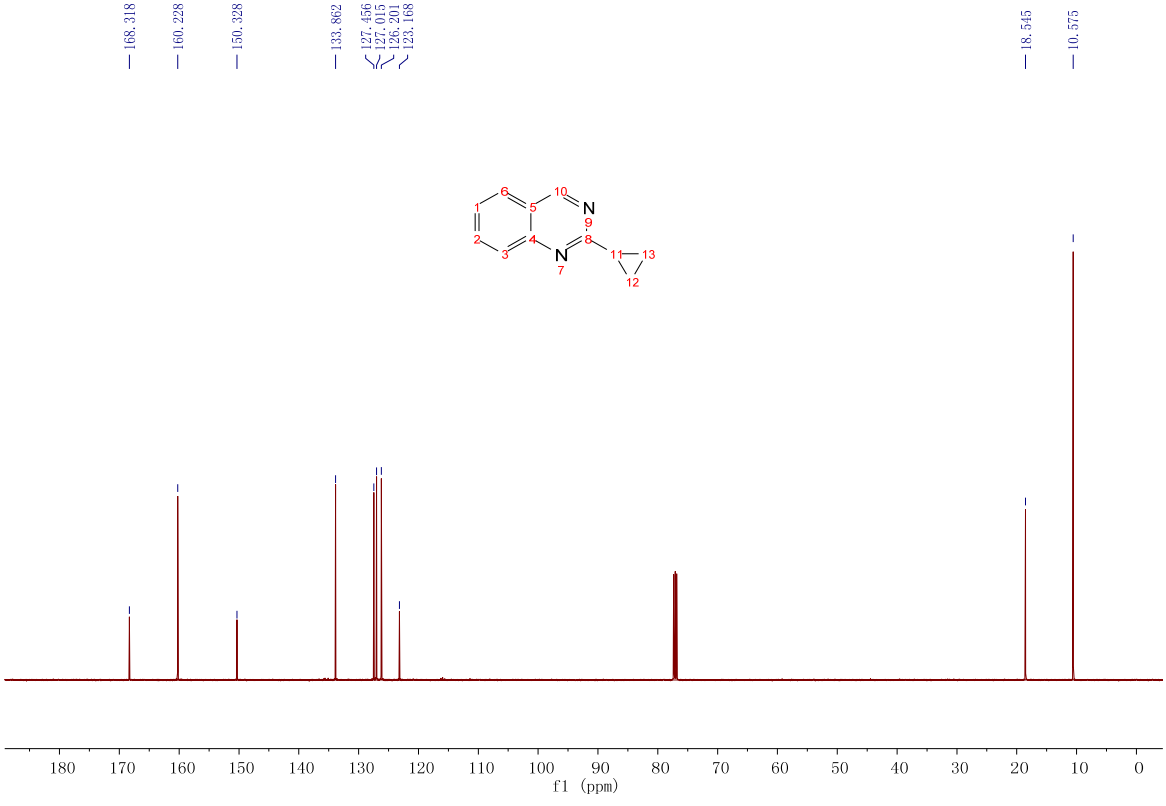


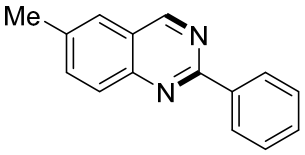
(3aw)

^{1}H NMR



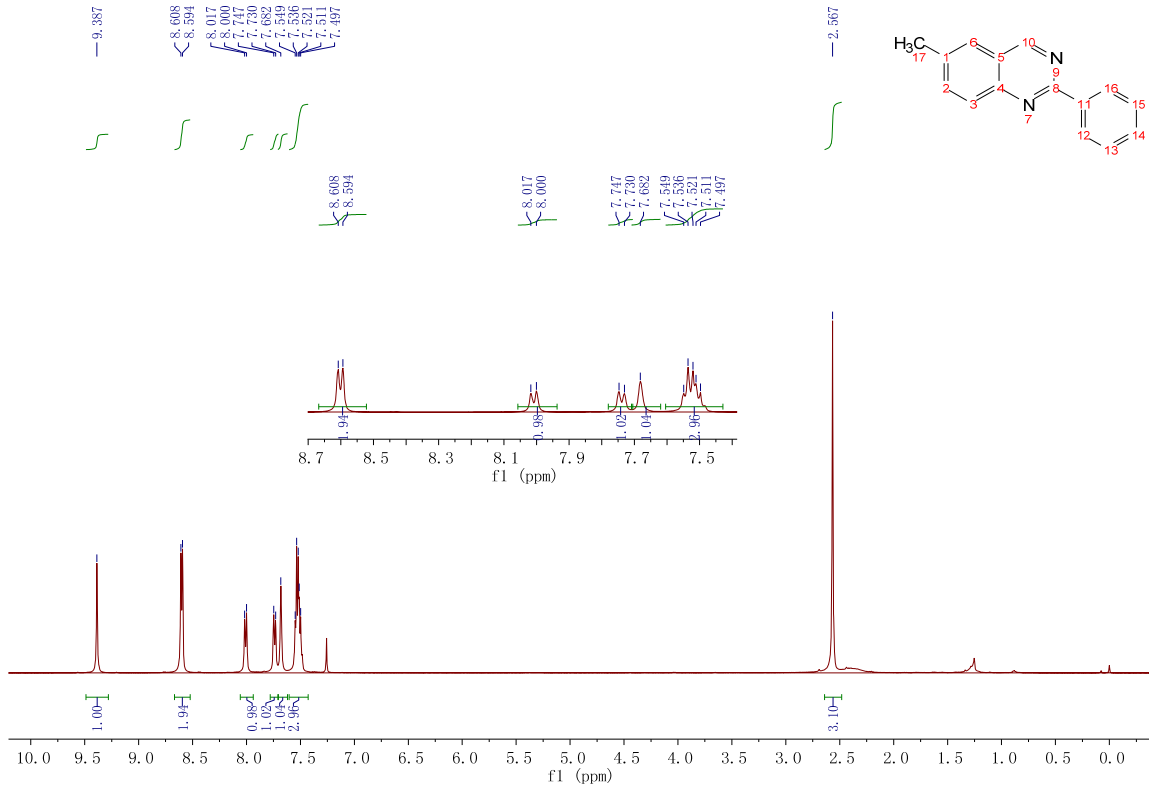
^{13}C NMR



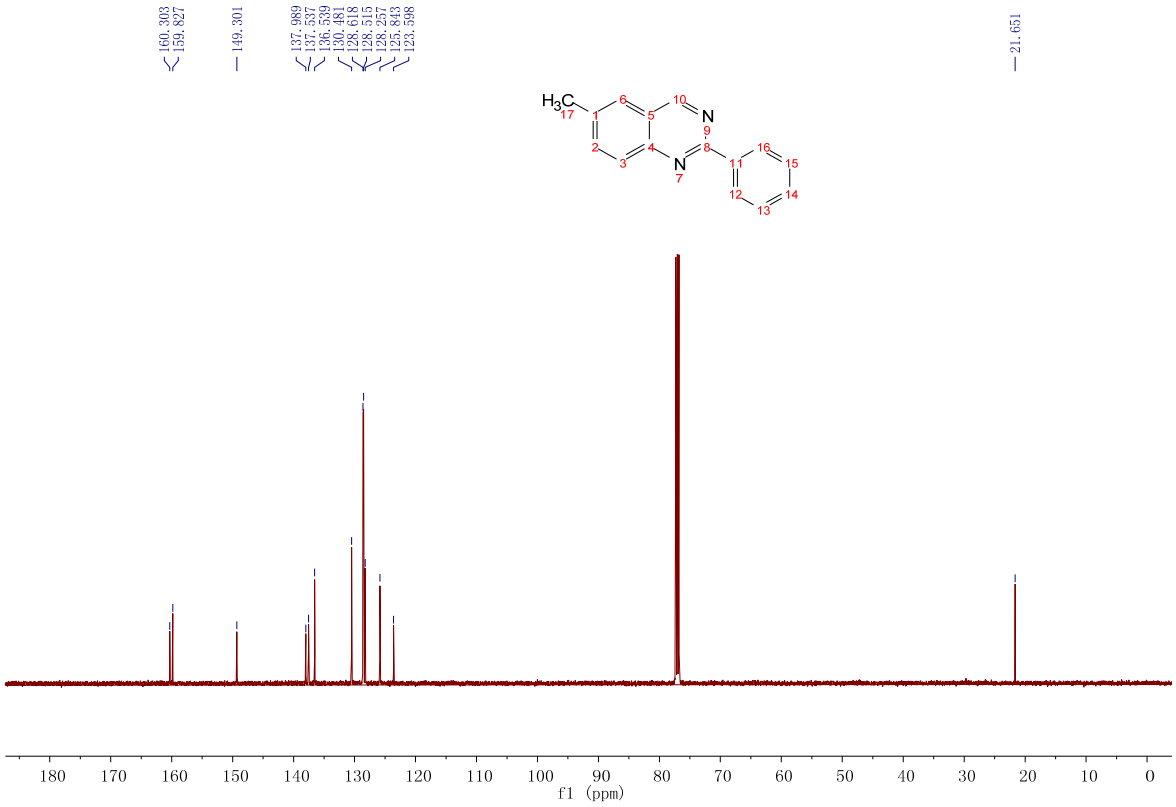


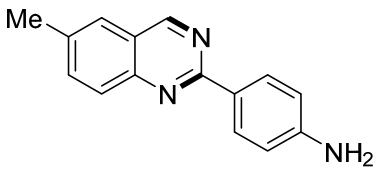
(3ba)

^{1}H NMR



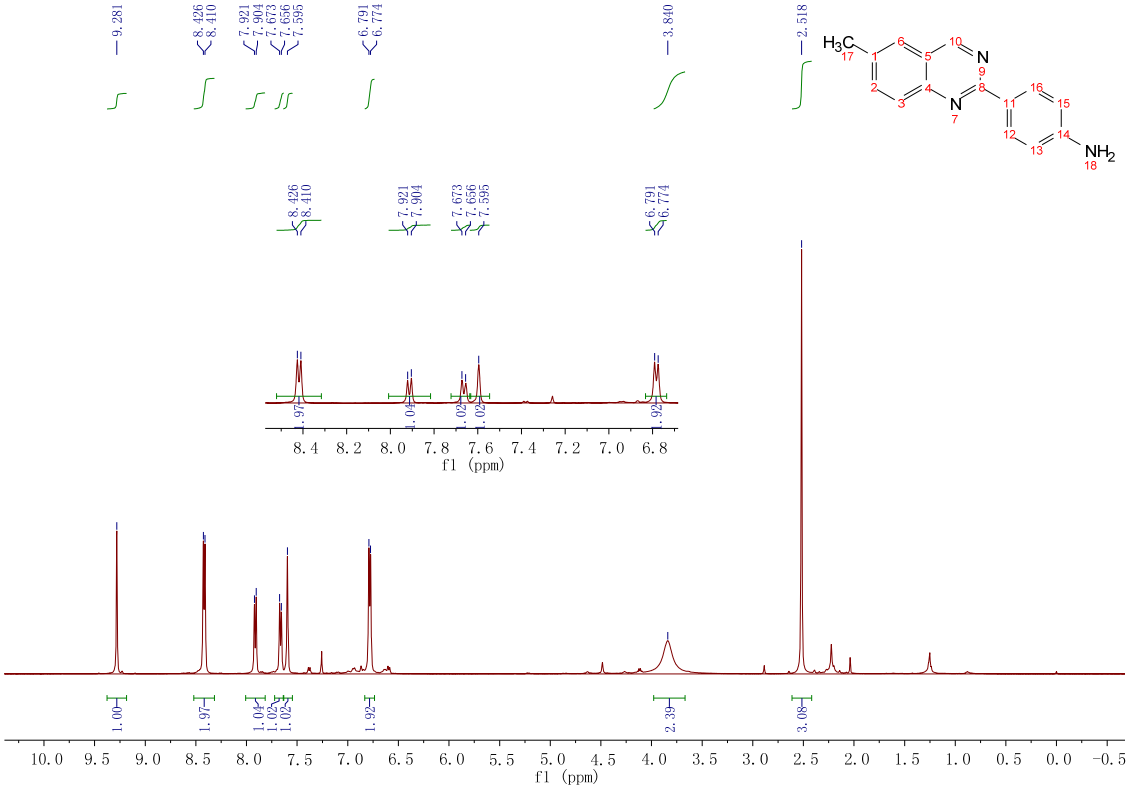
^{13}C NMR



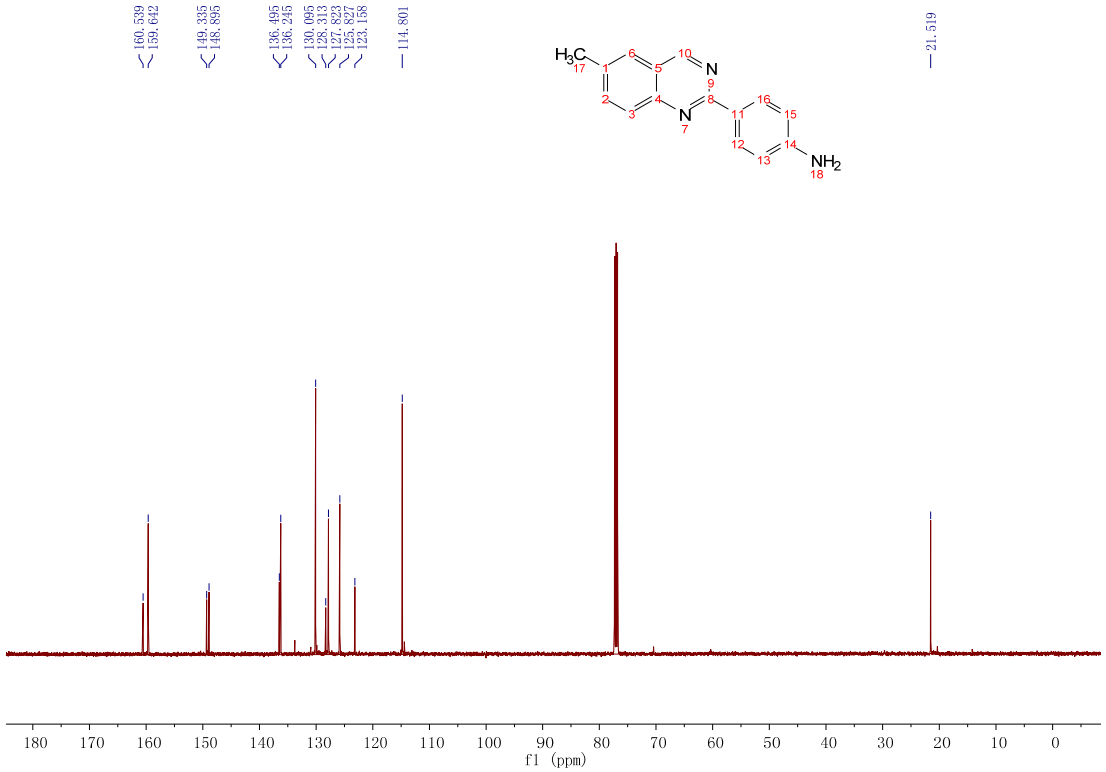


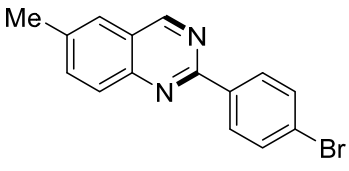
(3bh)

^{1}H NMR



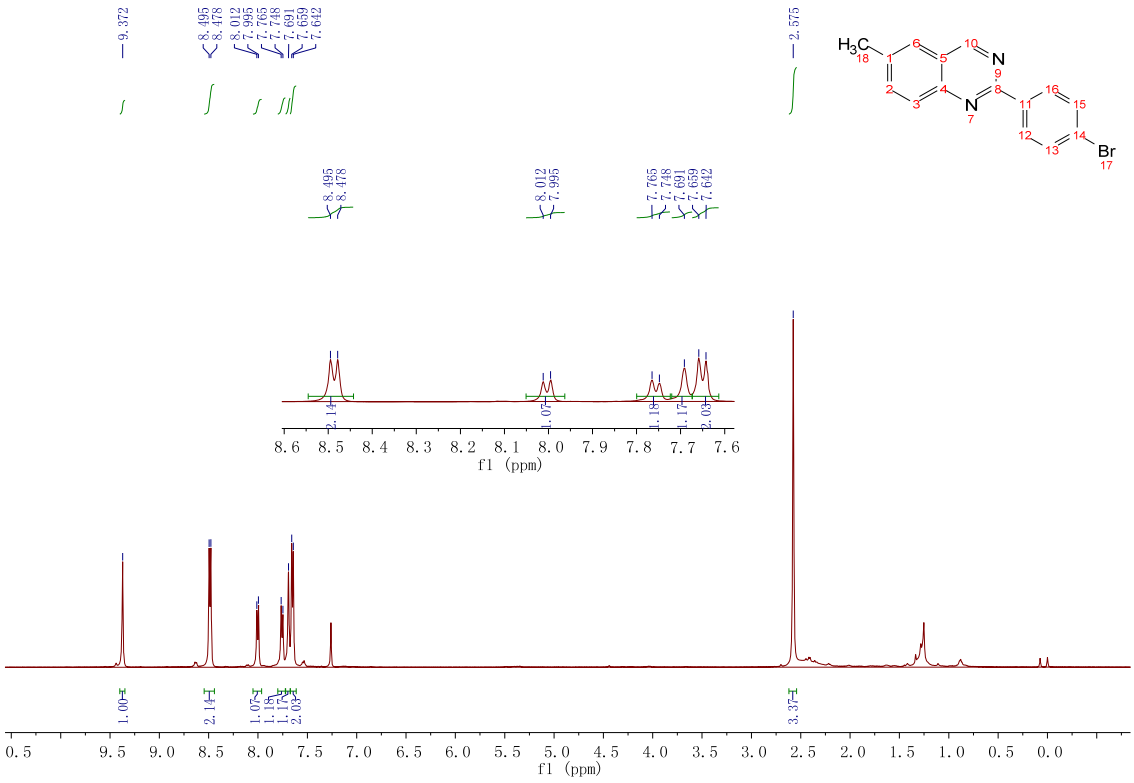
^{13}C NMR



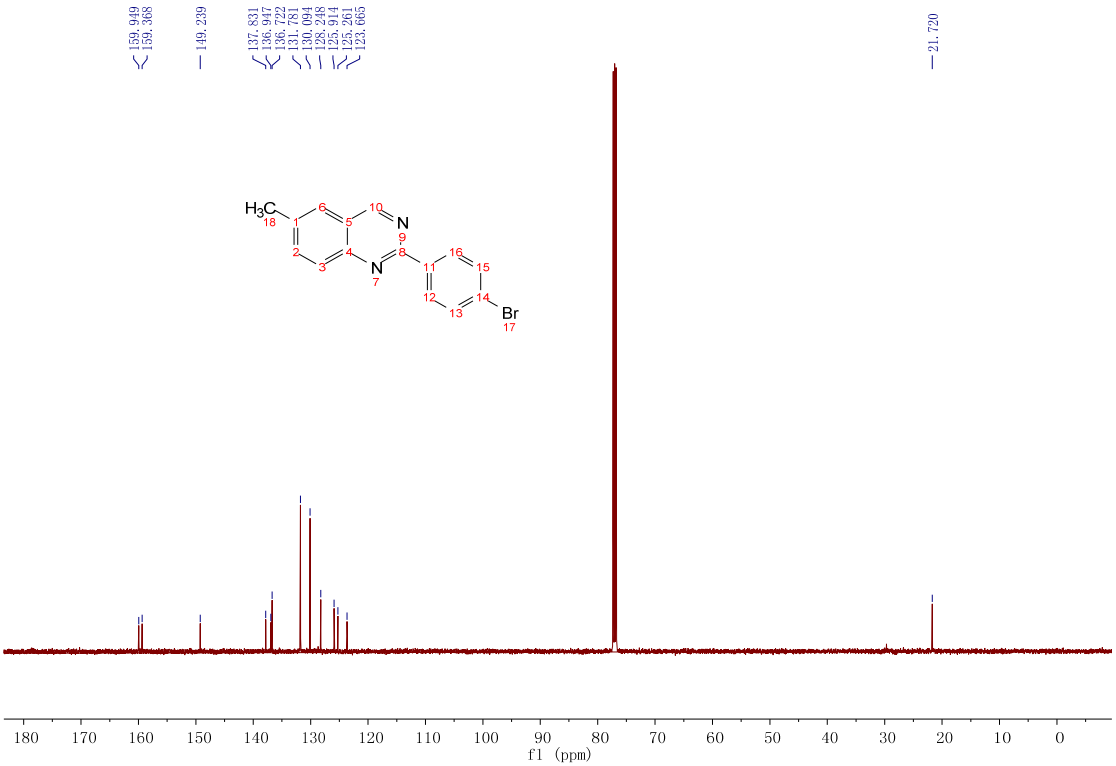


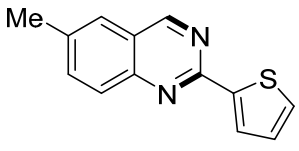
(3bm)

^{1}H NMR



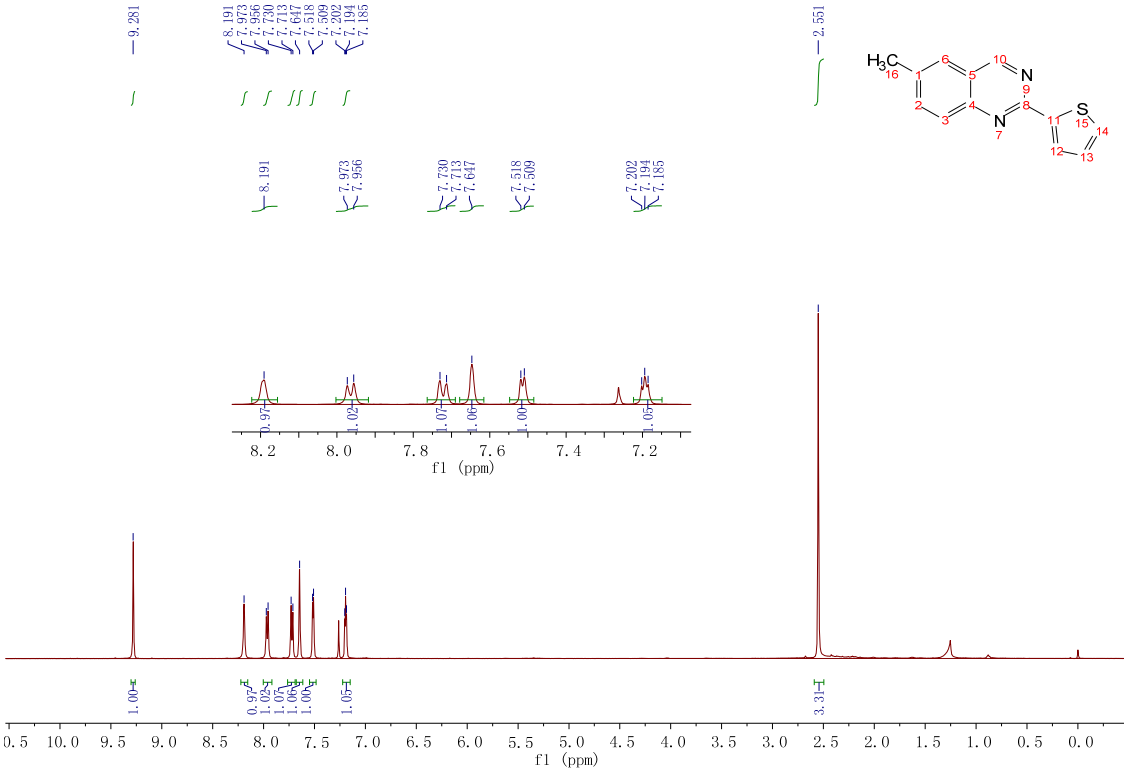
^{13}C NMR



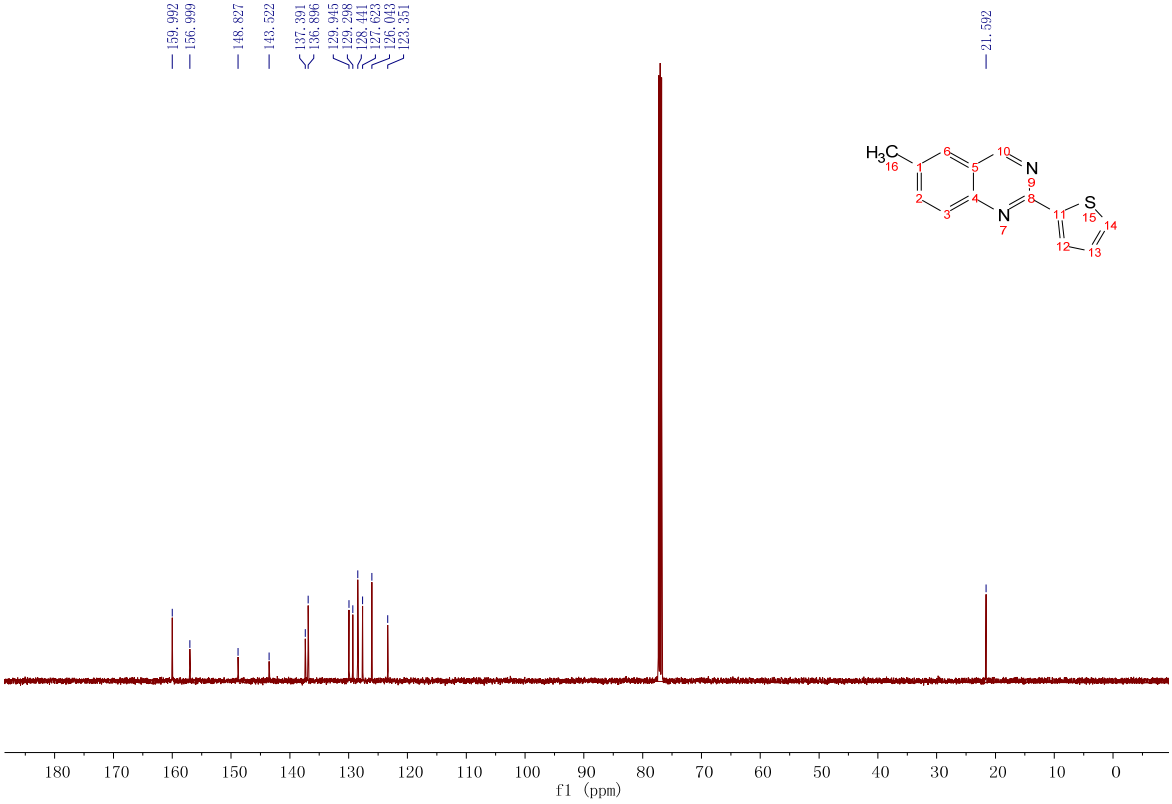


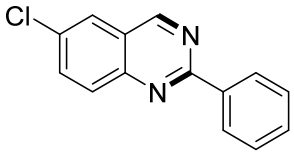
(3bt)

^{1}H NMR



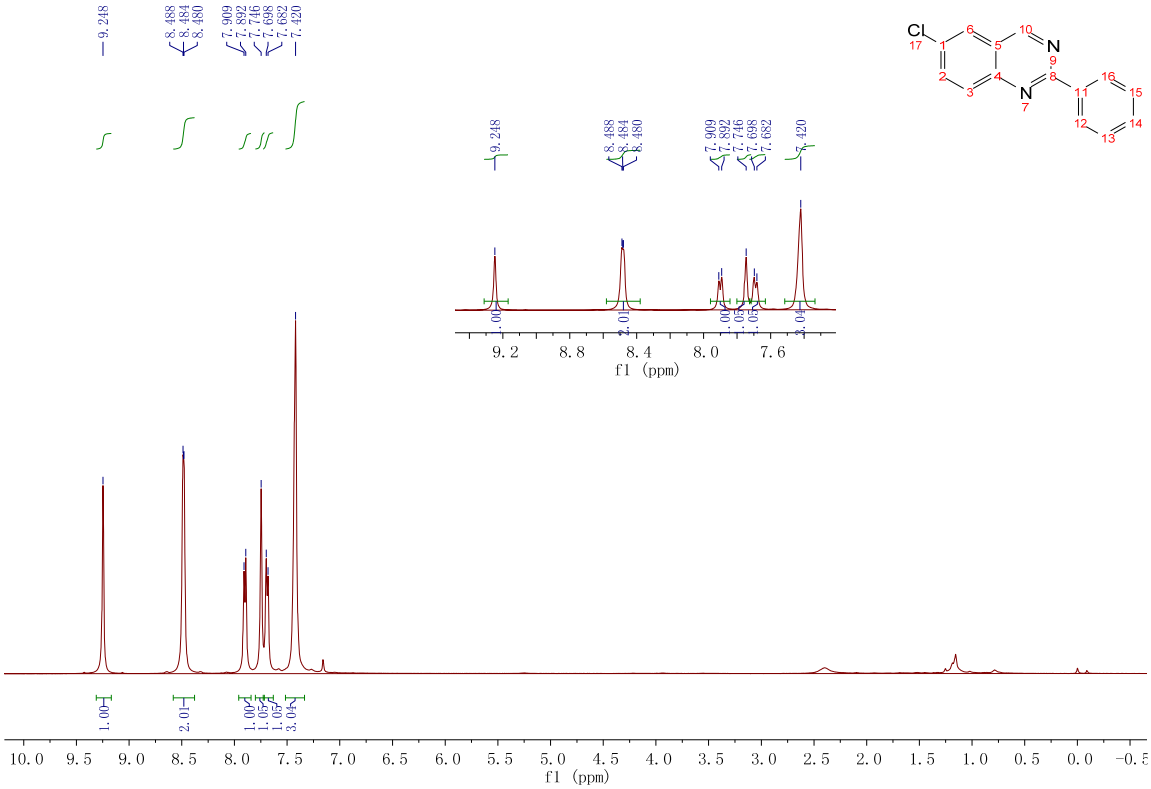
^{13}C NMR



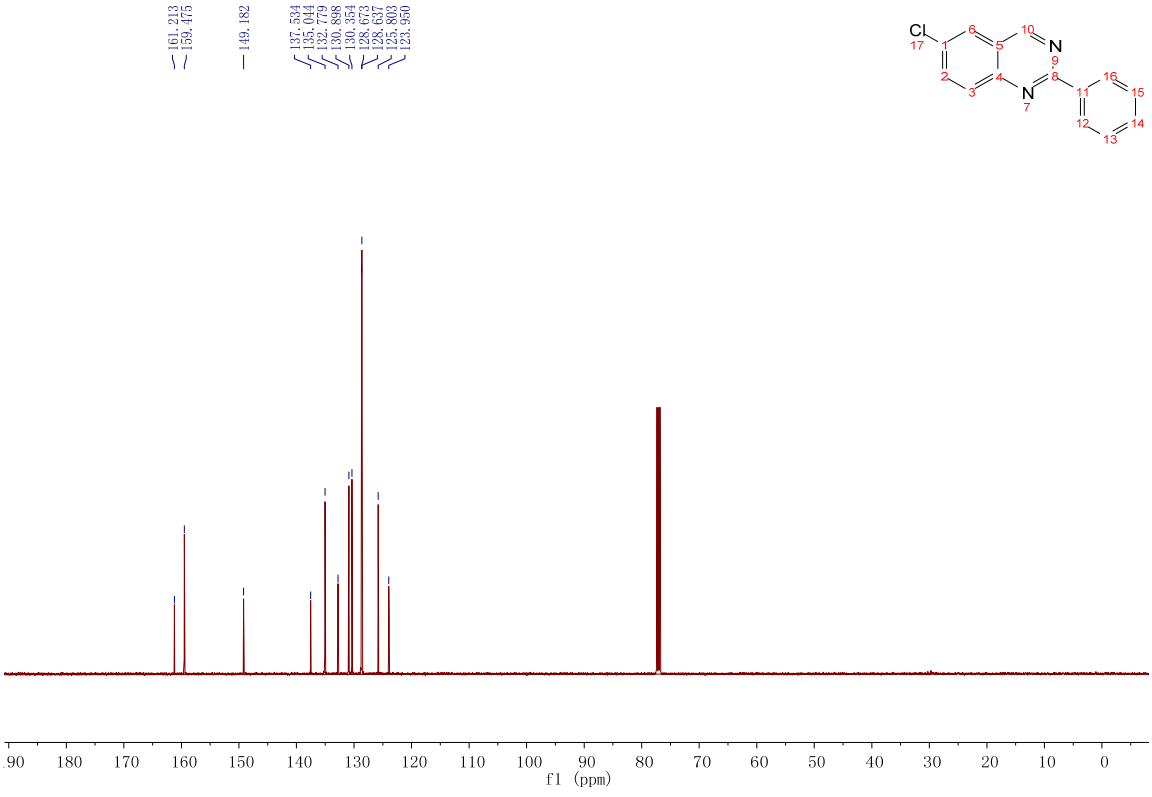


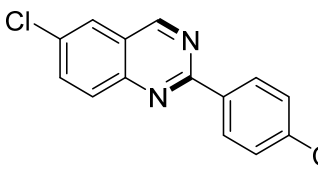
(3ca)

^{1}H NMR



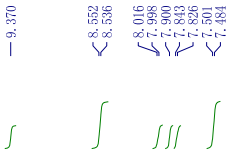
^{13}C NMR

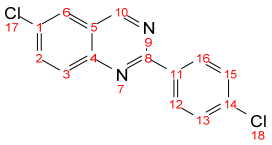


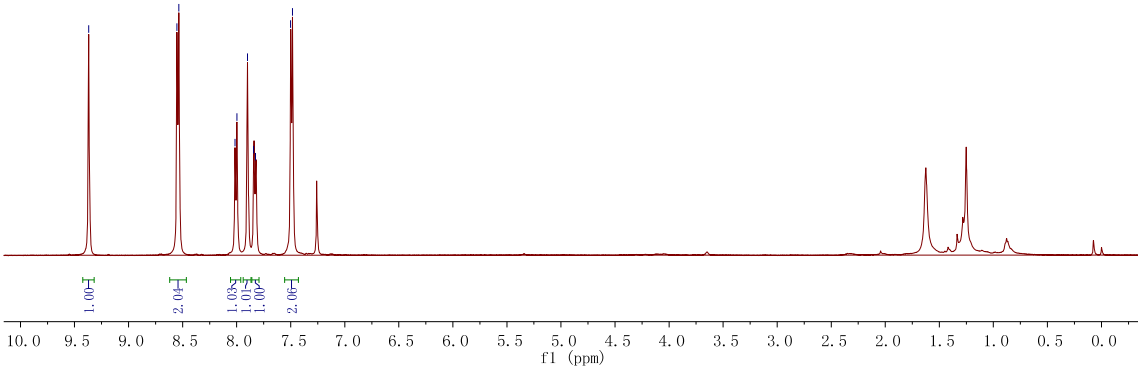


(3cj)

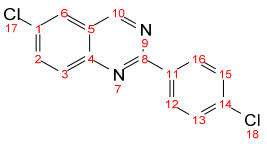
^{1}H NMR

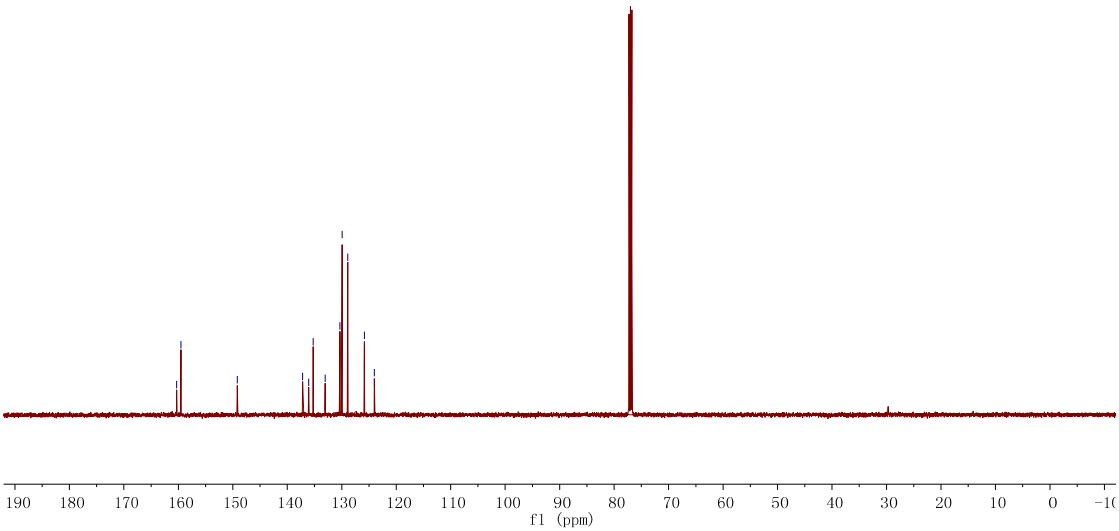


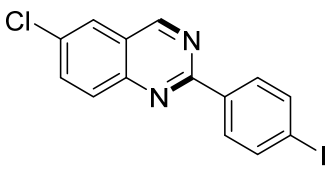




^{13}C NMR

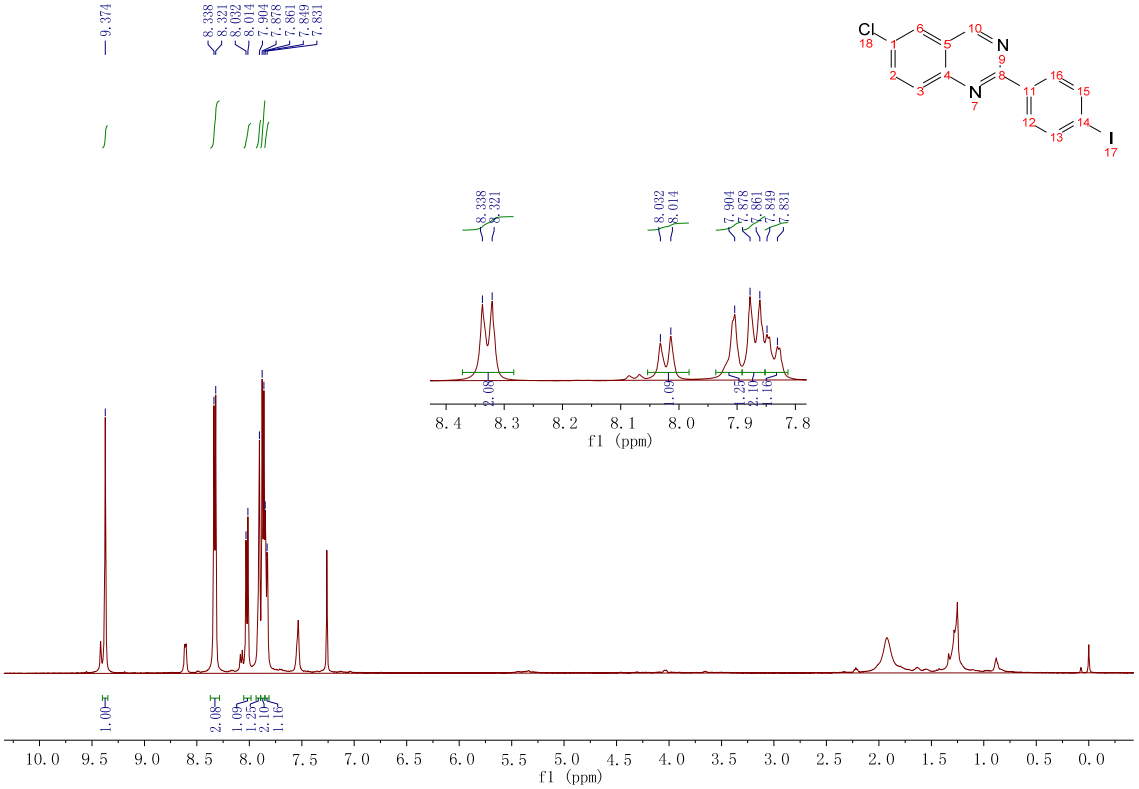




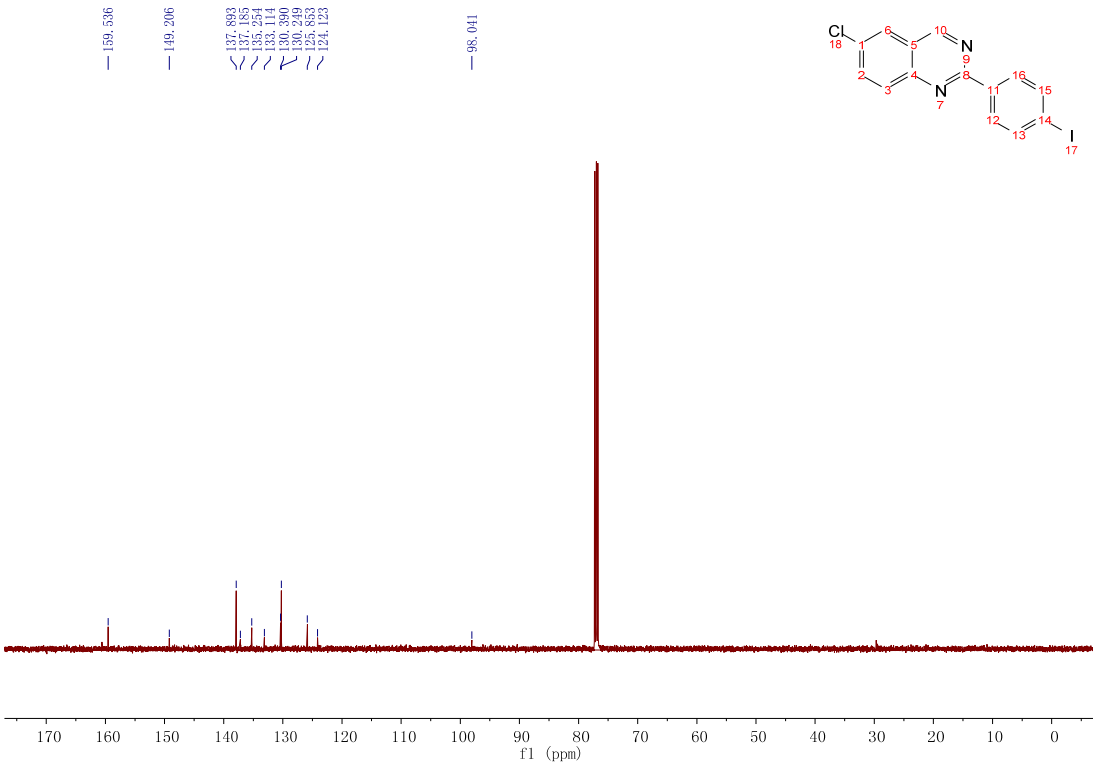


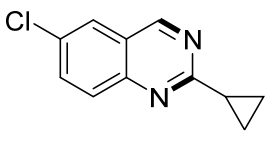
(3co)

^{1}H NMR



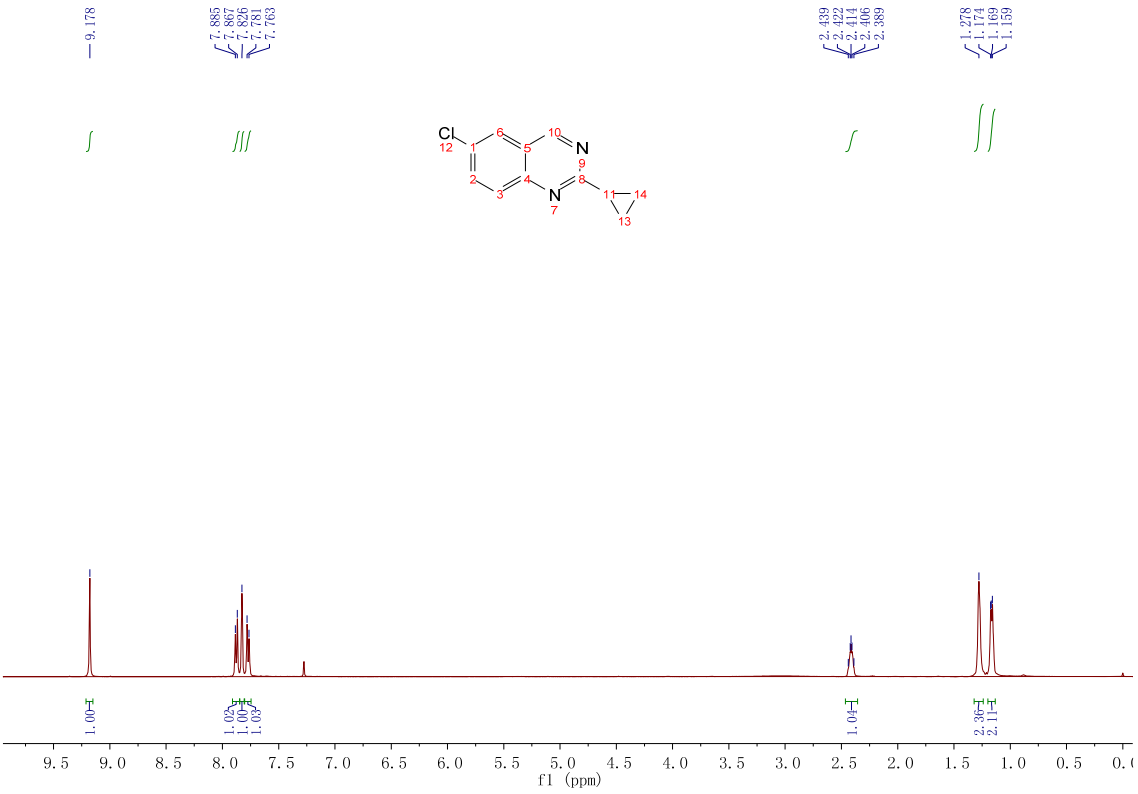
^{13}C NMR



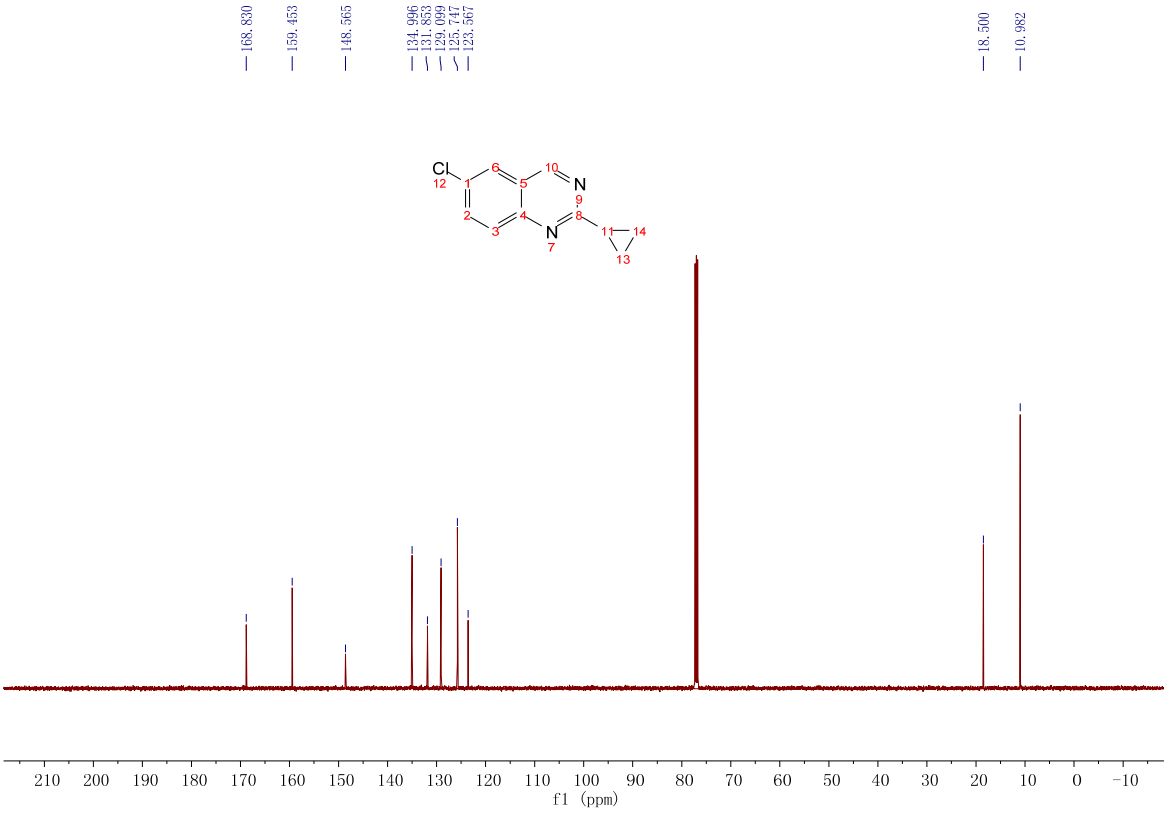


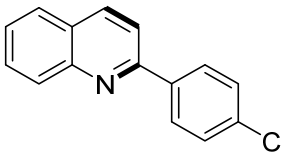
(3cw)

^{1}H NMR



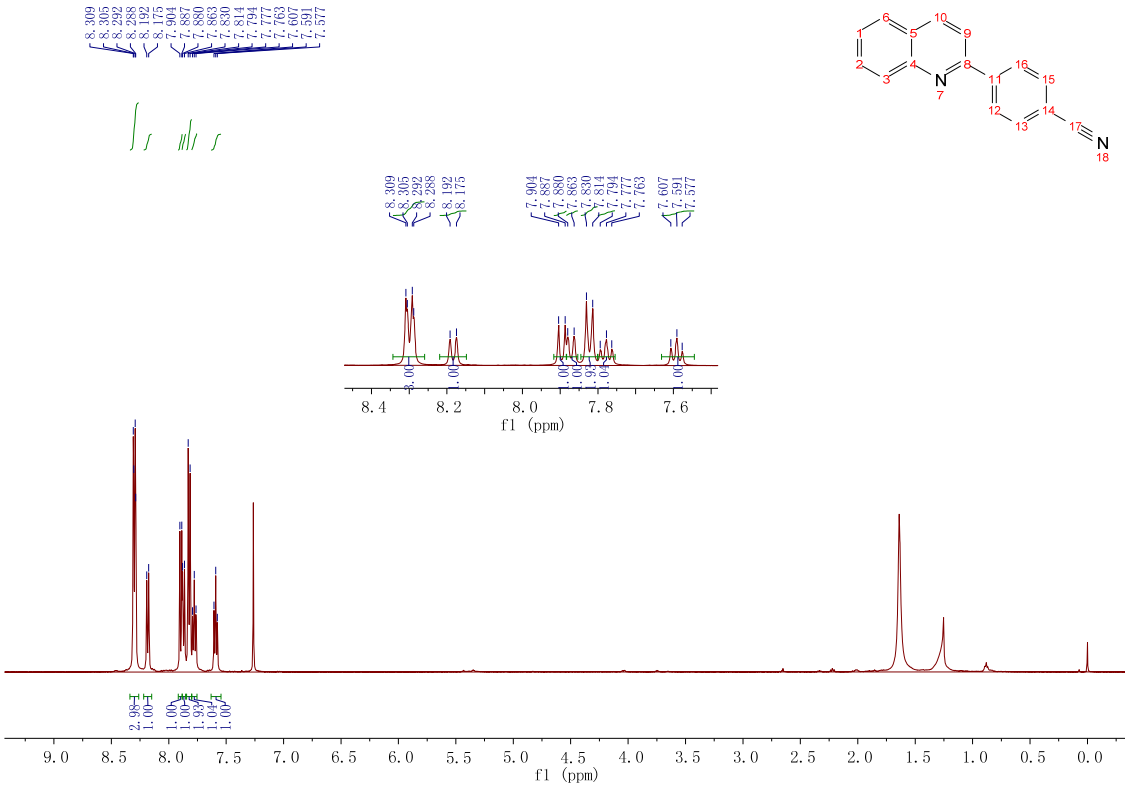
^{13}C NMR



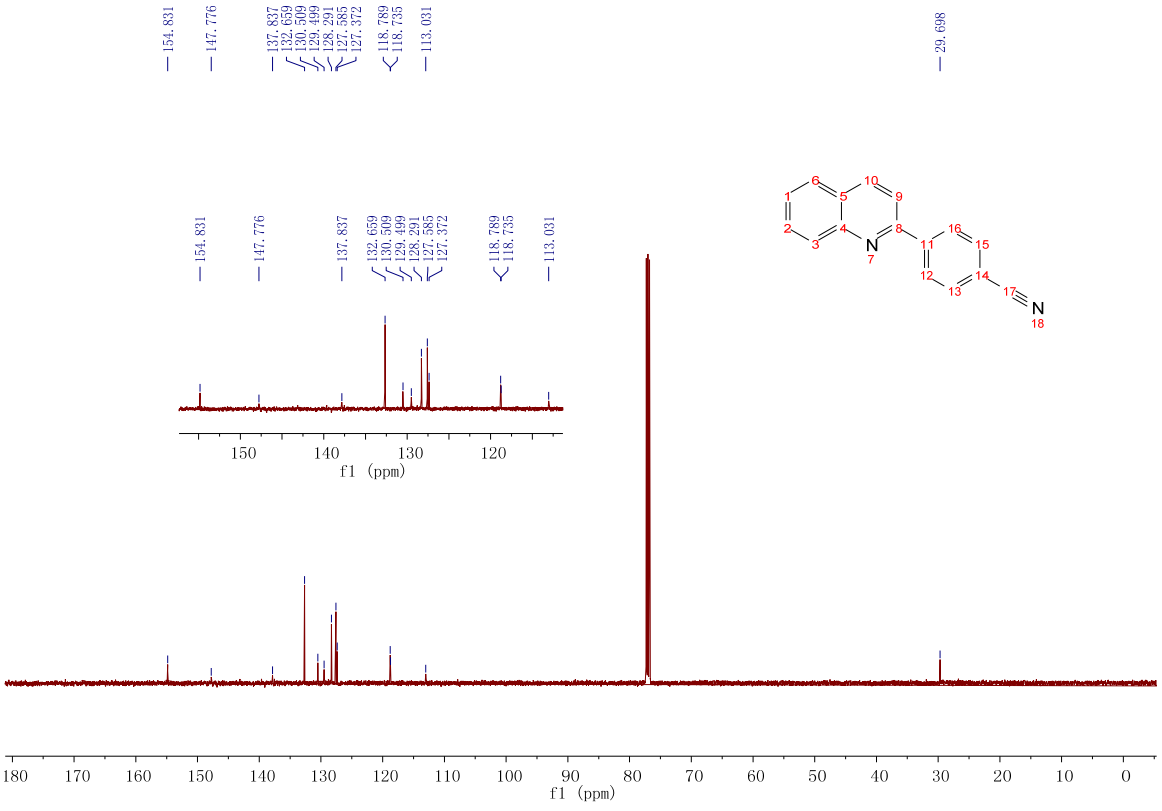


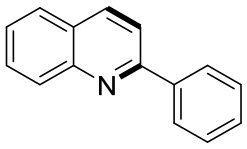
(8a)

^{1}H NMR



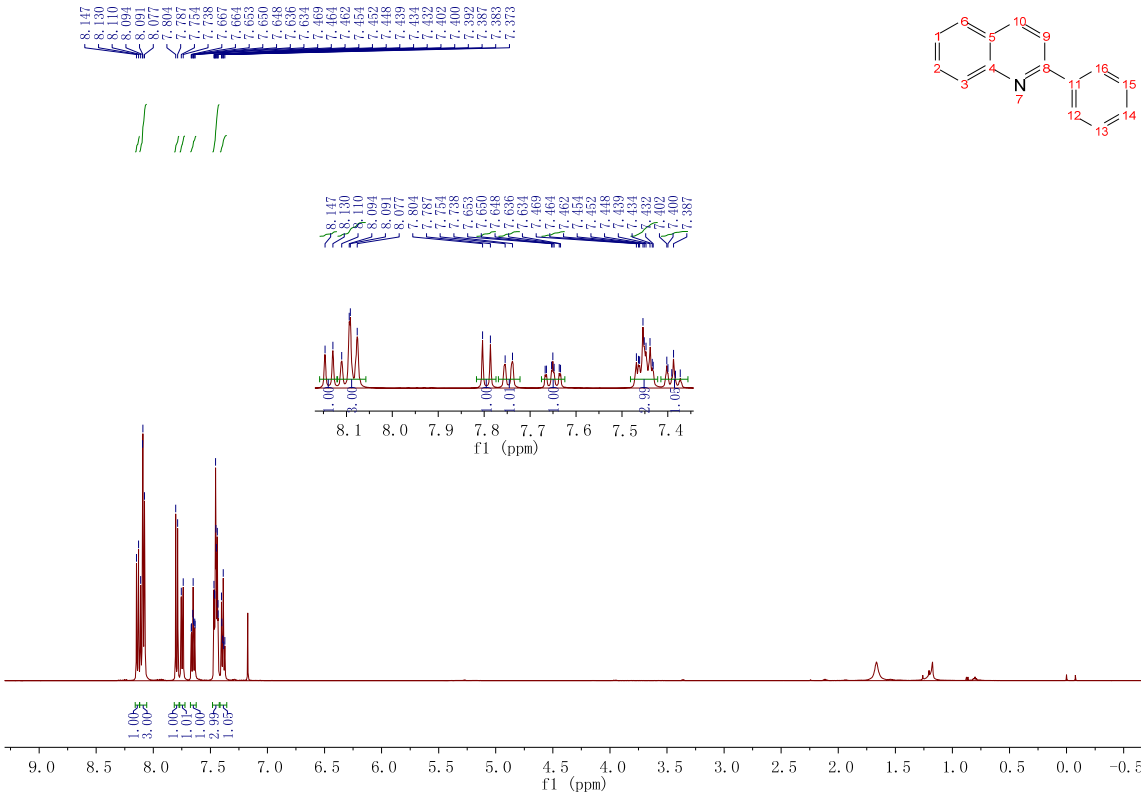
^{13}C NMR



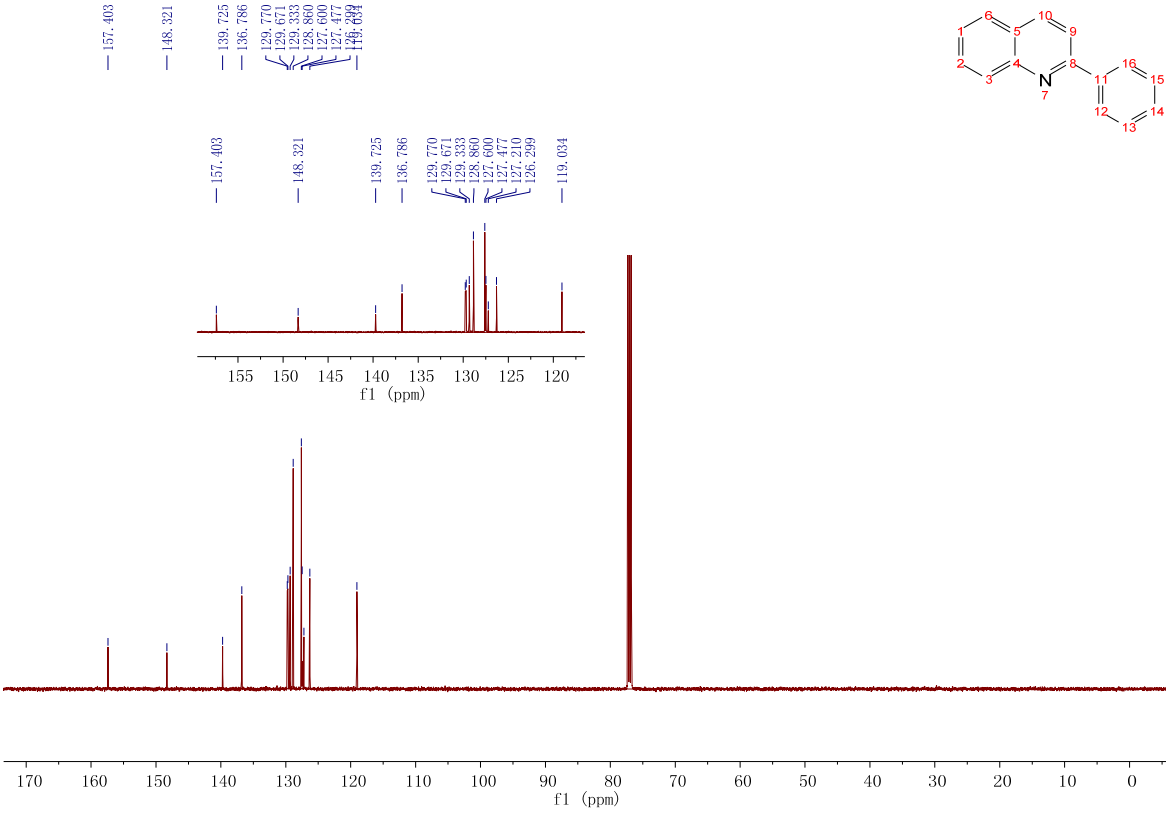


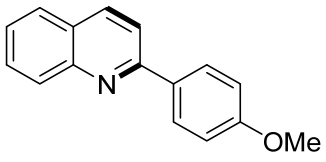
(8b)

^{1}H NMR



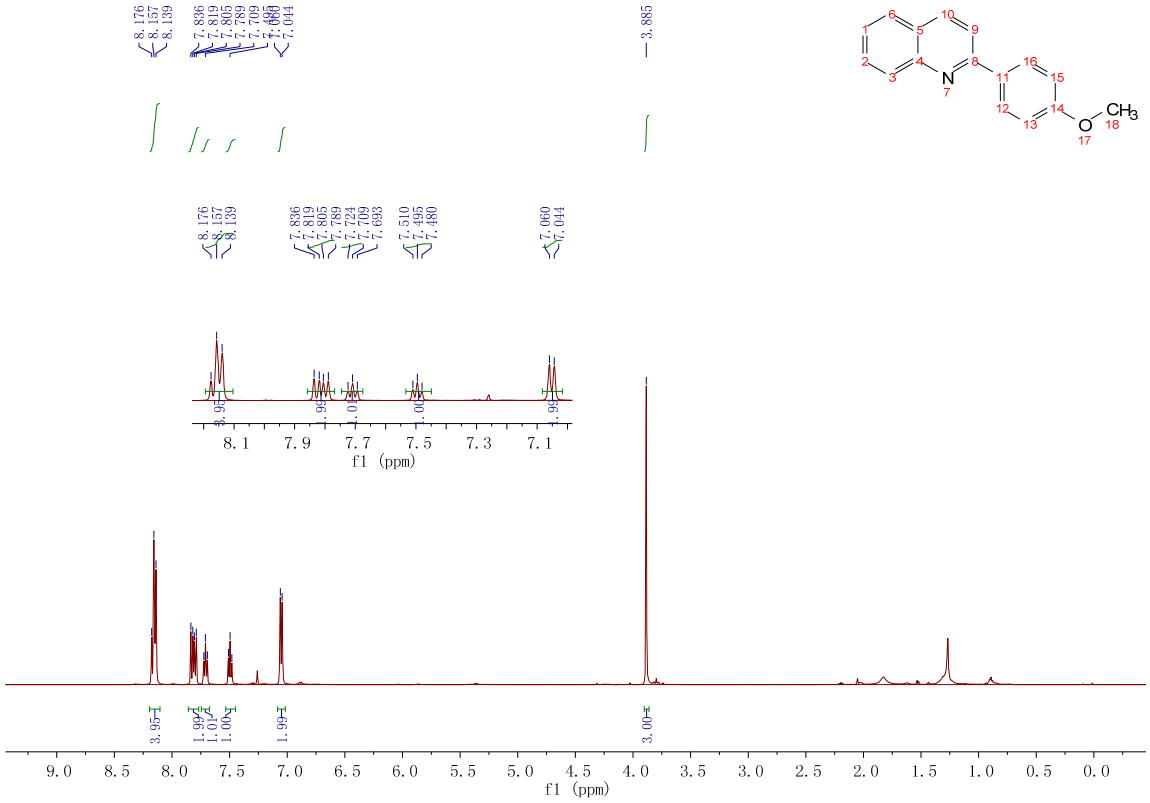
^{13}C NMR



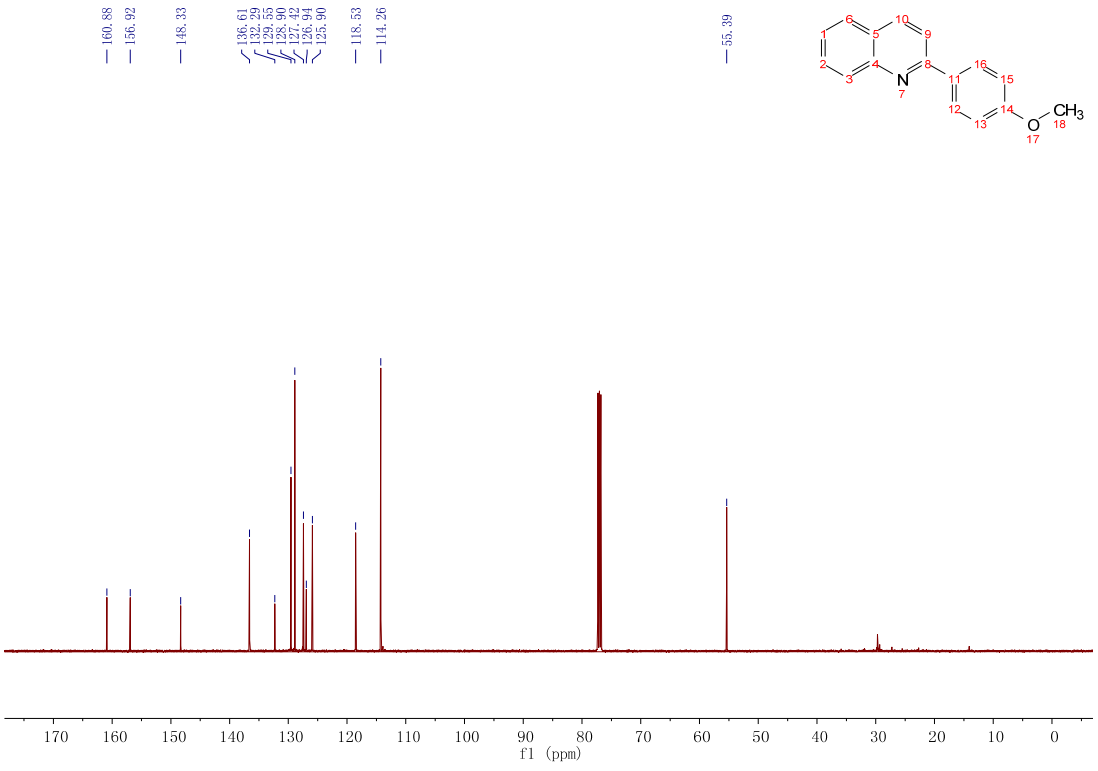


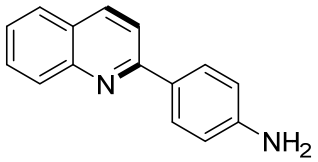
(8c)

^{1}H NMR



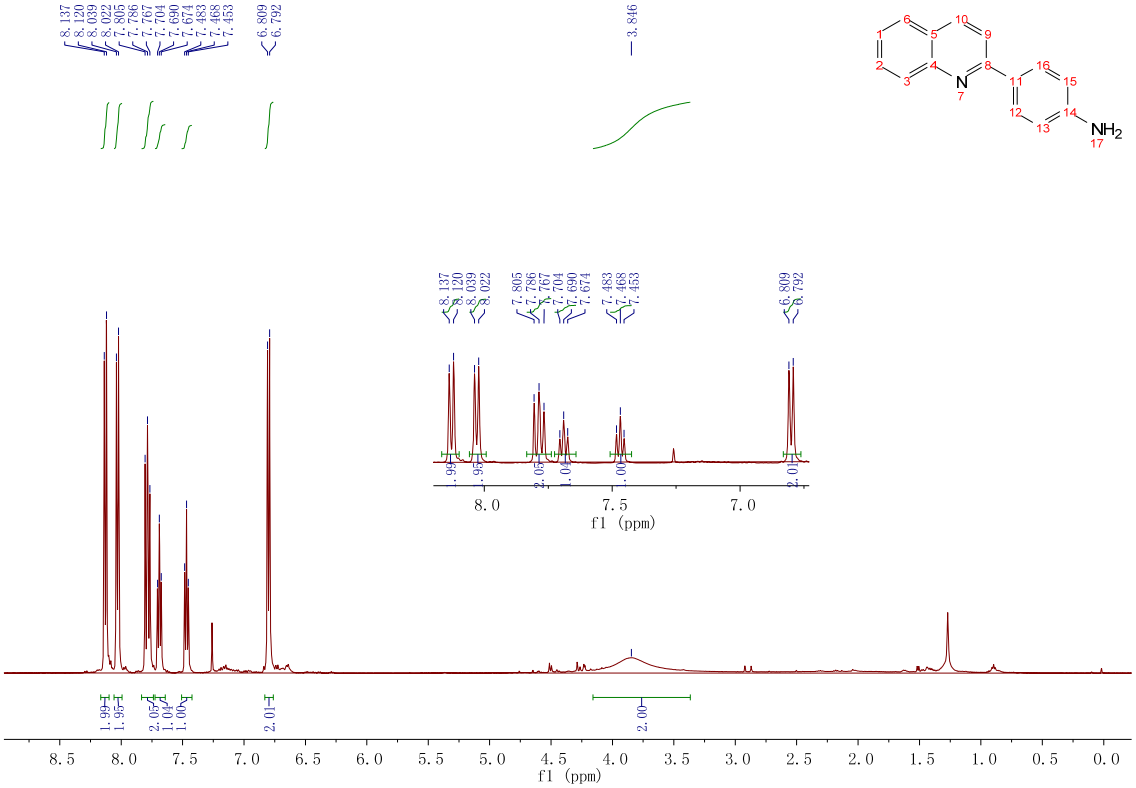
^{13}C NMR



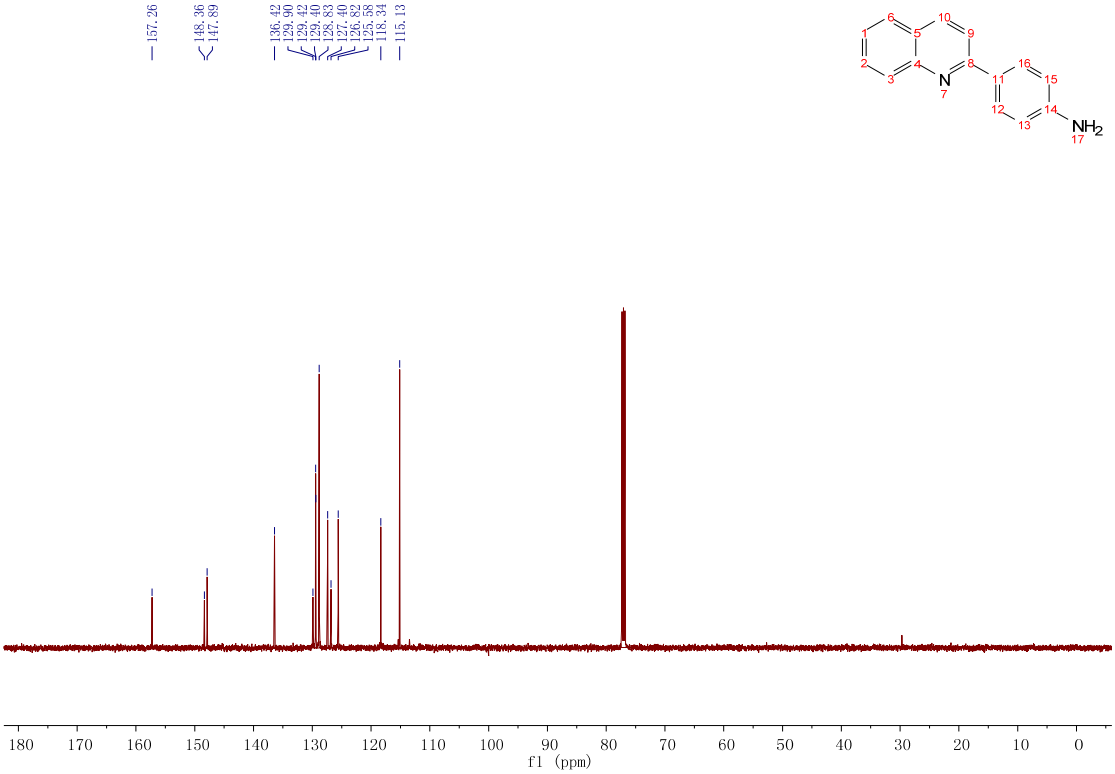


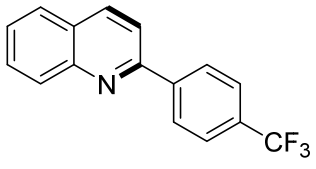
(8d)

^{1}H NMR



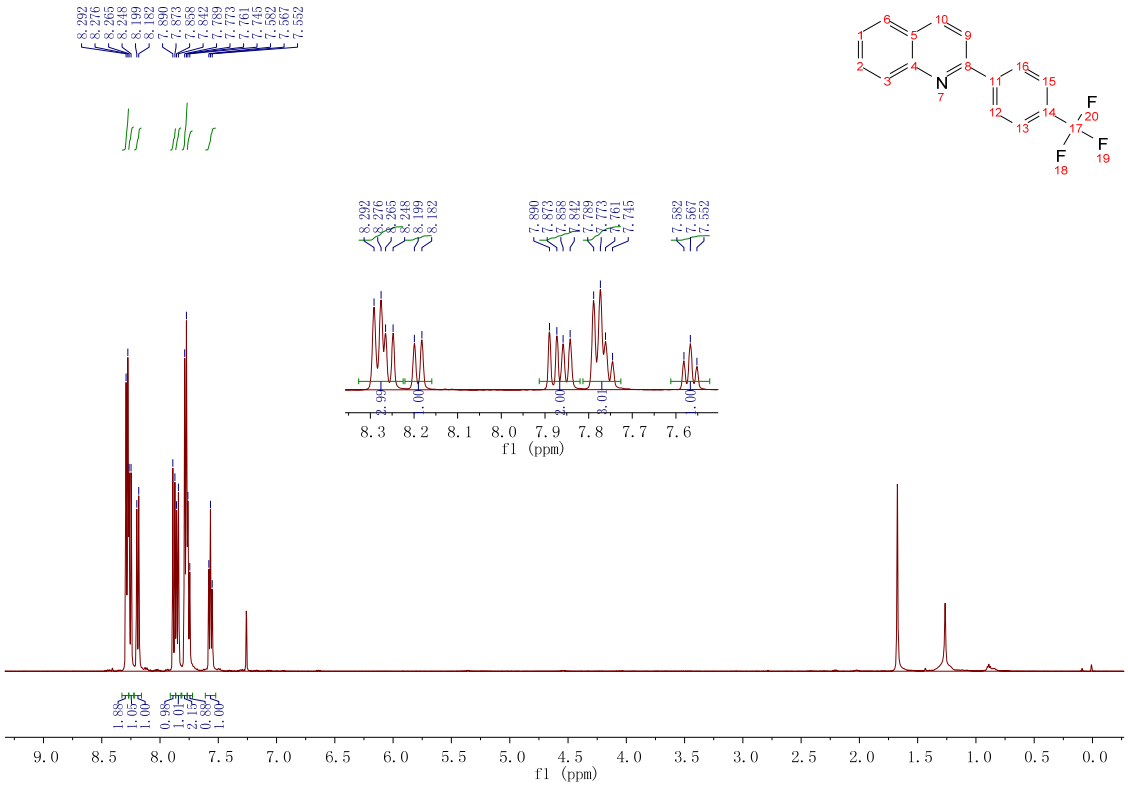
^{13}C NMR



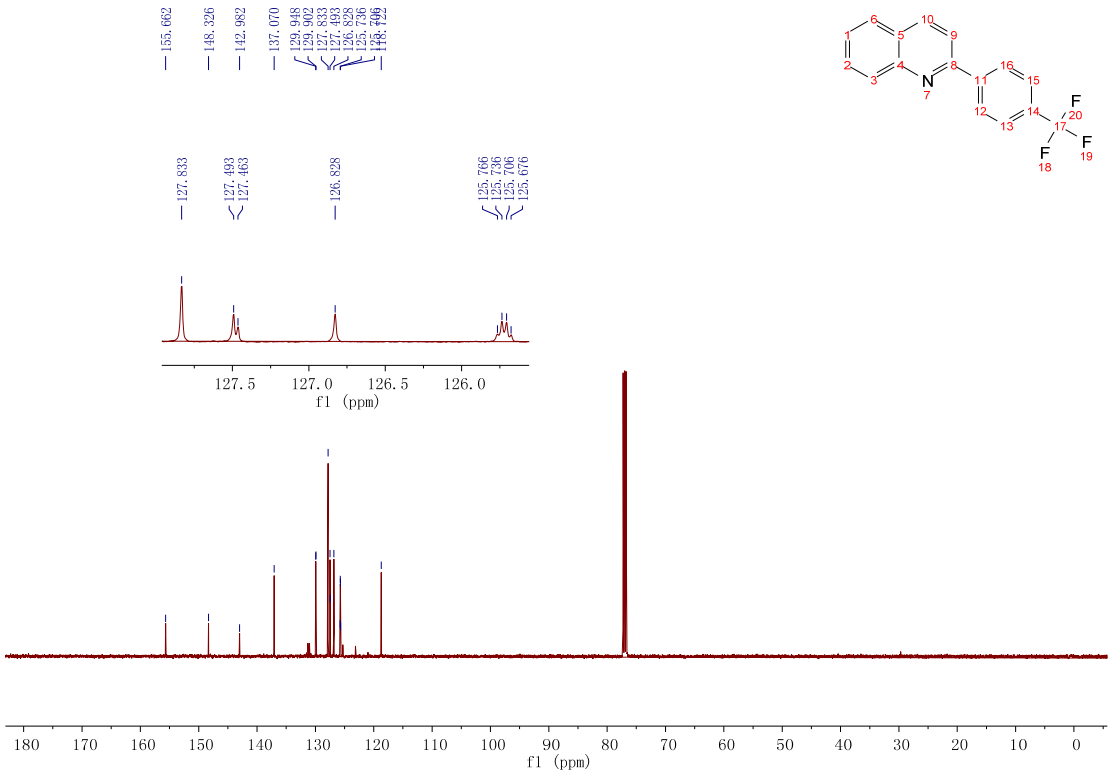


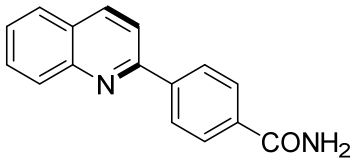
(**8e**)

^{1}H NMR



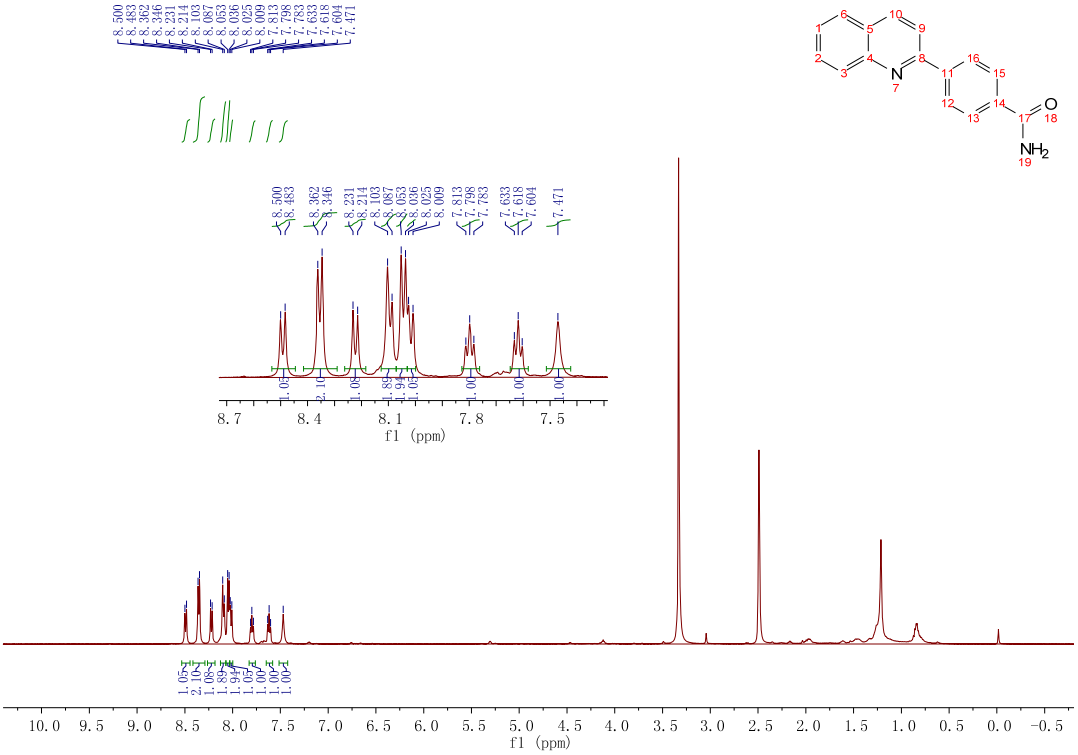
^{13}C NMR



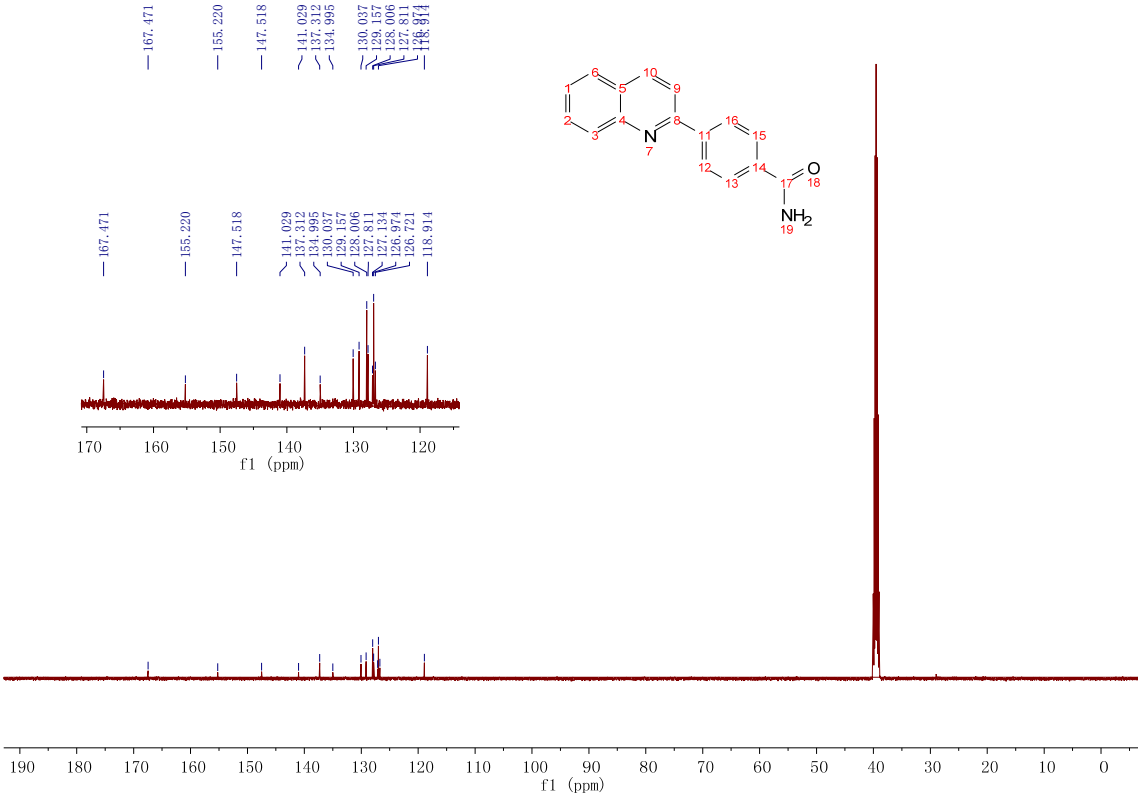


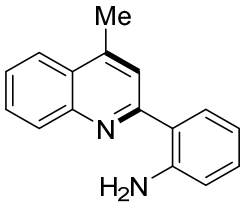
(8a')

^{1}H NMR



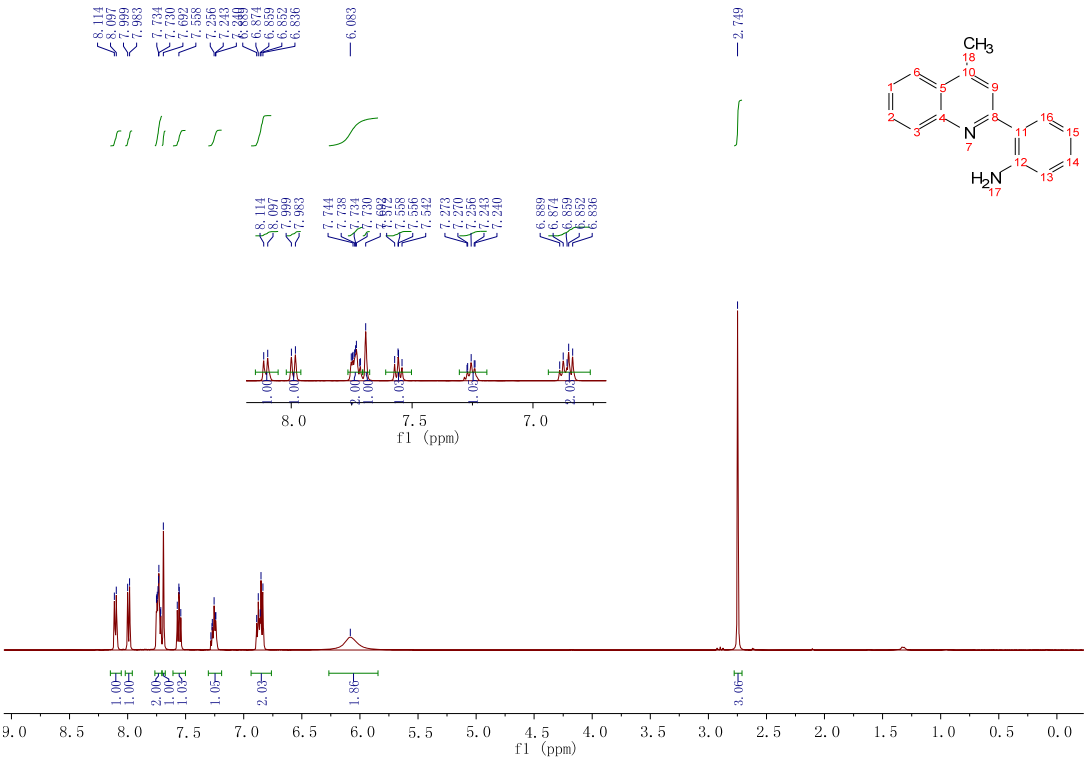
^{13}C NMR





(**10a**)

^{1}H NMR



^{13}C NMR