Supporting Information

2-(1-Methylhydrazinyl)pyridine as a Reductively Removable Directing Group in Cobalt-Catalyzed C(sp^2)-H Bond Alkenylation/Annulation Cascade

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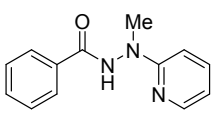
Table of Contents

1. Materials and methods

All reactions were carried out under Argon atmosphere with dry solvents under anhydrous conditions, unless otherwise noted. All the chemicals were purchased commercially, and used without further purification. Anhydrous THF was distilled from sodium-benzophenone. Dichloromethane and was distilled from calcium hydride. Thin-layer chromatography (TLC) was conducted with 0.25 mm Tsingdao silica gel plates (60F-254) and visualized by exposure to UV light (254 nm) or stained with potassium permanganate. Flash column chromatography was performed on Tsingdao silica gel (200-300 mesh) and neutral/basic aluminum oxide (200-300 mesh). ^{1}H NMR spectra were recorded on Bruker spectrometers (at 400 or 500 MHz) and reported relative to deuterated solvent signals or tetramethylsilane internal standard signals. Data for ^{1}H NMR spectra were reported as follows: chemical shift (δ/ppm), multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad.), coupling constant (*J*/Hz) and integration. ^{13}C NMR spectra were recorded on Bruker Spectrometers (100 or 125 MHz). Data for ^{13}C NMR spectra were reported in terms of chemical shift. ^{19}F NMR spectra were recorded on Bruker Spectrometers (376 MHz). High-resolution mass spectrometry (HRMS) was conducted on Bruker Apex IV RTMS. X-ray diffraction was performed on Rigaku Saturn 70 CCD diffractometer using graphite monochromated Cu-Kα radiation at a temperature of 100 ±1 K. Crystallographic data were obtained from Oxford diffraction single crystal X-ray diffractometer (Gemini S Ultra).

2. General procedure for the synthesis of starting materials



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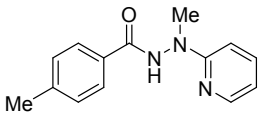

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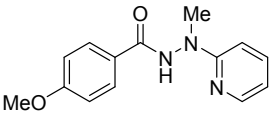

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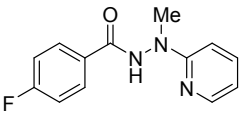

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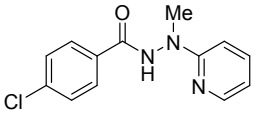

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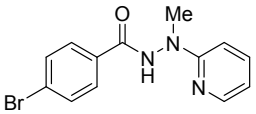

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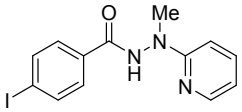

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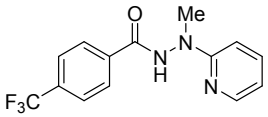

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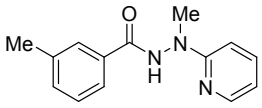

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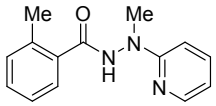

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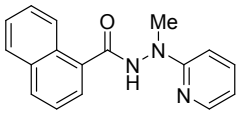

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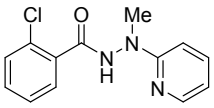

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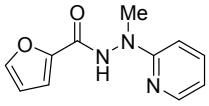

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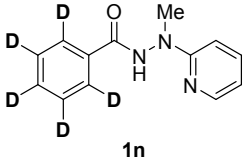
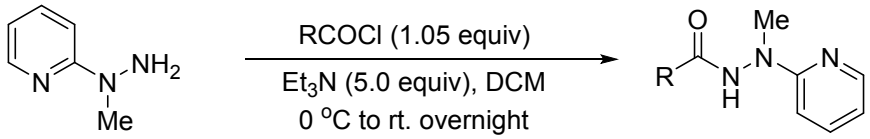


1n

Representative Method A : (1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1m)

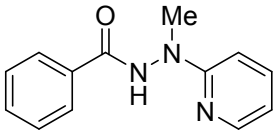


To a stirred mixture of 2-(1-methylhydrazinyl)pyridine[1] (1.0 equiv, 5 mmol) and Et_3N (5.0 equiv) in dry CH_2Cl_2 (0.2 to 0.5 M) was added benzoyl chloride (1.05 equiv) dropwise under Ar atmosphere at 0 °C. Kept the reaction mixture stirred at 0 °C for about 0.5 h, then the resulting mixture was warmed to room temperature and stirred overnight at this temperature. Upon completion of the reaction indicated by TLC, The reaction mixture was washed with H_2O and extracted with CH_2Cl_2 (20 mL) for three times. The combined organic phases were washed with brine, dried over with

anhydrous Na_2SO_4, filtered and concentrated under reduced pressure. The residue was purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product.

Representative Method B: (1n)

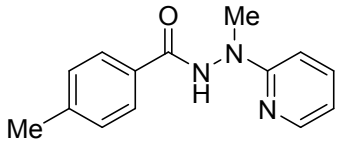
Carboxylic acid-D_5 (5 mmol) was taken in a 25 mL round-bottom flask and $SOCl_2$ (10 mL) was slowly added to the acid at room temperature under Ar atmosphere. The reaction mixture was refluxed for 3 h at 80 ^oC, and then the excess $SOCl_2$ was removed in vacuo to afford the crude acid chloride. The crude acid chloride was diluted with dry CH_2Cl_2 (5 mL) and then transferred to a stirred suspension of 2-(1-methylhydrazinyl)pyridine (1.0 equiv, 5 mmol) and Et_3N (5.0 equiv) in dry CH_2Cl_2 (15 mL) under Ar atmosphere at 0 ^oC. Kept the reaction mixture stirred at 0 ^oC for about 0.5 h, then the resulting mixture was warmed to room temperature and stirred overnight at this temperature. Upon completion of the reaction indicated by TLC, The mixture was transferred to a separating funnel and washed with water (15 mL), saturated $NaHCO_3$ and brine. The organic layer was dried over Na_2SO_4, filtered and concentrated under reduced pressure. The residue was purified by column chromatography (n-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1n** (74%).



1a

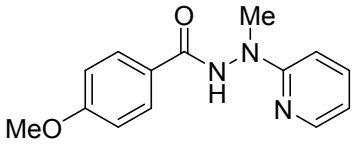
N'-Methyl-N'-(pyridin-2-yl)benzohydrazide: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1a** (80% yield) as a white solid, mp 131.0–132.8 °C. ^1H NMR (400 MHz, $CDCl_3$): δ 8.89 (br, 1H),

8.18 (d, J = 5.0 Hz，1H), 7.82 (m, 2H), 7.51 (t, J = 10.0 Hz, 1H), 7.38-7.48 (m, 3H), 6.68-6.73 (m, 2H), 3.38 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.6, 159.2, 147.5, 137.6, 132.4, 132.1, 128.6, 127.3, 114.6, 107.1, 38.7. IR (KBr) 3242, 1646, 1596, 1580, 1567, 1524, 1482, 1316, 1310, 1293, 769, 696 cm^{-1}. HRMS calculated for $C_{13}H_{14}N_3O$ (M + H^+): 228.1137, found 228.1134.



1b

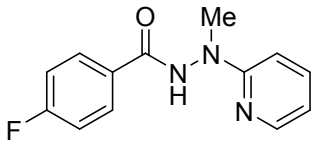
N',4-Dimethyl-N'-(pyridin-2-yl)benzohydrazid: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1b** (85% yield) as a white solid, mp 153.0–154.3 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.43 (br, 1H), 8.19 (d, J = 4.0 Hz, 1H), 7.75 (d, J = 8.0 Hz, 2H), 7.48 (t, J = 8.0 Hz, 1H), 7.24 (d, J = 8.0 Hz, 2H), 6.75 (d, J = 8.5 Hz, 1H), 6.71 (t, J = 6.5 Hz, 1H), 3.43 (s, 3H) , 2.41 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 166.5, 159.4, 147.6, 142.7, 137.6, 129.8, 129.4, 127.2, 114.6, 107.1, 38.8, 21.5. IR (KBr) 3238, 1653, 1603, 1592, 1529, 1500, 1481, 1312, 1302, 1289, 770, 757, 632 cm^{-1}. HRMS calculated for $C_{14}H_{16}N_3O$ (M + H^+): 242.1293, found 242.1284.



1c

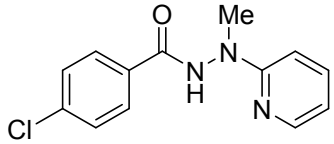
4-Methoxy-N'-methyl-N'-(pyridin-2-yl)benzohydrazide: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1c** (88%

yield) as a white solid, mp 140.7–142.0 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.47 (br, 1H), 8.19 (d, *J* = 4.0 Hz, 1H), 7.82 (d, *J* = 8.0 Hz, 2H), 7.480 (t, *J* = 8.0 Hz, 1H), 6,92 (d, *J* = 8.0 Hz, 2H), 6.74 (d, *J* = 8.5 Hz, 1H), 6.69 (dd, *J* = 4.0, 8.0 Hz, 1H), 3.86 (s, 3H) , 3.42 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.1, 162.7, 159.4, 147.6, 137.7, 129.1, 124.7, 114.6, 113.9, 107.1, 55.4, 38.9. IR (KBr) 3388, 1662, 1606, 1569, 1560, 1507, 1301, 1252, 1181, 1122, 768, 688 cm^{-1}. HRMS calculated for $C_{14}H_{16}N_3O_2$ (M + H$^+$): 258.1243, found 258.1238.



1d

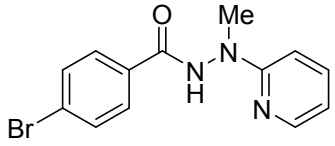
4-Fluoro-N'-methyl-N'-(pyridin-2-yl)benzohydrazid: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1d** (76% yield) as a light yellow solid, mp 167.0–168.3 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 9.03 (br, 1H), 8.19 (d, *J* = 4.5 Hz, 1H), 7.84 (m, 2H), 7.48 (t, *J* = 7.5 Hz, 1H), 7.04 (t, *J* = 8.5 Hz, 2H), 6.71-6.74 (m, 2H), 3.38 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ165.6, 165.0 (d, *J* = 251 Hz), 159.1, 147.5, 137.8, 129.7 (d, *J* = 8.0 Hz), 128.6, 115.7 (d, *J* = 22.0 Hz), 114.8, 107.2, 39.0. ^{19}F NMR (376 MHz, $CDCl_3$): δ -106.9. IR (KBr) 3296, 1654, 1601, 1596, 1493, 1477, 1291, 1220, 1156, 852, 770 cm^{-1}. HRMS calculated for $C_{13}H_{13}FN_3O$ (M + H$^+$): 246.1043, found 246.1037.



1e

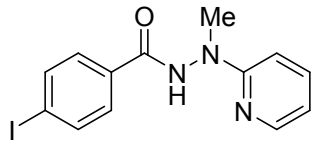
4-Chloro-N'-methyl-N'-(pyridin-2-yl)benzohydrazid: Prepared according

to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1e** (77% yield) as a light yellow solid, mp 183.4–184.3 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.90 (br, 1H), 8.19 (d, *J* = 4.0 Hz, 1H), 7.78 (d, *J* = 4.8 Hz, 2H), 7.50-7.54 (m, 1H), 7.38 (d, *J* = 8.0 Hz, 2H), 6.73-6.76 (m, 2H), 3.40 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.6, 159.1, 147.5, 138.4, 137.8, 130.9, 129.0, 128.7, 115.0, 107.2, 39.1. IR (KBr) 3264, 1656, 1596, 1568, 1518, 1477, 1430, 1398, 1308, 1014, 844, 766 cm^{-1}. HRMS calculated for $C_{13}H_{13}ClN_3O$ (M + H$^+$): 262.0747, found 262.0740.



1f

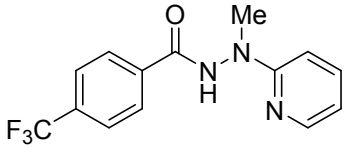
4-Bromo-N'-methyl-N'-(pyridin-2-yl)benzohydrazid: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1f** (81% yield) as a light yellow solid, mp 176.6–179.6 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.00 (br, 1H), 8.18 (d, *J* = 4.5 Hz, 1H), 7.70 (d, *J* = 8.5 Hz, 2H), 7.53 (d, *J* = 8.5 Hz, 2H), 7.50-7.51 (m, 1H), 6.72-6.75 (m, 2H), 3.39 (s, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 165.7, 159.1, 147.6, 137.8, 131.9, 131.5, 128.9, 126.9, 115.0, 107.2, 39.1. IR (KBr) 3260, 1654, 1593, 1518, 1429, 1397, 1304, 841, 766 cm^{-1}. HRMS calculated for $C_{13}H_{13}BrN_3O$ (M + H$^+$): 306.0242, found 306.0239.



1g

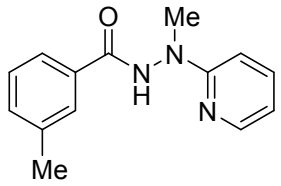
4-Iodo-N'-methyl-N'-(pyridin-2-yl)benzohydrazide: Prepared according

to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1g** (77% yield) as a white solid, mp 159.4–160.0 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 9.60 (br, 1H), 8.16 (d, *J* = 4.0 Hz, 1H), 7.65 (d, *J* = 8.5 Hz, 2H), 7.51 (d, *J* = 8.5 Hz, 2H), 7.46-7.52 (m, 1H), 6.67 (dd, *J* = 5.0, 6.5 Hz, 1H), 6.66 (d, *J* = 8.5 Hz, 1H), 3.32 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): 165.9, 159.0, 147.3, 137.8, 137.7, 131.7, 128.8, 114.8, 107.1, 38.9. IR (KBr) 3251, 1658, 1596, 1584, 1567, 1521, 1430, 1396, 1302, 1006, 754, 620 cm^{-1}. HRMS calculated for $C_{13}H_{13}IN_3O$ (M + H$^+$): 354.0103, found 354.0097.



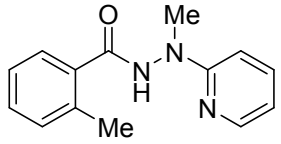
1h

4-Fluoro-N'-methyl-N'-(pyridin-2-yl)benzohydrazid: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1h** (66% yield) as a light yellow solid, mp 167.7–169.0 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 9.87 (br, 1H), 8.17 (m, 1H), 7.91 (d, *J* = 8.0 Hz, 2H), 7.54 (d, *J* = 8.0 Hz, 2H), 7.50-7,54 (m, 1H), 6.74 (dd, *J* = 4.0, 8.0 Hz, 1H), 6.70 (d, *J* = 8.0 Hz, 1H), 3.36 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.2, 158.9, 147.2, 138.1, 135.6, 134.0, 133.4 (q, *J* = 32.0 Hz), 127.8, 125.5(q, *J* = 4.0 Hz), 123.5 (q, *J* = 271.0 Hz), 115.1, 107.2, 39.1. ^{19}F NMR (376 MHz, $CDCl_3$): δ -63.1. IR (KBr) 3232, 1663, 1596, 1525, 1480, 1434, 1325, 1307, 1127, 1109, 857, 770 cm^{-1}. HRMS calculated for $C_{14}H_{13}F_3N_3O$ (M + H$^+$): 296.1011, found 296.1003.



1i

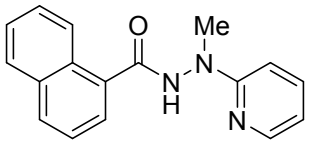
N',3-Dimethyl-N'-(pyridin-2-yl)benzohydrazid: Prepared according to the general method A, purified by column chromatography (n-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1i** (82% yield) as a white solid, mp 144.0–146.0 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.57 (br, 1H), 8.19 (dd, *J* = 2.0, 4.5 Hz，1H), 7.68 (s, 1H), 7.63 (d, *J* = 7.0 Hz, 1H), 7.48 (dt, *J* = 2.0, 8.5 Hz, 1H), 7.30-7.35 (m, 2H), 6.74 (d, *J* = 8.5 Hz, 1H), 6.71 (dd, *J* = 5.0, 6.5 Hz, 1H), 3.41 (s, 3H) , 2.39 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 166.7, 159.3, 147.6, 138.6, 137.6, 132.9, 128.6, 128.0, 124.2, 114.7, 107.1, 38.8, 21.3. IR (KBr) 3221, 1649, 1596, 1482, 1437, 1437, 770, 688 cm^{-1}. HRMS calculated for $C_{14}H_{16}N_3O$ (M + H^+): 242.1293, found 242.1284.



1j

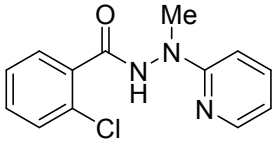
N',2-Dimethyl-N'-(pyridin-2-yl)benzohydrazide: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1j** (70% yield) as a white solid, mp 128.4–130.1 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.21 (br, 1H), 8.14 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.45 (dt, *J* = 2.0, 8.0 Hz, 1H), 7.41 (d, *J* = 7.5 Hz, 1H), 7.31 (dt, *J* = 1.0, 7.5 Hz, 1H), 7.17-7.22 (m, 2H), 6.71 (d, *J* = 8.5 Hz, 1H), 6.67 (dd, *J* = 5.0, 6.5 Hz, 1H), 3.36 (s, 3H) , 2.42 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 169.0, 159.1, 147.6, 137.5, 136.9,

133.7, 131.1, 130.4, 126.9, 125.7, 114.6, 107.0, 38.7, 19.7. IR (KBr) 3245, 1650, 1592, 1566, 1513, 1482, 1437, 1397, 1317, 901, 766 cm^{-1}. HRMS calculated for $C_{14}H_{16}N_3O$ ($M + H^+$): 242.1293, found 242.1287.



1k

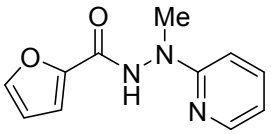
N'-Methyl-N'-(pyridin-2-yl)-1-naphthohydrazide: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1k** (56% yield) as a white solid, mp 183.0–184.9 °C. ^{1}H NMR (500 MHz, DMSO): δ 10.76 (br, 1H), 8.26 (d, *J* = 8.0 Hz, 1H), 8.21 (d, *J* = 1.0 Hz, 1H), 8.10 (d, *J* = 8.0 Hz, 1H), 8.02 (dd, *J* = 1.0, 8.0 Hz, 1H), 7.84 (d, *J* = 7.0 Hz, 1H), 7.59-7.65 (m, 4H), 6.91 (d, *J* = 9.0 Hz, 1H), 6.75 (dd, *J* = 5.0, 6.5 Hz, 1H), 3.43 (s, 3H). ^{13}C NMR (125 MHz, DMSO): 168.3, 160.0, 147.9, 138.1, 133.6, 132.6, 131.1, 130.4, 128.8, 127.6, 126.9, 126.3, 125.4, 125.4, 114.3, 107.2, 38.2. IR (KBr) 3166, 1648, 1582, 1479, 1434, 1301, 902, 781 cm^{-1}. HRMS calculated for $C_{17}H_{16}N_3O$ ($M + H^+$): 278.1293, found 278.1286.



1l

2-Chloro-N'-methyl-N'-(pyridin-2-yl)benzohydrazid: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1l** (65% yield) as a light yellow solid, mp 115.0–116.7 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.48 (br, 1H), 8.15 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.60 (dd, *J* = 1.0, 7.5 Hz, 1H), 7.47 (dt, *J* = 2.0, 7.5 Hz, 1H), 7.36-7.40 (m, 2H), 7.28 (dt, *J* = 1.5,

7.0 Hz, 1H), 6.81 (d, J = 8.5 Hz, 1H), 6.68 (dd, J = 5.0, 6.5 Hz, 1H), 3.39 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 165.8, 159.0, 147.5, 137.6, 133.2, 131.8, 131.0, 130.2, 130.1, 127.1, 114.8, 107.3, 38.4. IR (KBr) 3237, 1666, 1593, 1588, 1478, 1436, 1118, 892, 780 cm^{-1}. HRMS calculated for $C_{13}H_{13}ClN_3O$ (M + H$^+$): 262.0747, found 262.0744.



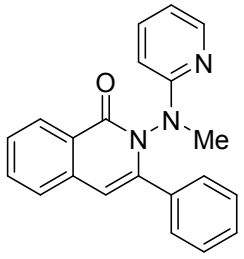
1m

N'-Methyl-N'-(pyridin-2-yl)furan-2-carbohydrazide: Prepared according to the general method A, purified by column chromatography (*n*-hexanes/EtOAc = 3:1 to 1:1) to afford the corresponding product **1m** (77% yield) as a light yellow solid, mp 140.3–142.1 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.48 (br, 1H), 8.21 (d, J = 4.0 Hz, 1H), 7.47-7.51 (m, 2H), 7.21 (d, J = 4.0 Hz, 1H), 6.77 (d, J = 8.0 Hz, 1H), 6.71 (dd, J = 4.0, 8.0 Hz, 1H), 6.54 (d, J = 4.0 Hz, 1H), 3.43 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 159.2, 157.3, 147.7, 146.6, 144.5, 137.7, 115.9, 114.9, 112.3, 107.2, 38.9. IR (KBr) 3224, 1664, 1597, 1564, 1407, 1296, 860, 756 cm^{-1}. HRMS calculated for $C_{11}H_{12}N_3O_2$ (M + H$^+$): 218.0930, found 218.0920.

3. General procedure for cobalt-catalyzed C (sp^2)-H alkynylation/cyclization

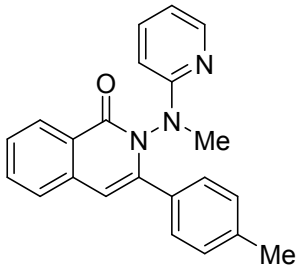
A mixture of N'-methyl-N'-(pyridin-2-yl)benzohydrazide (**1a**, 56.8 mg, 0.25 mmol), phenylacetylene (**2a**, 51 mg, 0.5 mmol), $Co(OAc)_2{\cdot}4H_2O$ (12.5 mg, 0.05 mmol), $Mn(OAc)_3{\cdot}2H_2O$ (134 mg, 0.5 mmol), TBAI (184.5 mg, 0.5 mmol) and HFIP (2.0 mL) was added to a 25 mL sealed tube. The tube was stirred at 100 °C for 24 h. After cooling to room temperature, the reaction mixture was diluted with 5.0 mL of ethyl acetate and filtered through a plug

of Celite, followed by washing with 70 mL of ethyl acetate. The combined residue was concentrated under reduced pressure, and then the resulting crude product was purified by column chromatography on neutral aluminum oxide to provide the product **3aa** (90%).



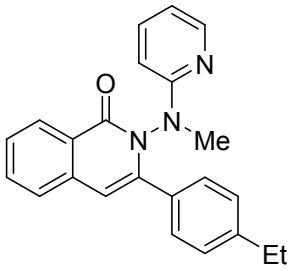
3aa

2-(Methyl(pyridin-2-yl)amino)-3-phenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3aa** (74 mg, 90% yield) as a light yellow solid, mp 127.6–128.4 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.39 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.0 Hz, 1H), 7.71 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.56 (d, *J* = 8.0 Hz, 1H), 7.41-7.49 (m, 4H), 7.30-7.38 (m, 3H), 6.70 (dd, *J* =5.0, 7.0 Hz, 1H), 6.58 (s, 1H), 6.42 (d, *J* = 8.5 Hz, 1H), 3.32 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.3, 158.8, 148.0, 145.8, 137.6, 136.6, 134.7, 133.0, 128.9, 128.5, 128.3, 127.9, 126.7, 126.3, 126.2, 114.9, 107.7, 106.4, 38.0. IR (KBr) 2780, 1665, 1593, 1485, 1432, 1337, 1142, 764, 697 cm^{-1}. HRMS calculated for $C_{21}H_{18}N_3O$ (M + H$^+$): 328.1450, found 328.1446.



3ab

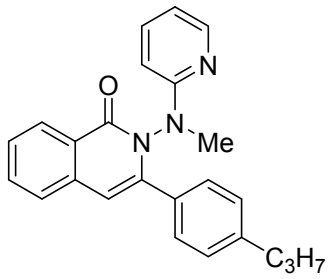
2-(Methyl(pyridin-2-yl)amino)-3-(*p*-tolyl)isoquinolin-1(2H)-on: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3ab** (73 mg, 85% yield) as a light yellow solid, mp 175.1–178.1 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.38 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.0 Hz, 1H), 7.69 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.55 (d, *J* = 8.0 Hz, 1H), 7.44-7.49 (m, 2H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.11 (d, *J* = 8.0 Hz, 2H), 6.70 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.56 (s, 1H), 6.41 (d, *J* = 8.5 Hz, 1H), 3.32 (s, 3H) , 2.34 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.4, 158.9, 147.9, 145.9, 138.8, 137.6, 136.7, 133.0, 131.8, 128.6, 128.4, 128.2, 126.6, 126.1, 114.8, 107.6, 106.5, 38.0, 21.2. IR (KBr) 2804, 1662, 1624, 1593, 1485, 1434, 1340, 820, 693 cm^{-1}. HRMS calculated for $C_{22}H_{20}N_3O$ (M + H$^+$): 342.1606, found 342.1599.



3ac

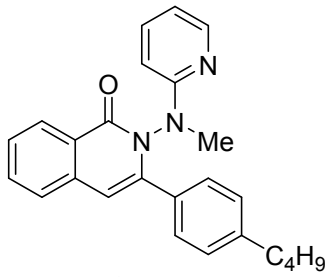
3-(4-Ethylphenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3ac** (84 mg, 94% yield) as a light yellow solid, mp 123.6–125.0 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.38 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.0 Hz, 1H), 7.69 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.55 (d, *J* = 8.0 Hz, 1H), 7.44-7.49 (m, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.13 (d, *J* = 8.0 Hz, 2H), 6.70 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.57 (s, 1H), 6.42 (d, *J* = 8.5 Hz, 1H),

3.32 (s, 3H) , 2.63 (q, J = 7.5 Hz, 2H), 1.23 (t, J = 7.5 Hz, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.4, 158.9, 147.9, 145.9, 145.1, 137.6, 136.7, 133.0, 132.0, 128.5, 128.3, 127.4, 126.6, 126.2, 114.8, 107.7, 106.5, 38.0, 28.6, 15.1. IR (KBr) 2774, 1660, 1620, 1533, 1481, 1431, 1156, 830, 770, 696, 524 cm^{-1}. HRMS calculated for $C_{23}H_{22}N_3O$ (M + H$^+$): 356.1763, found 356.1760.



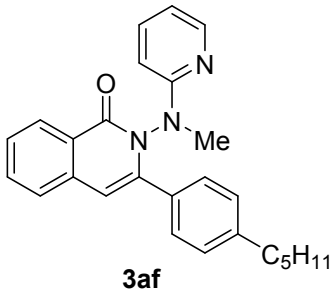
3ad

2-(Methyl(pyridin-2-yl)amino)-3-(4-propylphenyl)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3ad** (84 mg, 91% yield) as a light yellow solid, mp 126.2–128.8 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.38(d, J = 8.0 Hz, 1H), 8.20 (d, J = 4.0 Hz, 1H), 7.69 (t, J = 8.5 Hz, 1H), 7.55 (d, J = 8.0 Hz, 1H), 7.44-7.49 (m, 2H), 7.31 (d, J = 8.0 Hz, 2H), 7.11 (d, J = 8.0 Hz, 2H), 6.70 (dd, J = 5.0, 7.0 Hz, 1H), 6.58 (s, 1H), 6.41 (d, J = 8.0 Hz, 1H), 3.31 (s, 3H) , 2.58 (t, J = 7.5 Hz, 2H), 1.64 (m, 2H), 0.93 (t, J = 7.5 Hz, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.4, 158.9, 147.9, 145.9, 143.6, 137.6, 136.7, 133.0, 131.9, 128.4, 128.3, 128.0, 126.6, 126.2, 114.8, 107.7, 106.5, 38.0, 37.7, 24.2, 13.8. IR (KBr) 2773, 1632, 1619, 1592, 1479, 1429, 1336, 826, 770, 694, 543, 446 cm^{-1}. HRMS calculated for $C_{24}H_{24}N_3O$ (M + H$^+$): 370.1919, found 370.1912.



3ae

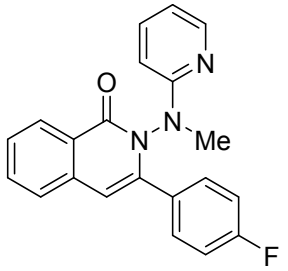
3-(4-Butylphenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 4:1) to afford the corresponding product **3ae** (91 mg, 95% yield) as a light yellow solid, mp 125.7–127.7 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.38 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.0 Hz，1H), 7.69 (t, *J* = 7.0 Hz, 1H), 7.55 (d, *J* = 8.0 Hz, 1H), 7.44-7.49 (m, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.11 (d, *J* = 8.0 Hz, 2H), 6.70 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.57 (s, 1H), 6.41 (d, *J* = 8.5 Hz, 1H), 3.32 (s, 3H) , 2.60 (t, *J* = 7.5 Hz, 2H), 1.56-1.64 (m, 2H), 1.31-1.39 (m, 2H), 0.92 (t, *J* = 7.5 Hz, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.4, 158.92, 147.9, 146.0, 143.8, 137.6, 136.7, 133.0, 131.9, 128.4, 128.3, 127.9, 126.6, 126.2, 114.8, 107.6, 106.5, 37.9, 35.4, 33.3, 22.4, 13.9. IR (KBr) 2788, 1662, 1620, 1592, 1479, 1431, 1337, 1119, 827, 770, 696, 543 cm^{-1}. HRMS calculated for $C_{25}H_{26}N_3O$ ($M + H^+$): 384.2076, found 384.2070.



3af

2-(Methyl(pyridin-2-yl)amino)-3-(4-pentylphenyl)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column

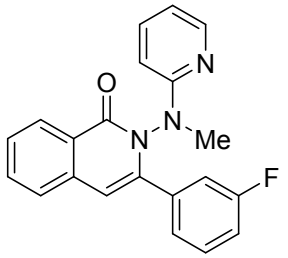
chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 4:1) to afford the corresponding product **3af** (84 mg, 85% yield) as a light yellow solid, mp 123.1–124.9 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.38 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.0 Hz，1H), 7.69 (t, *J* = 7.0 Hz, 1H), 7.55 (d, *J* = 8.0 Hz, 1H), 7.44-7.49 (m, 2H), 7.31 (d, *J* = 8.0 Hz, 2H), 7.11 (d, *J* = 8.0 Hz, 2H), 6.70 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.58 (s, 1H), 6.41 (d, *J* = 8.5 Hz, 1H), 3.32 (s, 3H) , 2.59 (t, *J* = 7.5 Hz, 2H), 1.58-1.64 (m, 2H), 1.27-1.35 (m, 4H), 0.89 (t, *J* = 7.0 Hz, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.4, 158.9, 147.9, 146.0, 143.9, 137.6, 136.7, 133.0, 131.9, 128.4, 128.3, 127.9, 126.6, 126.1, 114.8, 107.6, 106.5, 37.9, 35.7, 31.5, 30.8, 22.5, 13.9. IR (KBr) 2781, 1660, 1617, 1582, 1481, 1431, 1340, 1118, 769, 696, 633, 544 cm^{-1}. HRMS calculated for $C_{26}H_{28}N_3O$ (M + H$^+$): 398.2232, found 398.2233.



3ag

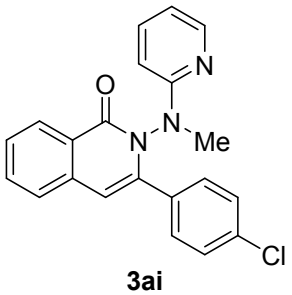
3-(4-Fluorophenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3ag** (80 mg, 92% yield) as a light yellow solid, mp 143.0–145.5 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.38(d, *J* = 8.0 Hz, 1H), 8.20 (dd, *J* = 1.0, 4.0 Hz, 1H), 7.69 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.55 (d, *J* = 7.5 Hz, 1H), 7.45-7.50 (m, 2H), 7.40-7.42 (m, 2H), 7.00 (t, *J* = 8.5 Hz, 2H), 6.71 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.56 (s, 1H), 6.43 (d, *J* = 8.0 Hz, 1H), 3.31 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 163.0 (d, *J* = 247.5 Hz), 161.2,

158.7, 148.0, 144.7, 137.7, 136.4, 133.1, 130.6 (d, J = 40.0 Hz), 130.4, 128.2, 126.8, 126.3 (d, J = 10.0 Hz), 126.2, 115.1, 114.9, 107.8, 106.3, 38.0. ^{19}F NMR (376 MHz, $CDCl_3$): δ -112.05. IR (KBr) 2769, 1669, 1617, 1594, 1507, 1481, 1261, 1096, 800, 696, 616, 534 cm^{-1}. HRMS calculated for $C_{21}H_{17}FN_3O$ (M + H$^+$): 346.1356, found 346.1349.



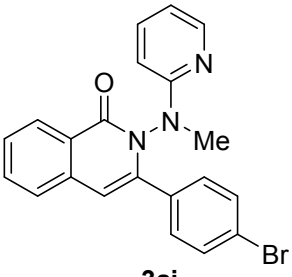
3ah

3-(3-Fluorophenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3ah** (65 mg, 75% yield) as a light yellow solid, mp 133.1–135.6 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.39 (d, J = 8.0 Hz, 1H), 8.20 (d, J = 4.5 Hz, 1H), 7.70 (dt, J = 1.0, 8.0 Hz, 1H), 7.56 (d, J = 8.0 Hz, 1H), 7.46-7.51 (m, 2H), 7.29 (t, J = 7.5 Hz, 1H), 7.21 (t, J = 8.0 Hz, 1H), 7.15 (d, J = 11.5 Hz, 1H), 7.06 (dt, J = 1.5, 7.5 Hz, 1H), 6.72 (dd, J = 5.0, 7.0 Hz, 1H), 6.58 (s, 1H), 6.43 d, J = 8.5 Hz, 1H), 3.33 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 162.0 (d, J = 245 Hz), 161.2, 158.7, 148.0, 144.4, 137.7, 136.6 (d, J = 8.8 Hz), 136.3, 133.1, 129.5 (d, J = 8.8 Hz), 128.2, 127.0, 126.3, 124.3, 116.0, 115.8, 115.4 (d, J = 58.8 Hz), 107.9, 106.4, 38.1. ^{19}F NMR (376 MHz, $CDCl_3$): δ -112.80. IR (KBr) 2780, 1667, 1593, 1483, 1270, 983, 767, 700 cm^{-1}. HRMS calculated for $C_{21}H_{17}FN_3O$ (M + H$^+$): 346.1356, found 346.1351.



3ai

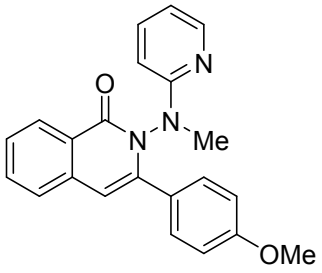
3-(4-Chlorophenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3ai** (72 mg, 80% yield) as a light yellow solid, mp 185.1–186.6 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.38 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.0 Hz, 1H), 7.70 (dt, *J* = 0.8, 8.0 Hz, 1H), 7.56 (d, *J* = 7.6 Hz, 1H), 7.46-7.52 (m, 2H), 7.36 (d, *J* = 8.4 Hz, 2H), 7.28 (d, *J* = 8.4 Hz, 2H), 6.73 (dd, *J* = 5.2, 6.8 Hz, 1H), 6.56 (s, 1H), 6.43 (d, *J* = 8.4 Hz, 1H), 3.31 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 161.2, 158.7, 148.1, 144.6, 137.8, 136.4, 135.0, 133.1, 129.8, 128.3, 128.2, 126.9, 126.3, 115.2, 107.8, 106.4, 38.1. IR (KBr) 2773, 1663, 1623, 1593, 1481, 1434, 1088, 1015, 825, 769, 696, 546 cm^{-1}. HRMS calculated for $C_{21}H_{17}ClN_3O$ (M + H$^+$): 362.1060, found 362.1061.



3aj

3-(4-Bromophenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3aj** (84 mg, 82% yield) as a light yellow

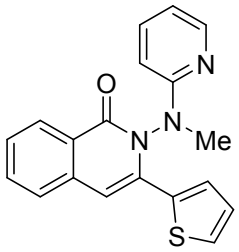
solid, mp 184.2–186.8 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.38 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.5 Hz，1H), 7.70 (t, *J* = 7.5 Hz, 1H), 7.56 (d, *J* = 8.0 Hz, 1H), 7.48-7.51 (m, 2H), 7.44 (d, *J* = 8.0 Hz, 2H), 7.30 (d, *J* = 8.0 Hz, 2H), 6.72 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.56 (s, 1H), 6.43 (d, *J* = 8.0 Hz, 1H), 3.31 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.2, 158.7, 148.1, 144.6, 137.8, 136.4, 133.6, 133.1, 131.2, 130.1, 128.3, 126.9, 126.3, 123.3, 115.2, 107.8, 106.4, 38.1. IR (KBr) 2776, 1663, 1621, 1592, 1480, 1430, 822, 769, 696, 600 cm^{-1}. HRMS calculated for $C_{21}H_{17}BrN_3O$ (M + H^+): 406.0555, found 406.0547.



3ak

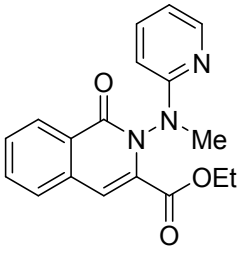
3-(4-Methoxyphenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 4:1 to 2:1) to afford the corresponding product **3ak** (80 mg, 89% yield) as a light yellow solid, mp 159.5–162.0 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.37 (d, *J* = 8.0 Hz, 1H), 8.20 (d, *J* = 4.0 Hz, 1H), 7.68 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.54 (d, *J* = 7.5 Hz, 1H), 7.44-7.48 (m, 2H), 7.34 (d, *J* = 9.0 Hz, 2H), 6.82 (d, *J* = 9.0 Hz, 2H), 6.70 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.56 (s, 1H), 6.41 (d, *J* = 8.5 Hz, 1H), 3.80 (s, 3H), 3.32 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.4, 160.1, 158.9, 148.0, 145.5, 137.6, 136.7, 133.0, 128.2, 127.0, 126.5, 126.1, 114.8, 113.4, 107.5, 106.4, 55.2, 37.9. IR (KBr) 2776, 1657, 1624, 1592, 1510, 1471, 1248, 1177, 1028, 823, 774 cm^{-1}. HRMS calculated for $C_{22}H_{20}N_3O_2$

$(M + H^+)$: 358.1556, found 358.1551.



3al

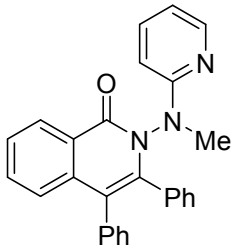
2-(Methyl(pyridin-2-yl)amino)-3-(thiophen-2-yl)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3al** (79 mg, 94% yield) as a light yellow oil. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.35 (d, *J* = 8.0 Hz, 1H), 8.28 (d, *J* = 4.5 Hz, 1H), 7.69 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.58 (d, *J* = 7.5 Hz, 1H), 7.44-7.49 (m, 3H), 7.35 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.02 (dd, *J* = 3.5, 5.0 Hz, 1H), 6.96 (s, 1H), 6.75-6.77 (m, 1H), 6.43 (d, *J* = 7.5 Hz, 1H), 3.50 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.3, 158.8, 148.0, 138.7, 137.8, 136.5, 134.0, 133.1, 128.9, 128.2, 128.1, 126.8, 126.3, 125.8, 115.4, 106.9, 106.3, 38.0. IR (KBr) 2773, 1670, 1610, 1592, 1481, 1434, 1110, 981, 818, 759, 696, 540 cm^{-1}. HRMS calculated for $C_{19}H_{16}N_3OS$ $(M + H^+)$: 334.1014, found 334.1011.



3am

Ethyl-2-(methyl(pyridin-2-yl)amino)-1-oxo-1,2-dihydroisoquinoline-3-carboxylate: Prepared according to general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1)

to afford the corresponding product **3am** (57 mg, 70% yield) as a light yellow solid, mp 98.9–100.8 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.39 (d, *J* = 8.0 Hz, 1H), 8.20 (dd, *J* = 1, 4.5 Hz, 1H), 7.73 (dt, *J* = 1.5, 8.0 Hz, 1H), 7.62 (d, *J* = 8.0 Hz, 1H), 7.56 (dt, *J* = 1.5, 8.0 Hz, 1H), 7.42-7.46 (m, 1H), 7.01 (s, 1H), 6.72 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.40 (d, *J* = 8.5 Hz, 1H), 4.25 (q, *J* = 7.0 Hz, 1H), 3.58 (s, 3H), 1.20 (t, *J* = 7.0 Hz, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 162.0, 160.9, 158.6, 147.8, 137.5, 136.9, 135.1, 133.2, 128.5, 128.4, 127.9, 127.3, 115.2, 109.6, 106.9, 62.2, 38.3, 13.8. IR (KBr) 2788, 1731, 1663, 1592, 1474, 1413, 1304, 1220, 1033, 764, 690 cm^{-1}. HRMS calculated for $C_{18}H_{18}N_3O_3$ (M + H$^+$): 324.1348, found 324.1343.

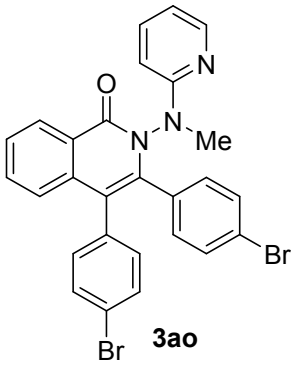


3an

2-(Methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one:

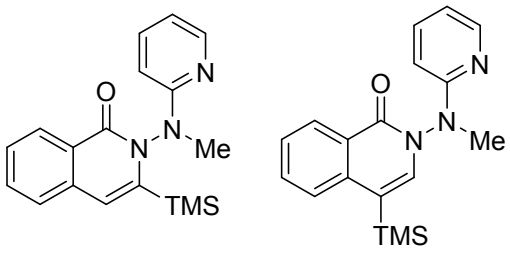
Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3an** (83 mg, 82% yield) as a white solid, mp 198.2–200.3 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.51 (dd, *J* = 1.0, 8.0 Hz, 1H), 8.17 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.58 (dt, *J* = 1.5, 8.0 Hz, 1H), 7.49 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.45 (dt, *J* = 2.0, 7.5 Hz, 1H), 7.24-7.28 (m, 2H), 7.07-7.21 (m, 8H), 6.96 (d, *J* = 7.5 Hz, 1H), 6.69 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.46 (d, *J* = 8.5 Hz, 1H), 3.32 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.8, 158.5, 147.8, 143.5, 137.5, 137.4, 136.0, 133.7, 132.8, 131.6, 131.4, 129.5, 129.2, 128.4, 128.1, 128.0, 127.9, 127.2, 127.0, 126.8, 126.3, 125.8, 119.4,

114.7, 106.3, 38.0. IR (KBr) 2770, 1670, 1620, 1477, 1437, 1320, 1150, 979, 788, 698, 633, 544 cm^{-1}. HRMS calculated for $C_{27}H_{22}N_3O$ (M + H^+): 404.1763, found 404.1754.



3ao

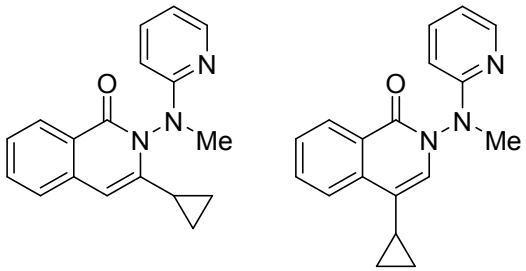
3,4-Bis(4-bromophenyl)-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 4:1 to 3:1) to afford the corresponding product **3ao** (60 mg, 43% yield) as a yellow solid, mp 172.0–173.1 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.80 (d, *J* = 8.0 Hz, 1H), 8.16 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.59 (t, *J* = 7.0 Hz, 1H), 7.46-7.53 (m, 2H), 7.41 (dd, *J* = 2.0, 8.0 Hz, 1H), 7.35 (dd, *J* = 2.0, 8.0 Hz, 1H), 7.29 (dd, *J* = 2.0, 8.0 Hz, 1H), 7.19 (d, *J* = 8.5 Hz, 1H), 7.05 (dd, *J* = 2.5, 8.0 Hz, 1H), 6.98 (dt, *J* =2.0, 8.0 Hz, 1H), 6.98-7.02 (m, 3H), 6.71 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.43 (d, *J* = 8.5 Hz, 1H), 3.28 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.6, 158.2, 148.0, 142.5, 137.6, 136.9, 134.7, 133.2, 133.0, 132.5, 131.6, 131.4, 130.9, 130.8, 130.7, 128.4, 127.2, 126.4, 125.5, 122.6, 121.5, 118.2, 115.1, 106.2, 38.2. IR (KBr) 2773, 1672, 1594, 1487, 1323, 1073, 1012, 821, 769, 705, 510 cm^{-1}. HRMS calculated for $C_{27}H_{20}Br_2N_3O$ (M + H^+): 559.9973, found 559.9969.



3ap:3ap' (3:1)

2-(Methyl(pyridin-2-yl)amino)-3-(trimethylsilyl)isoquinolin-1(2H)-one:

Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 6:1 to 4:1) to afford the corresponding product **3ap** (76 mg, 94% yield) as a colourless oil. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.46 (dd, *J* = 1.0, 8.0 Hz, 0.33H), 8.35 (d, *J* = 8.0 Hz, 1H), 8.27-8.30 (m, 1.34H), 7.56 (d, *J* = 8.0 Hz, 1.0H), 7.46-7.51 (m, 1.34H), 7.41-7.44 (m, 1.30H), 7.21 (s, 0.33H), 6.75-6.79 (m, 1.26H), 6.74 (s, 1.00H), 6.31 (d, *J* = 8.0 Hz, 1.00H), 6.25 (s, 1.00H), 3.60 (s, 1.00H), 3.58 (s, 3.00H), 0.41 (s, 3.00H), 0.22 (s, 9.00H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.4, 160.8, 160.2, 159.0, 149.3, 147.9, 147.8, 139.5, 139.4, 137.8, 137.4, 136.5, 132.6, 132.4, 128.7, 127.8, 127.5, 127.1, 126.9, 126.6, 126.2, 115.8, 115.3, 115.1, 114.5, 108.1, 106.9, 39.9, 37.9, -0.3, -0.60. IR (KBr) 2769, 2361, 1654, 1561, 1419, 1248, 1066, 838, 760, 668 cm^{-1}. HRMS calculated for $C_{18}H_{22}N_3OSi$ ($M + H^+$): 324.1532, found 324.1524.

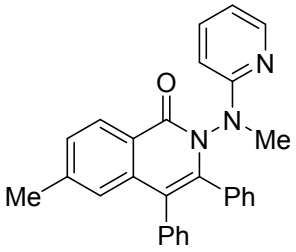


3aq:3aq' (3.7:1)

3-Cyclopropyl-2-(methyl(pyridin-2-yl)amino)isoquinolin-1(2H)-one:

Prepared according to the general procedure, purified by column

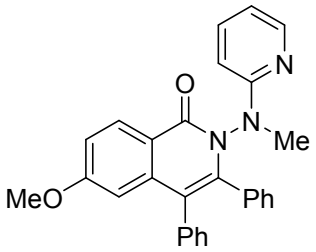
chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 6:1 to 4:1) to afford the corresponding product **3aq** (67 mg, 92% yield) as a colourless oil. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.43 (d, *J* = 8.5 Hz, 0.27H), 8.32 (d, *J* = 8.0 Hz, 1H), 8.26 (dd, *J* = 1.0, 5.0 Hz, 1.27H), 8.08 (d, *J* = 8.5 Hz, 0.27H), 7.77 (t, *J* = 8.0 Hz, 0.27H), 7.63 (dt, *J* = 1.0, 8.0 Hz, 1H), 7.53 (t, *J* = 7.0 Hz, 1H), 7.39-7.47 (m, 3.27H), 7.06 (d, *J* = 1.5 Hz, 0.27H), 6.71-6.75 (m, 1.27H), 6.29-6.31 (m, 1.27H), 6.25 (s, 1H), 3.61 (s, 3H), 3.57 (s, 0.9H), 1.92-1.96 (m, 1.27H), 0.95-1.01 (m, 1.61H), 0.71-0.83 (m, 3H), 0.58-0.70 (m, 0.58H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.5, 160.5, 158.9, 158.7, 148.0, 147.9, 147.3, 137.9, 137.7, 136.8, 132.8, 132.6, 131.7, 128.4, 126.9, 126.1, 125.7, 125.6, 123.6, 119.0, 115.3, 114.7, 106.8, 106.2, 102.2, 37.7, 37.4, 12.2, 10.1, 7.4, 5.9, 5.3, 5.1. IR (KBr) 2776, 1666, 1628, 1582, 1478, 1259, 1029, 778, 699 cm^{-1}. HRMS calculated for $C_{18}H_{18}N_3O$ (M + H^+): 292.1450, found 292.1447.



3bn

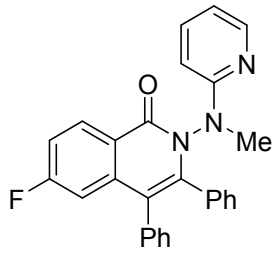
6-Methyl-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3bn** (89 mg, 85% yield) as a light yellow solid, mp 246.0–248.2 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.40 (d, *J* = 8.0 Hz, 1H), 8.16 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.45 (dt, *J* = 2.0, 7.5 Hz, 1H), 7.33 (dd, *J* = 1.0, 8.0 Hz, 1H), 7.24-7.28 (m, 1H), 7.04-7.21 (m, 9H), 6.95 (t,

J = 7.5 Hz, 1H), 6.67 (dd, *J* = 5.0, 6.5 Hz, 1H), 6.43 (d, *J* = 8.5 Hz, 1H), 3.31 (s, 3H), 2.38 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.7, 158.5, 147.8, 143.5, 137.5, 137.4, 136.0, 133.7, 131.6, 129.5, 129.2, 128.4, 128.0, 127.9, 127.2, 126.9, 125.5, 124.0, 119.3, 114.6, 106.3, 38.0, 22.0. IR (KBr) 2790, 1667, 1615, 1595, 1482, 1322, 833, 764, 698 cm^{-1}. HRMS calculated for $C_{28}H_{24}N_3O$ (M + H$^+$): 418.1919, found 418.1915.



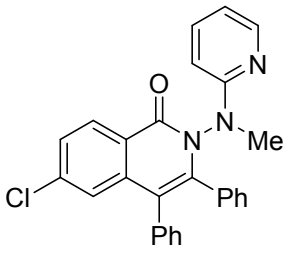
3cn

6-Methoxy-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 4:1 to 2:1) to afford the corresponding product **3cn** (100 mg, 92% yield) as a yellow solid, mp 221.5–223.7 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.43 (d, *J* = 8.0 Hz, 1H), 7.80 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.46 (dt, *J* = 2.0, 8.0 Hz, 1H), 7.24 (t, *J* = 8.0 Hz, 1H), 7.06-7.20 (m, 9H), 6.95 (d, *J* = 7.5 Hz, 1H), 6.68 (dt, *J* = 2.0, 7.0 Hz, 1H), 6.62 (d, *J* = 2.5 Hz, 1H), 6.43 (d, *J* = 8.5 Hz, 1H), 3.72 (s, 3H), 3.30 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 163.3, 160.4, 158.6, 147.8, 144.1, 139.6, 137.4, 136.0, 133.8, 131.6, 131.3, 130.5, 129.4, 129.1, 128.1, 128.0, 127.2, 127.0, 120.0, 119.1, 115.4, 114.6, 107.9, 106.3, 55.3, 38.1. IR (KBr) 2781, 1664, 1591, 1480, 1410, 1233, 836, 767, 726 cm^{-1}. HRMS calculated for $C_{28}H_{24}N_3O_2$ (M + H$^+$): 434.1869, found 434.1864.



3dn

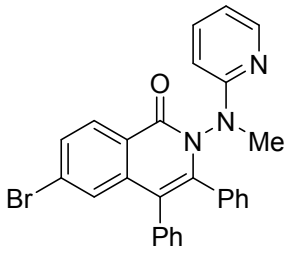
6-Fluoro-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3dn** (99 mg, 94% yield) as a white solid, mp 220.1–222.0 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.49 (dd, *J* = 4.0, 9.0 Hz, 1H), 8.15 (m, 1H), 7.46 (dt, *J* = 2.0, 8.0 Hz, 1H), 7.01-7.26 (m, 10H), 6.95 (t, *J* = 7.5 Hz, 1H), 6.87 (dd, *J* = 2.5, 10.0 Hz, 1H), 6.68 (dt, *J* = 5.0, 7.0 Hz, 1H), 6.43 (d, *J* = 8.5 Hz, 1H), 3.29 (s, 1H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 165.7 (d, *J* = 248.8 Hz), 160.1, 158.3, 147.9, 145.0, 140.1 (d, *J* = 10.0 Hz), 137.5, 135.5, 133.5, 131.6, 131.5, 131.2, 129.3, 129.1, 128.3, 128.2, 127.3 (d, *J* = 3.8 Hz), 122.9, 118.8, 115.3 (d, *J* = 23.8 Hz), 114.8, 111.1 (d, *J* = 23.8 Hz), 106.2, 38.1. ^{19}F NMR (376 MHz, $CDCl_3$): δ -104.7. IR (KBr) 2773, 1672, 1613, 1593, 1476, 1324, 1157, 727, 561 cm^{-1}. HRMS calculated for $C_{27}H_{21}FN_3O$ (M + H$^+$): 422.1669, found 422.1663.



3en

6-Bromo-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column

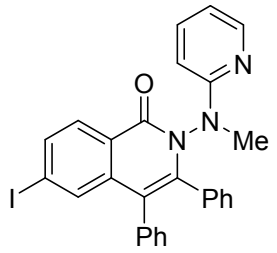
chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3en** (77 mg, 70% yield) as a white solid, mp 234.7–236.5 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.42 (d, *J* = 8.5 Hz, 1H), 8.16 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.45-7.49 (m, 2H), 7.09-7.44 (m, 10H), 6.96 (t, *J* = 7.5 Hz, 1H), 6.69-6.72 (m, 1H), 6.43 (d, *J* = 8.5 Hz, 1H), 3.29 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.3, 158.2, 148.0, 145.1, 139.6, 138.9, 137.5, 135.3, 133.4, 131.5, 131.3, 130.1, 129.3, 129.1, 128.3, 128.2, 127.3, 125.2, 124.6, 118.5, 114.9, 106.2, 38.1. IR (KBr) 2785, 1669, 1595, 1483, 1322, 945, 763, 711 cm^{-1}. HRMS calculated for $C_{27}H_{21}ClN_3O$ (M + H$^+$): 438.1373, found 438.1367.



3fn

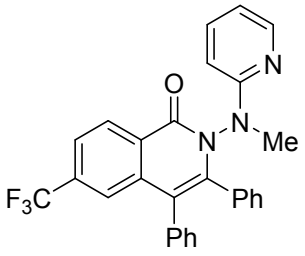
6-Bromo-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3fn** (96 mg, 80% yield) as a white solid, mp 233.5–234.6 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.34 (d, *J* = 8.5 Hz, 1H), 8.16 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.59 (dd, *J* = 2.0, 9.0 Hz, 1H), 7.45 (dt, *J* = 1.5, 7.0 Hz, 1H), 7.40 (d, *J* = 1.5 Hz, 1H), 7.07-7.29 (m, 9H), 6.96 (t, *J* = 8.0 Hz, 1H), 6.71 (dt, *J* = 5.0, 7.0 Hz, 1H), 6.43 (d, *J* = 8.5 Hz, 1H), 3.29 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.4, 158.2, 147.9, 145.1, 139.0, 137.5, 135.2, 133.4, 131.5, 131.3, 130.1, 130.0, 129.4, 129.1, 128.3, 128.1, 127.3, 127.2, 124.9, 118.4, 114.9, 106.2, 38.0. IR (KBr) 2776, 1666, 1593, 1481,

1406, 1320, 942, 764, 705 cm^{-1}. HRMS calculated for $C_{27}H_{21}BrN_3O$ (M + H^+): 482.0868, found 482.0865.



3gn

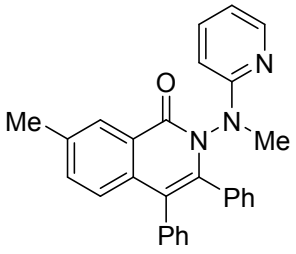
6-Iodo-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3gn** (98 mg, 74% yield) as a white solid, mp 235.0–236.6 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.15-8.19 (m, 2H), 7.80 (dd, *J* = 1.5, 8.0 Hz, 1H), 7.62 (d, *J* = 1.5 Hz, 1H), 7.46 (dt, *J* = 2.0, 8.0 Hz, 1H), 7.25-7.28 (m, 1H), 7.06-7.20 (m, 8H), 6.95 (d, *J* = 7.5 Hz, 1H), 6.69 (dt, *J* = 0.5, 5.5 Hz, 1H), 6.41 (d, *J* = 8.5 Hz, 1H), 3.28 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.6, 158.2, 147.9, 144.9, 138.9, 137.5, 135.8, 135.2, 134.6, 133.4, 131.5, 131.3, 129.7, 129.3, 129.1, 128.3, 128.1, 127.3, 127.2, 125.4, 118.2, 114.9, 106.2, 101.2, 38.1. IR (KBr) 2776, 1668, 1592, 1479, 1437, 1318, 939, 764, 703 cm^{-1}. HRMS calculated for $C_{27}H_{21}IN_3O$ (M + H^+): 530.0729, found 530.0723.



3hn

2-(Methyl(pyridin-2-yl)amino)-3,4-diphenyl-6-

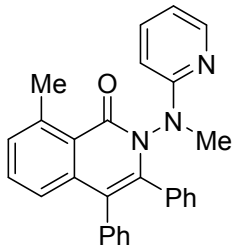
(trifluoromethyl)isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3hn** (85 mg, 72% yield) as a white solid, mp 175.0–176.8 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.61 (d, *J* = 8.0 Hz, 1H), 8.17 (dd, *J* = 2.0, 10.0 Hz, 1H), 7.69 (dd, *J* = 1.0, 8.0 Hz, 1H), 7.54 (s, 1H), 7.48 (dt, *J* = 1.5, 7.5 Hz, 1H), 7.25-7.30 (m, 1H), 7.09-7.23 (m, 8H), 6.97 (d, *J* = 7.5 Hz, 1H), 6.71 (dd, *J* = 5.0, 6.5 Hz, 1H), 6.44 (d, *J* = 8.5 Hz, 1H), 3.30 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.6, 158.1, 148.0, 145.3, 137.7, 137.6, 135.0, 134.4 (q, *J* = 32.5 Hz), 133.3, 131.5, 131.2, 129.4, 129.3, 129.2, 128.5, 128.4, 128.3, 128.2, 128.0, 127.5, 127.4, 127.3, 127.2 (q, *J* = 67.5 Hz), 124.7, 123.0 (q, *J* = 3.8 Hz), 122.7, 122.5, 119.1, 115.0, 106.1, 38.1. ^{19}F NMR (376 MHz, $CDCl_3$): δ -63.0. IR (KBr) 2795, 1669, 1596, 1559, 1487, 1313, 1141, 764, 698 cm^{-1}. HRMS calculated for $C_{28}H_{21}F_3N_3O$ (M + H$^+$): 472.1637, found 472.1627.



3in

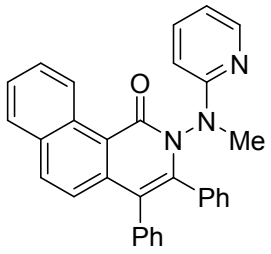
7-Methyl-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3in** (94 mg, 90% yield) as a light yellow solid, mp 156.1–157.4 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.32 (s, 1H), 8.16 (dd, *J* = 1, 5.0 Hz, 1H), 7.45 (dt, *J* = 2.0, 8.5 Hz, 1H), 7.41 (d, *J* = 1.5, 8.5 Hz, 1H), 7.06-7.26 (m, 10H), 6.95 (t, *J* = 7.5 Hz, 1H), 6.67 (dd, *J* = 5.0, 6.5

Hz, 1H), 6.43 (d, J = 8.5 Hz, 1H), 3.31 (s, 3H), 2.45 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.8, 158.6, 147.8, 142.5, 137.4, 137.0, 136.1, 135.1, 134.2, 133.8, 131.6, 131.4, 129.6, 129.3, 128.0, 127.9, 127.2, 126.9, 126.2, 125.8, 119.4, 106.4, 38.0, 21.3. IR (KBr) 2772, 1666, 1592, 1477, 1419, 1328, 1156, 826, 766, 706 cm^{-1}. HRMS calculated for $C_{28}H_{24}N_3O$ (M + H$^+$): 418.1919, found 418.1915.



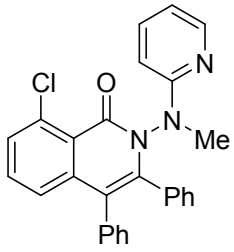
3jn

8-Methyl-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3jn** (64 mg, 61% yield) as a white solid, mp 215.6–217.8 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.15 (dd, J = 1.0, 5.0 Hz, 1H), 7.41-7.46 (m, 2H), 7.21-7.26 (m, 2H), 7.04-7.20 (m, 9H), 6.92 (t, J = 7.5 Hz, 1H), 6.66 (dd, J = 5.0, 6.5 Hz, 1H), 6.44 (d, J = 8.5 Hz, 1H), 3.30 (s, 3H), 2.94 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 161.2, 158.5, 147.8, 143.5, 142.6, 139.2, 137.3, 136.7, 133.8, 131.9, 131.7, 131.5, 130.0, 129.3, 129.0, 128.1, 127.9, 127.2, 127.1, 126.9, 124.7, 124.2, 119.2, 114.4, 106.3, 38.0, 24.1. IR (KBr) 2775, 1666, 1589, 1473, 1431, 1297, 1149, 782, 698 cm^{-1}. HRMS calculated for $C_{28}H_{24}N_3O$ (M + H$^+$): 418.1919, found 418.1916.



3kn

2-(Methyl(pyridin-2-yl)amino)-3,4-diphenylbenzo[h]isoquinolin-1(2H)-one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3kn** (50 mg, 44% yield) as a light yellow solid, mp 231.7–232.8 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 10.18 (d, *J* = 9.0 Hz, 1H), 8.18 (dd, *J* = 1.0, 5.0 Hz, 1H), 7.93 (d, *J* = 8.5 Hz, 1H), 7.87 (d, *J* = 7.5 Hz, 1H), 7.70 (dt, *J* = 2.0, 7.0 Hz, 1H), 7.60 (dt, *J* = 1.0, 7.5 Hz, 1H), 7.45 (t, *J* = 7.0 Hz, 1H), 7.31 (d, *J* = 9.0 Hz, 1H), 7.08-7.28 (m, 9H), 6.97 (t, *J* = 7.5 Hz, 1H), 6.69 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.44 (d, *J* = 8.5 Hz, 1H), 3.39 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 160.9, 158.6, 147.9, 145.3, 138.9, 137.5, 136.5, 134.0, 133.8, 132.1, 131.9, 131.7, 129.2, 129.0, 128.7, 128.2, 128.1, 128.0, 127.7, 127.3, 127.2, 127.1, 126.7, 123.6, 120.0, 119.5, 114.7, 106.3, 38.2. IR (KBr) 2773, 1660, 1584, 1477, 1437, 1216, 834, 766, 698 cm^{-1}. HRMS calculated for $C_{31}H_{24}N_3O$ (M + H$^+$): 454.1919, found 454.1912.



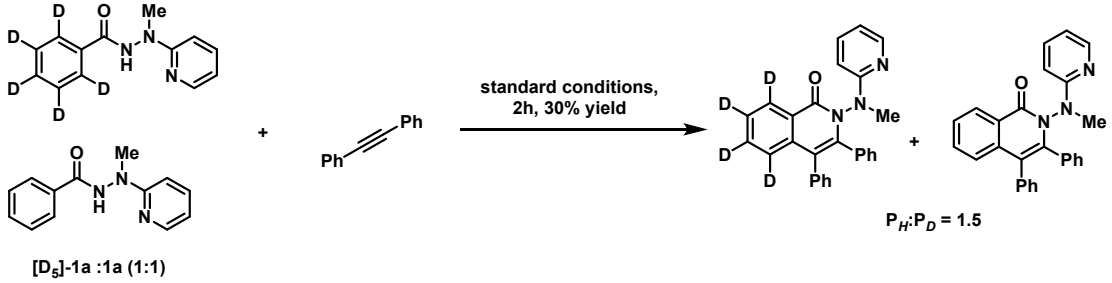
3ln

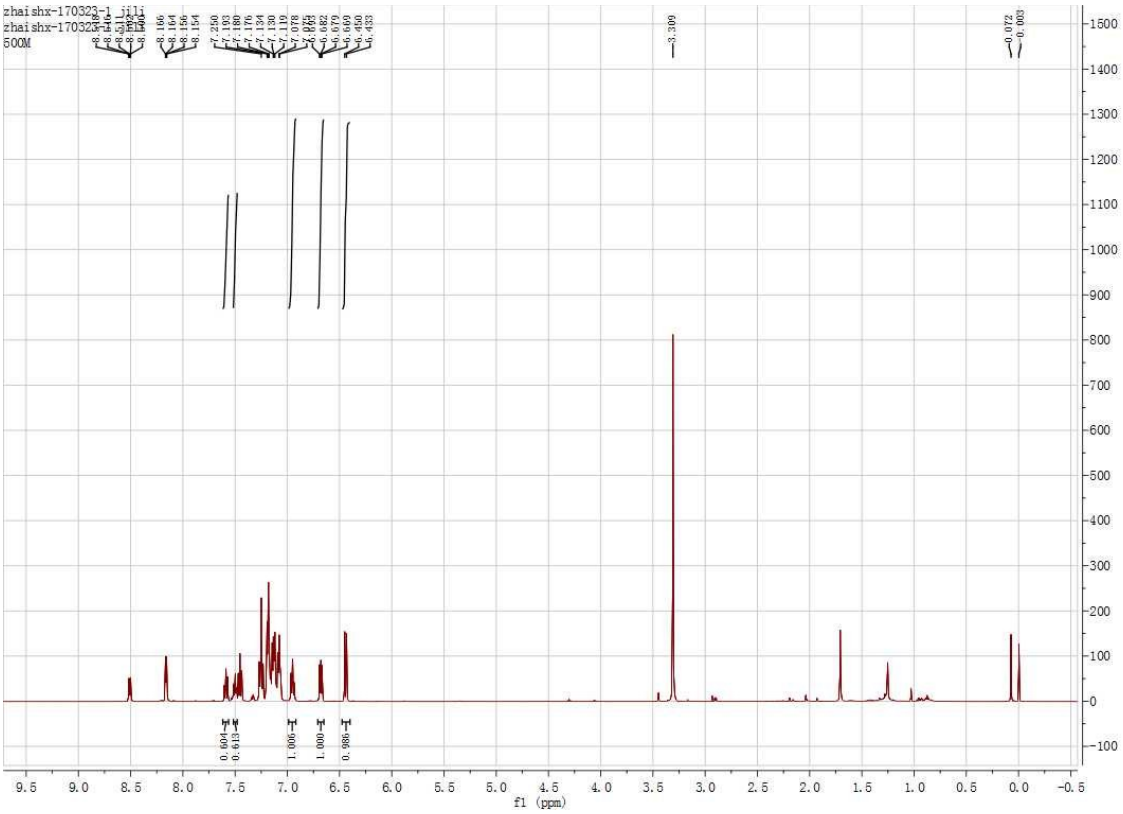
8-Chloro-2-(methyl(pyridin-2-yl)amino)-3,4-diphenylisoquinolin-1(2H)-

one: Prepared according to the general procedure, purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 5:1 to 3:1) to afford the corresponding product **3ln** (64 mg, 58% yield) as a white solid, mp 212.8–213.8 °C. ^{1}H NMR (500 MHz, $CDCl_3$): δ 8.13 (dd, *J* = 1.0, 5.0 Hz，1H), 7.47 (d, *J* = 8.0 Hz, 1H), 7.45 (dt, *J* = 1.5, 7.0 Hz, 1H), 7.38 (t, *J* = 8.0 Hz, 1H), 7.04-7.25 (m, 10H), 6.92 (t, *J* = 7.5 Hz, 1H), 6.69 (dd, *J* = 5.0, 7.0 Hz, 1H), 6.43 (d, *J* = 8.5 Hz, 1H), 3.29 (s, 3H). ^{13}C NMR (125 MHz, $CDCl_3$): δ 158.9, 158.2, 147.8, 144.9, 140.6, 137.5, 136.1, 133.5, 132.2, 131.6, 131.4, 130.0, 129.1, 128.9, 128.2, 128.1, 128.0, 127.3, 127.2, 125.1, 122.8, 118.5, 114.7, 106.2, 38.2. IR (KBr) 2766, 1677, 1588, 1474, 1433, 1289, 811, 756, 699 cm^{-1}. HRMS calculated for $C_{27}H_{21}ClN_3O$ (M + H$^+$): 438.1373, found 438.1369.

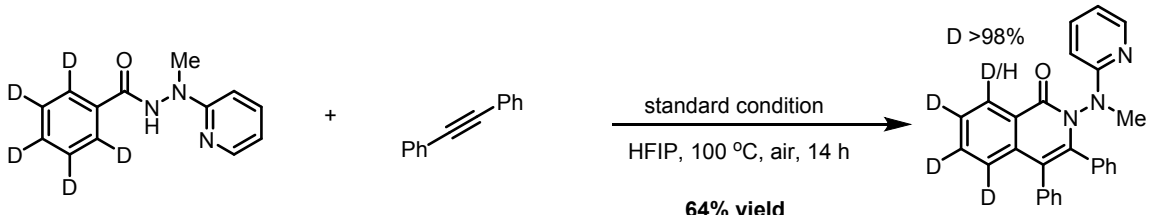
4. Preliminary Mechanistic Experiments

Deuterium labeling studies

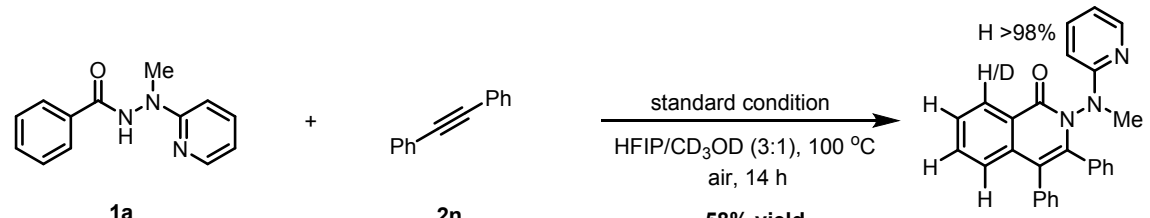




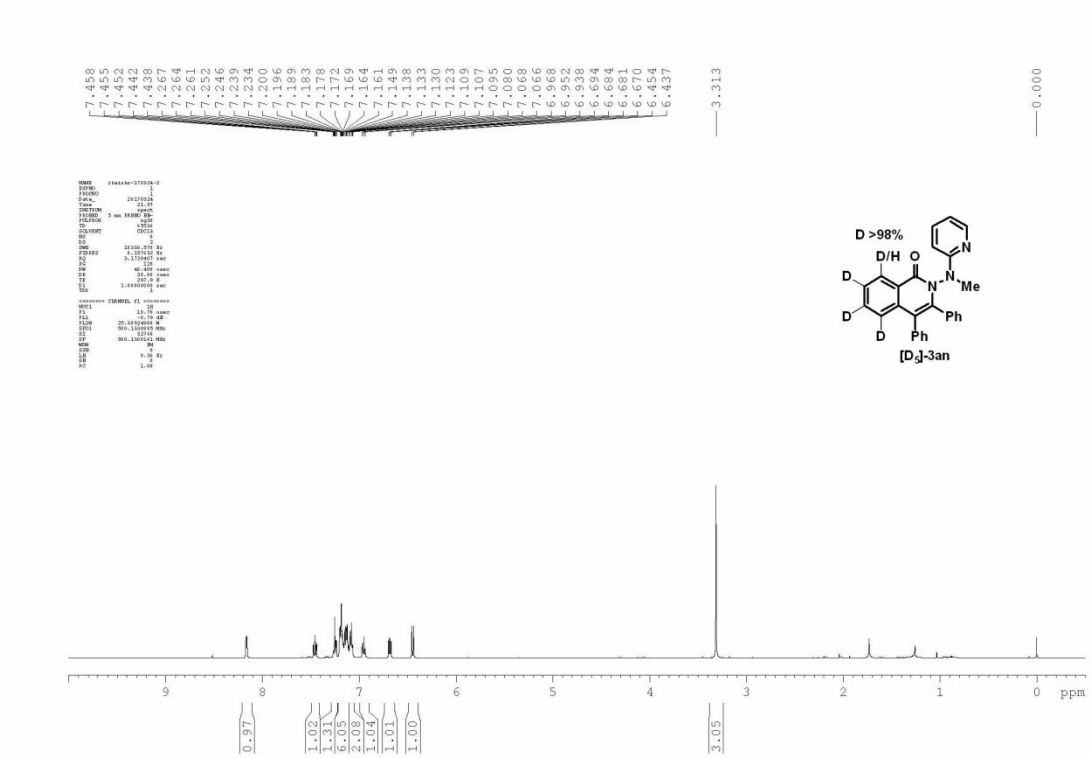
Studies with isotopically labeled compounds

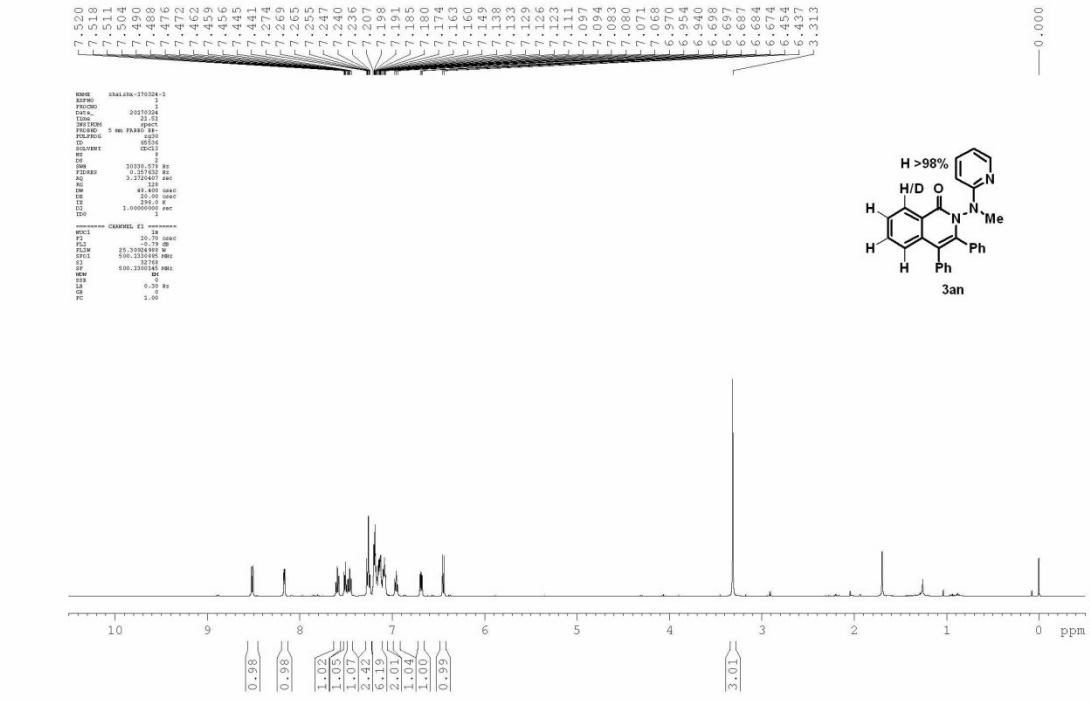


[D$_5$]-1a **2n** **[D$_5$]-3an**

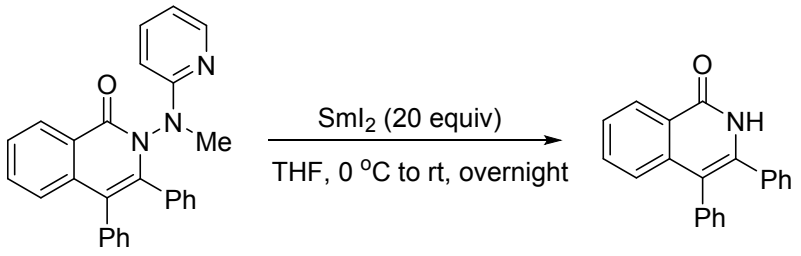


1a **2n** **3an**



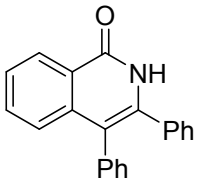


5. Removal of the directing group



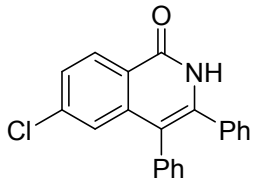
3an **5**

General experiment procedure: An oven-dried 25 mL two-neck round bottom flask was charged with **3an** (0.11 mmol, 45 mg). After purging with Ar three times, 5 mL fresh distilled THF was added, followed by SmI_2 (0.1 M in THF, 20 equiv) was added dropwise at 0 °C. After 5 minutes, the mixture was warmed to rt and stirred overnight. After that the mixture was quenched with 5 mL saturated aqueous $Na_2S_2O_3$ and extracted with DCM, dried over Na_2SO_4, filtered, and concentrated under reduced pressure and **5**[2] was obtained in 94% yield via column chromatography.



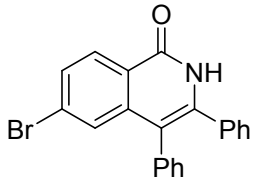
5

3,4-Diphenylisoquinolin-1(2H)-one: Purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 3:1 to 2:1) to afford the corresponding product **5** (31 mg, 94% yield). ^{1}H NMR (500 MHz, DMSO): δ 11.54 (br, 1H), 8.31 (d, J = 7.5 Hz, 1H), 7.64 (t, J = 7.5 Hz, 1H), 7.51 (t, J = 7.5 Hz, 1H), 7.22-7.31 (m, 8H), 7.14 (d, J = 7.5 Hz, 3H). ^{13}C NMR (125 MHz, DMSO): δ 162.1, 158.5, 139.0, 138.5, 136.3, 135.0, 132.9, 132.1, 130.3, 128.7, 128.6, 128.1, 127.5, 127.3, 126.7, 125.5, 125.4, 115.9.



6

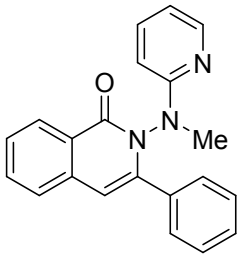
6-Chloro-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure (43.8 mg, 0.1 mmol scale), purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 3:1 to DCM/MeOH = 30:1) to afford the corresponding product **6** (29 mg, 88% yield). ^{1}H NMR (400 MHz, DMSO): δ 11.66 (br, 1H), 8.31 (d, *J* = 8.4 Hz, 1H), 7.55 (dd, *J* = 2.0, 8.4 Hz, 1H), 7.20-7.34 (m, 8H), 7.16 (dd, *J* = 1.6, 8.0 Hz, 2H), 7.04 (d, *J* = 2.0 Hz, 1H). ^{13}C NMR (100 MHz, DMSO): δ 161.6, 140.8, 140.2, 138.1, 135.6, 134.7, 132.1, 130.2, 129.8, 128.9, 128.2, 127.9, 126.9, 124.3, 124.1, 115.0.



7

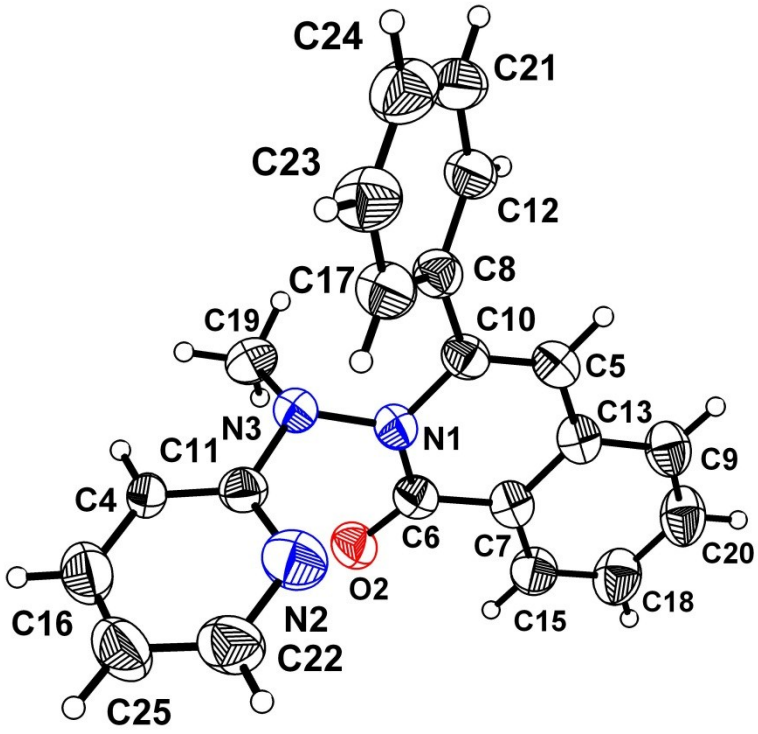
6-Bromo-3,4-diphenylisoquinolin-1(2H)-one: Prepared according to the general procedure (24.1 mg, 0.05 mmol scale), purified by column chromatography on neutral aluminum oxide (*n*-hexanes/EtOAc = 3:1 to DCM/MeOH = 50:1) to afford the corresponding product **7** (17 mg, 90% yield). ^{1}H NMR (400 MHz, DMSO): δ 11.70 (br, 1H), 8.22 (d, *J* = 8.4 Hz, 1H), 7.67 (dd, *J* = 2.0, 8.4 Hz, 1H), 7.26-7.34 (m, 3H), 7.20-7.24 (m, 6H), 7.14-7.16 (m, 2H). ^{13}C NMR (100 MHz, DMSO): δ 161.9, 140.9, 140.4, 135.7, 134.7, 132.2, 130.3, 129.9, 129.8, 129.0, 128.3, 128.0, 127.5, 127.4, 124.4, 115.1.

6. X-ray Crystallographic Data of Compound 3aa and Compound 3an



3aa

X-ray of 3aa (CCDC: 1547832)



Crystal Clear-SM Expert 2.0 r4 (Rigaku, 2009)

Cell length a	5.9781(14)
Cell length b	12.919(2)
Cell length c	22.346(4)
Cell angle alpha	90

Cell angle beta	92.713(5)
Cell angle gamma	90
Cell volume	1723.8(5)
Cell formula units Z	6
Cell measurement temperature	293
Cell measurement reflns used	1697
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Cell measurement theta max	67.9
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Symmetry space group name H-M	'P2'
Symmetry Int Tables number	3
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Exptl crystal colour	'Colorless'
Exptl crystal size max	0.20
Exptl crystal size mid	0.20
Exptl crystal size min	0.20
Chemical formula weight	327.15
Chemical formula sum	$C_{21}H_{18}N_3O$
Exptl absorpt coefficient mu	9.97
Exptl absorpt correction type	'Multi-scan'
Exptl absorpt correction T max	1.000
Exptl absorpt correction T min	0.556
Diffrn ambient temperature	293
Diffrn source power	0.0
Diffrn source voltage	45.0
Diffrn source current	0.9
Diffrn radiation wavelength	1.54187

Diffrn radiation type	'Copper'
Diffrn source	'Sealed Tube'
Diffrn radiation monochromator	'Graphite Monochromator'
Diffrn measurement specimen support	'Fiber'
Diffrn detector	'CCD'
Diffrn measurement device	AFC11 (Right): Eulerian 3 circle
Diffrn measurement device type	Rigaku Saturn944+ (2x2 bin mode)
Diffrn detector area resol mean	22.2222
Diffrn measurement method	profile data from \w-scans
Diffrn reflns number	13254
Diffrn reflns av R equivalents	0.059
Diffrn reflns av unetI/netI	0.084
Diffrn reflns theta full	67.9
Diffrn measured fraction theta max	0.974
Diffrn measured fraction theta full	0.974
Diffrn reflns theta min	22.9
Diffrn reflns theta max	67.9
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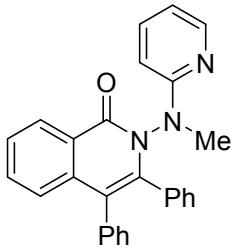
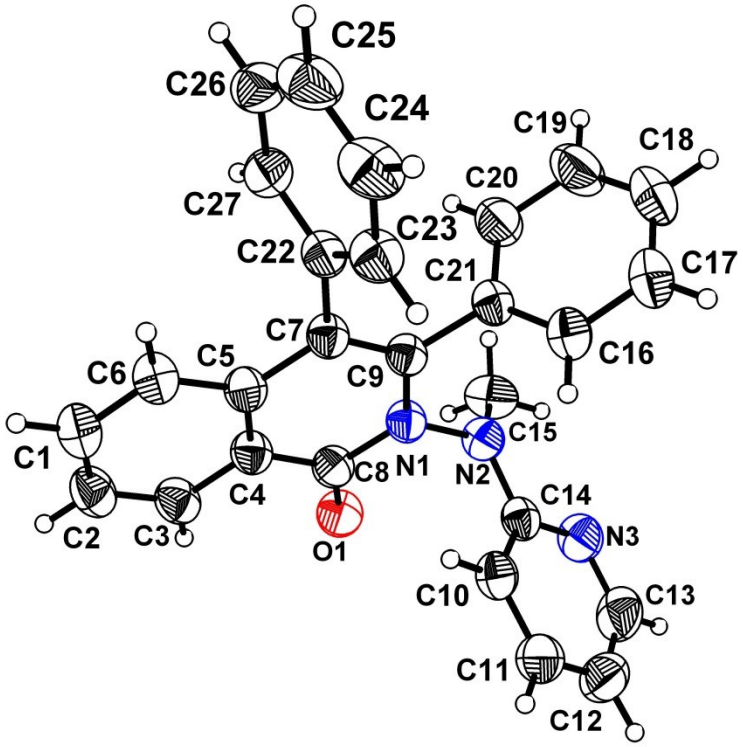


3an

X-ray of 3an (CCDC: 1548078)



Crystal Clear-SM Expert 2.0 r4 (Rigaku, 2009)

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Cell length b	11.047(6)
Cell length c	20.569(9)
Cell angle alpha	90.032(4)
Cell angle beta	90.00(3)
Cell angle gamma	114.101(17)

Cell volume	2145(18)
Cell formula units Z	8
Cell measurement temperature	293
Cell measurement reflns used	2302
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Symmetry Int Tables number	1
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Exptl crystal size max	0.20
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Exptl absorpt coefficient mu	10.68
Exptl absorpt correction type	'Multi-scan'
Exptl absorpt correction T max	1.000
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Diffrn ambient temperature	293
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Diffrn radiation wavelength	1.54187
Diffrn radiation type	'Copper'
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Diffrn radiation monochromator	'Graphite Monochromator'
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Diffrn detector	'CCD'
Diffrn measurement device	AFC11 (Right): Eulerian 3 circle
Diffrn measurement device type	Rigaku Saturn944+ (2x2 bin mode)
Diffrn detector area resol mean	22.2222
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7. **References**

1. (a) Stadler, A.-M.; Lehn, J.-M. *J. Am. Chem. Soc.* **2014**, *136*, 3400-3409. (b) Radunsky, C.; Kösters, J.; Letzel, M.; Yogendra, S.; Schwickert, C.; Manck, S.; Sarkar, B.; Pöttgen, R.; Weigand, J.; Neugebauer, J.; Müller, J. *Eur. J. Inorg. Chem.* **2015,** *24***,** 4006–4012. (c) Stadler, A.-M.; Karmazin, L.; Bailly, C. *Angew. Chem. Int. Ed.* 2015, 54,14570–14574.

2. (a) Guimond, N.; Gouliaras, C.; Fagnou, K. *J. Am. Chem. Soc.* **2010**, *132*, 6908-6909. (b) Shiota, H.; Ano, Y.; Aihara, Y.; Fukumoto, Y.; Chatani, N. *J. Am. Chem. Soc.* **2011**, *133*, 4952-4955.

8. ^{1}H, ^{13}C and ^{19}F NMR Spectra

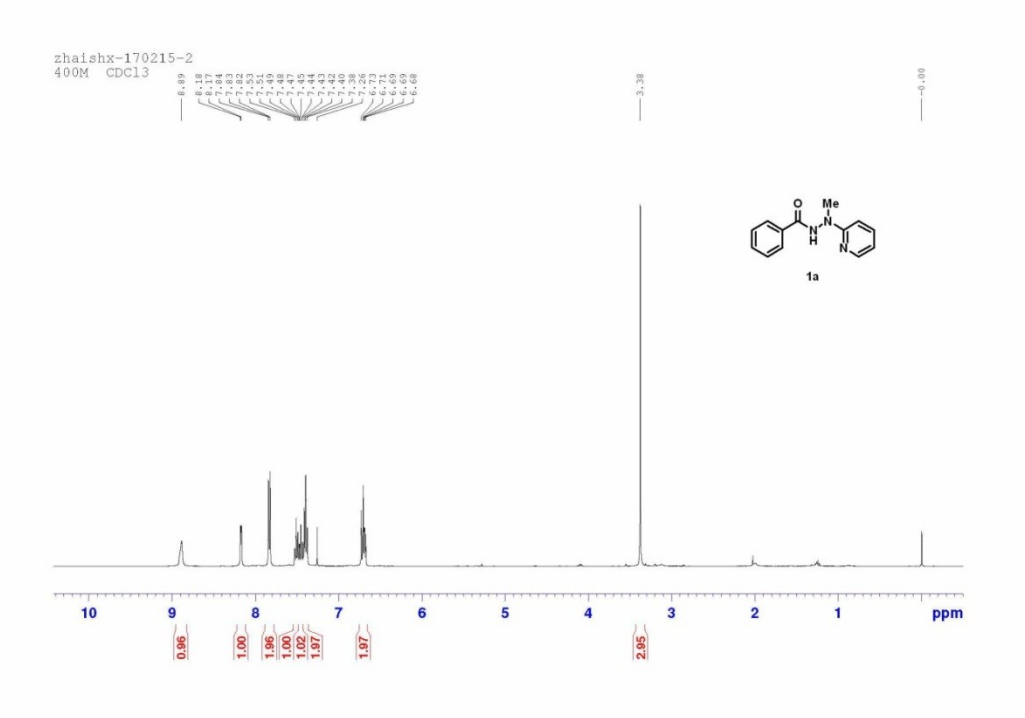

Fig. S1. ^{1}H NMR Spectrum of **1a** (400 MHz, $CDCl_3$).

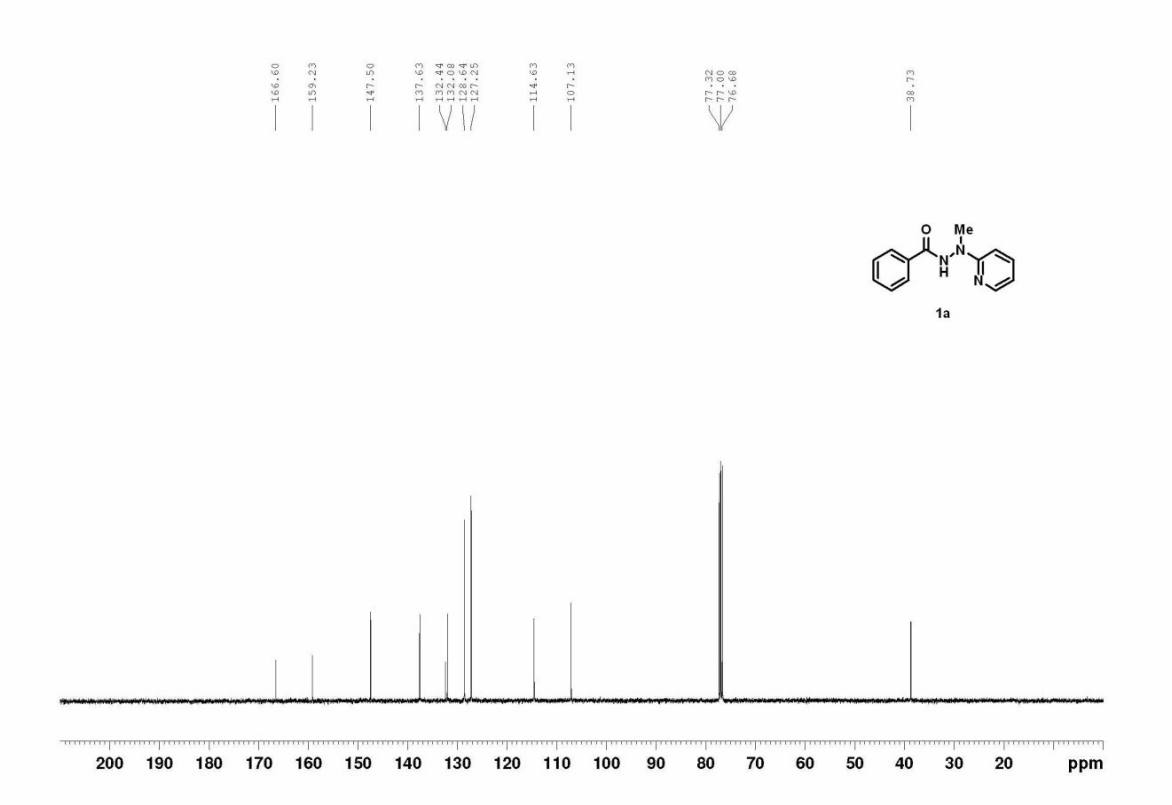

Fig. S2. ^{13}C NMR Spectrum of **1a** (100 MHz, $CDCl_3$).

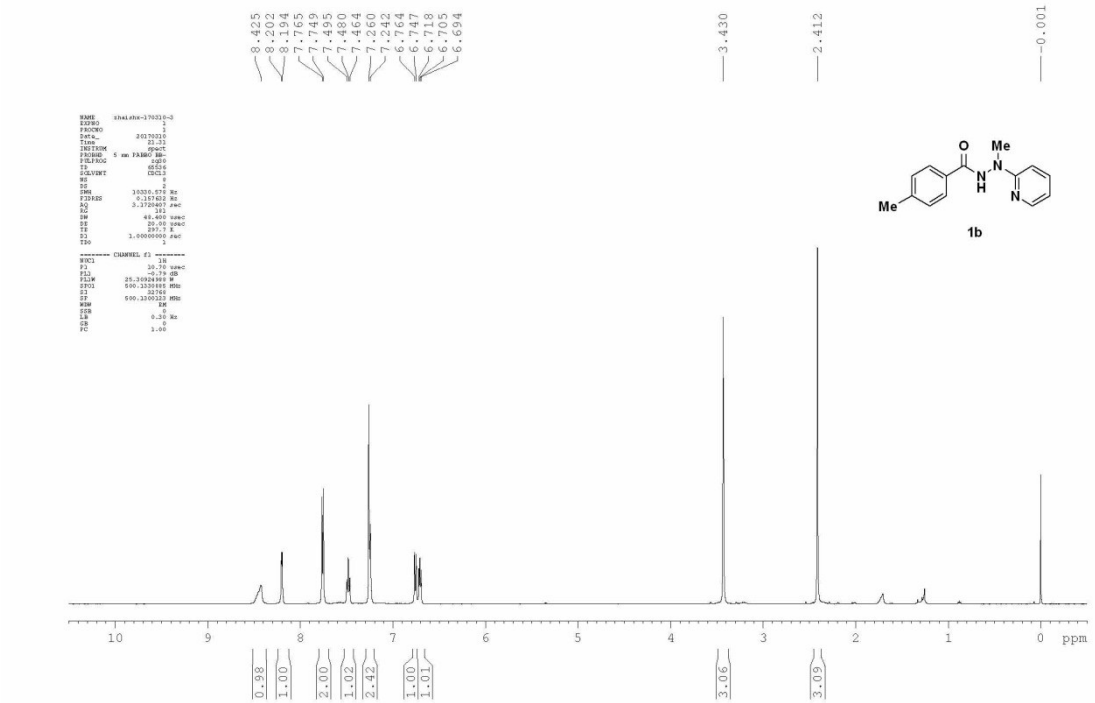

Fig. S3. ^{1}H NMR Spectrum of **1b** (500 MHz, $CDCl_3$).

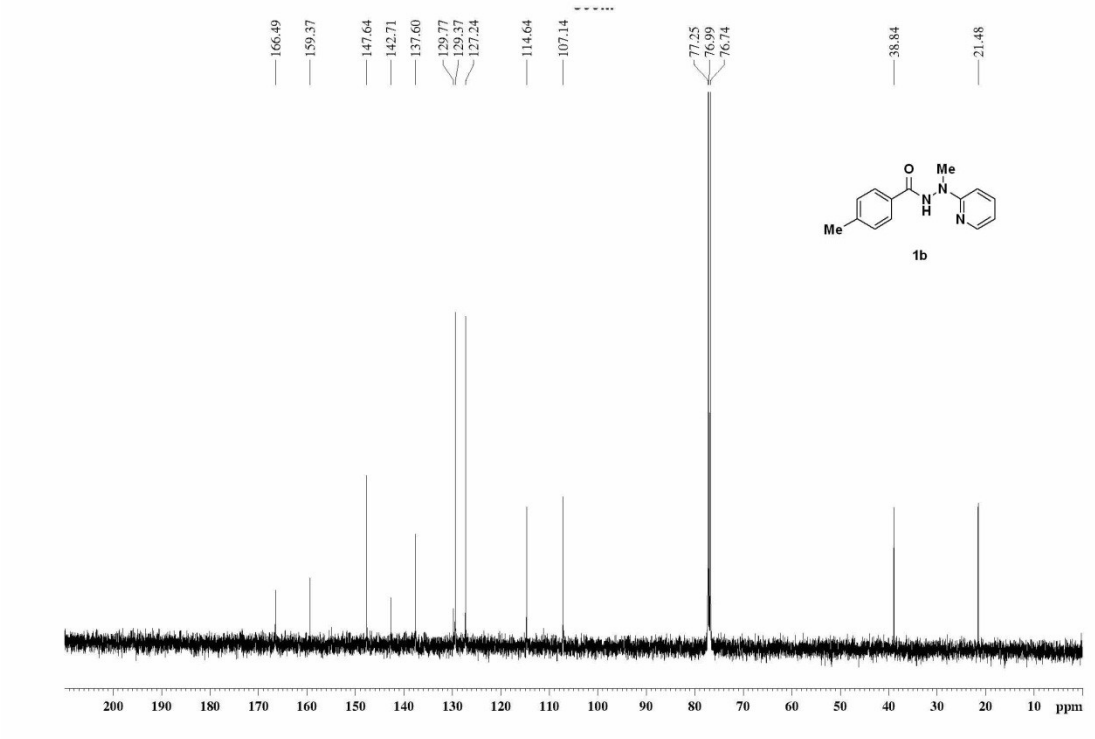

Fig. S4. ^{13}C NMR Spectrum of **1b** (125 MHz, $CDCl_3$).

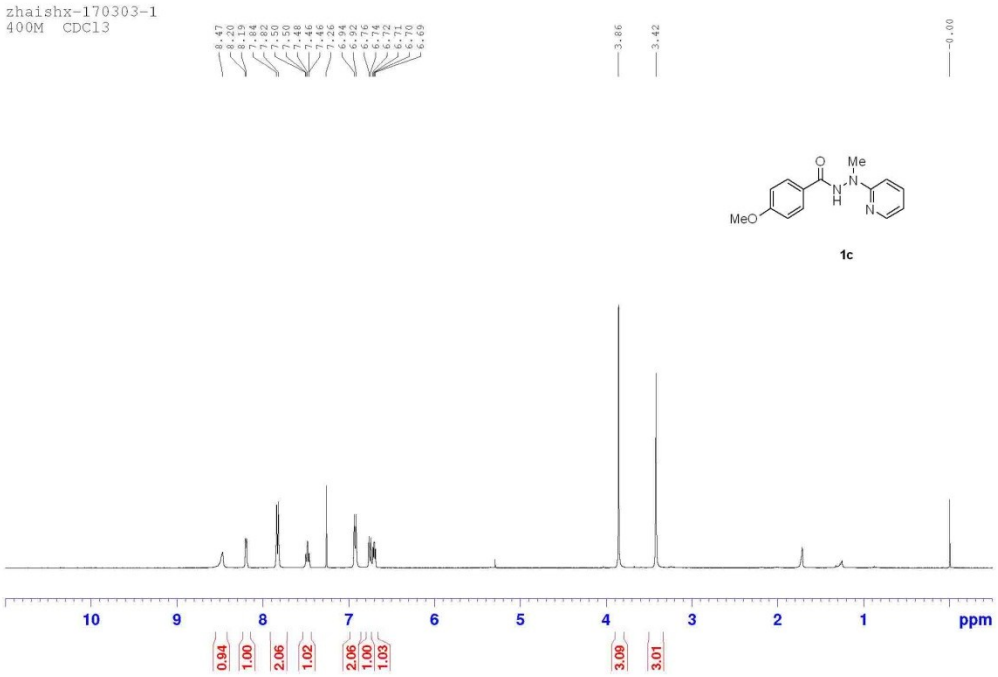

Fig. S5. ^{1}H NMR Spectrum of **1c** (400 MHz, $CDCl_3$).

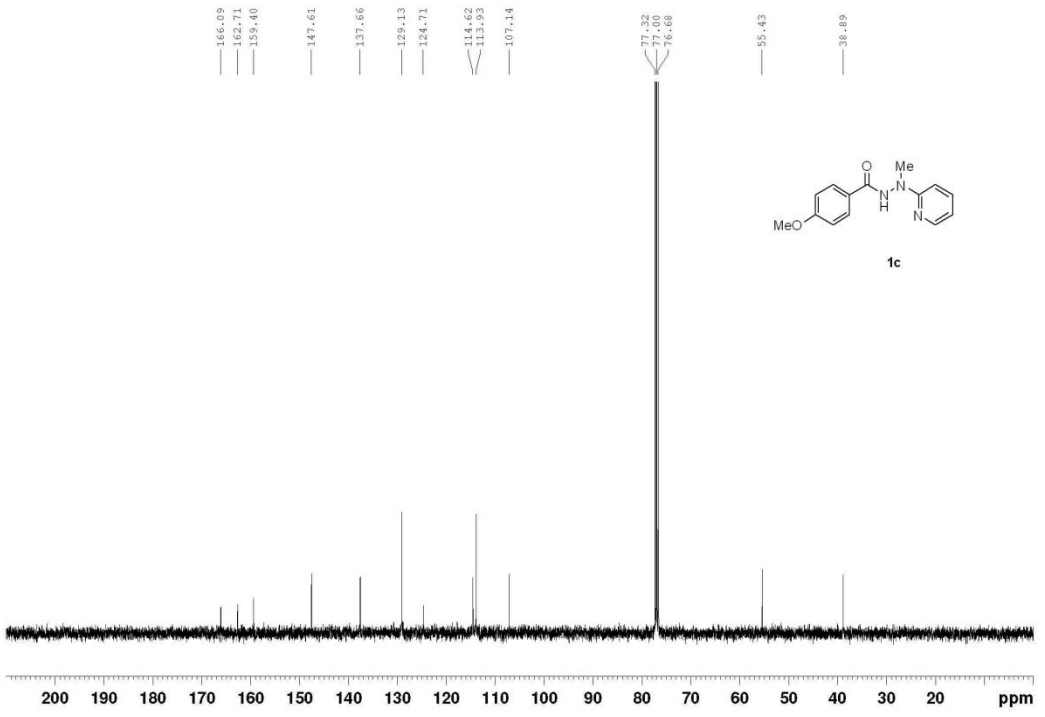

Fig. S6. ^{13}C NMR Spectrum of **1c** (100 MHz, $CDCl_3$).

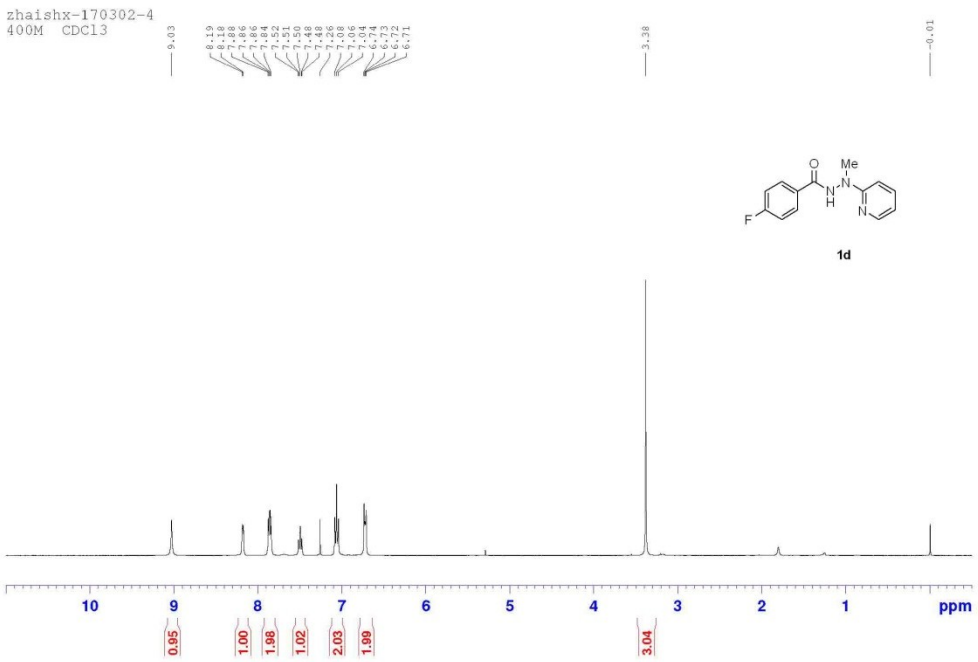

Fig. S7. ^{1}H NMR Spectrum of **1d** (400 MHz, $CDCl_3$).

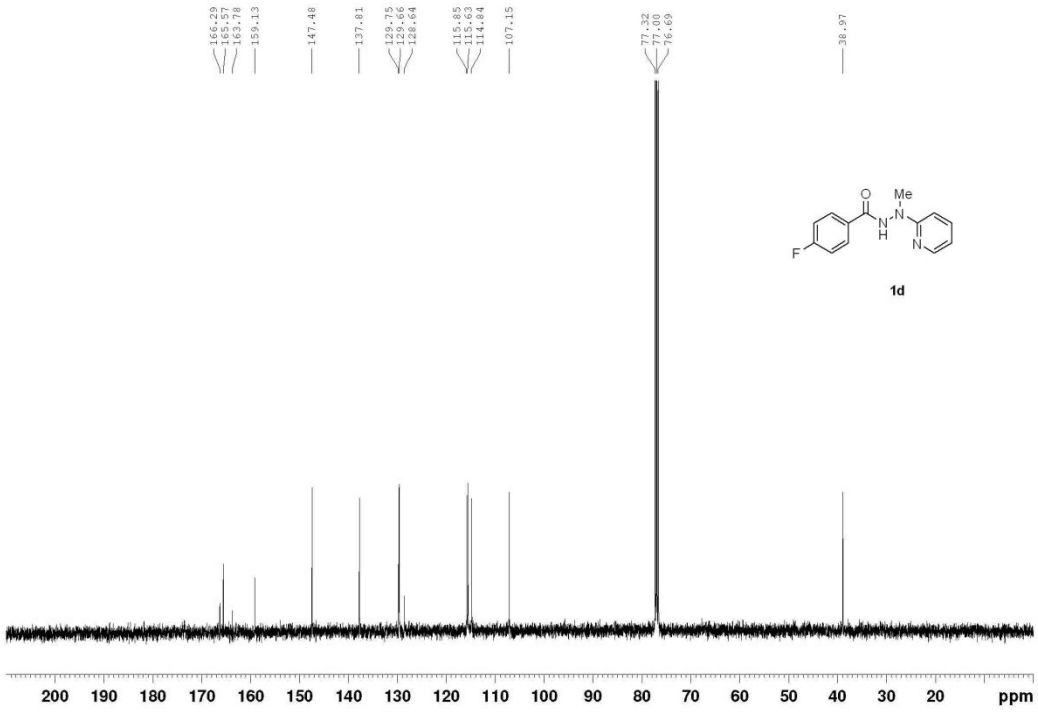

Fig. S8. ^{1}H NMR Spectrum of **1d** (100 MHz, $CDCl_3$).

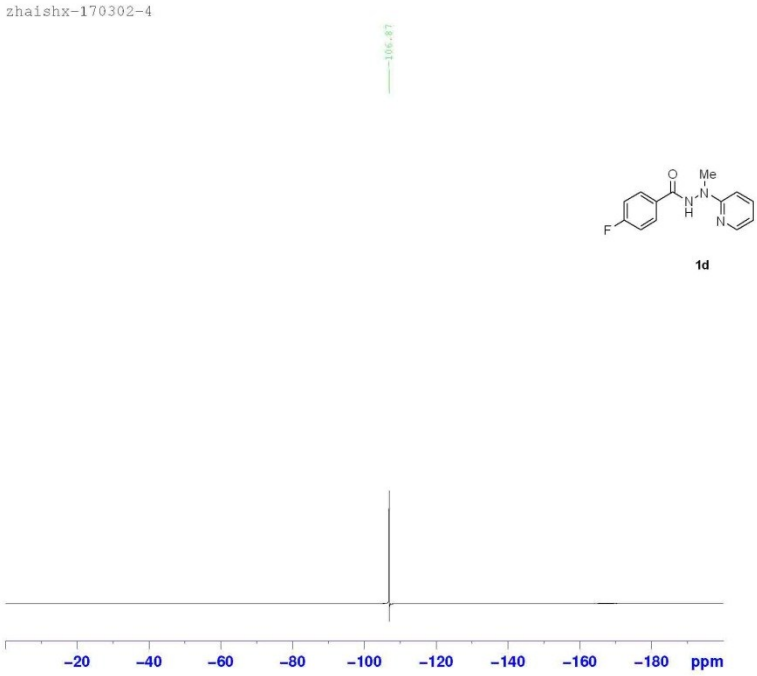

Fig. S9. ^{19}F NMR Spectrum of **1d** (376 MHz, $CDCl_3$).

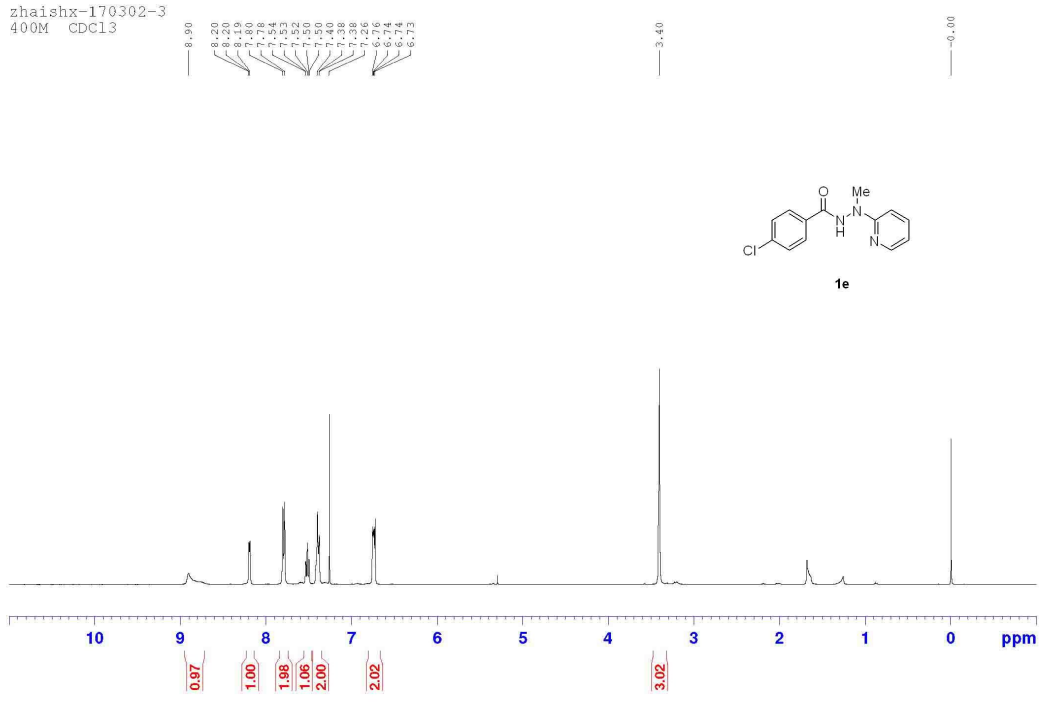

Fig. S10. ^{1}H NMR Spectrum of **1e** (400 MHz, $CDCl_3$).

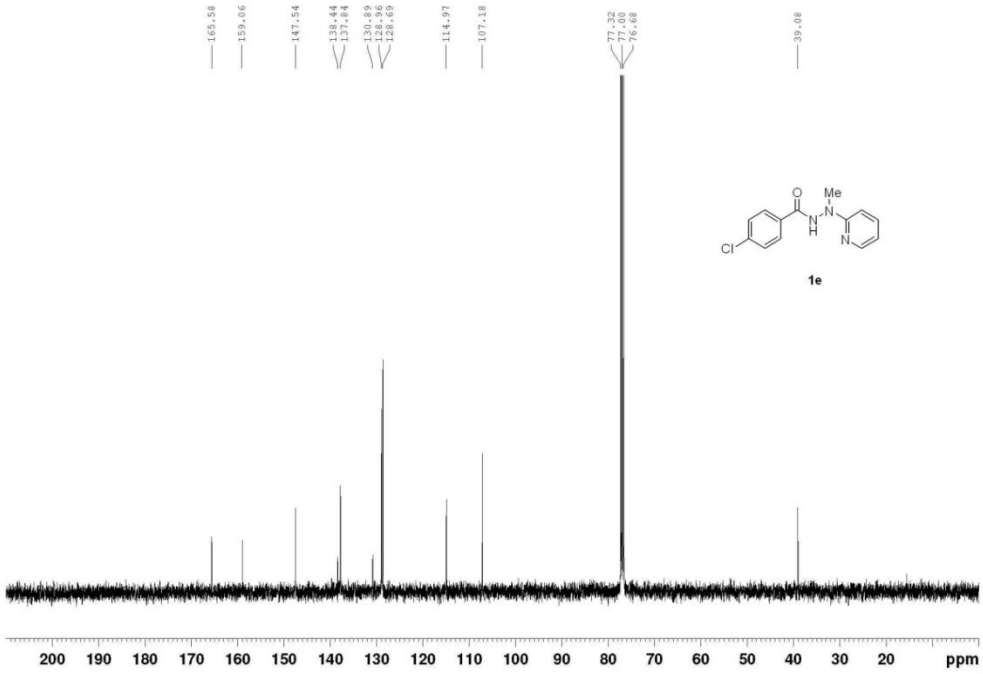

Fig. S11. ^{13}C NMR Spectrum of **1e** (100 MHz, $CDCl_3$).

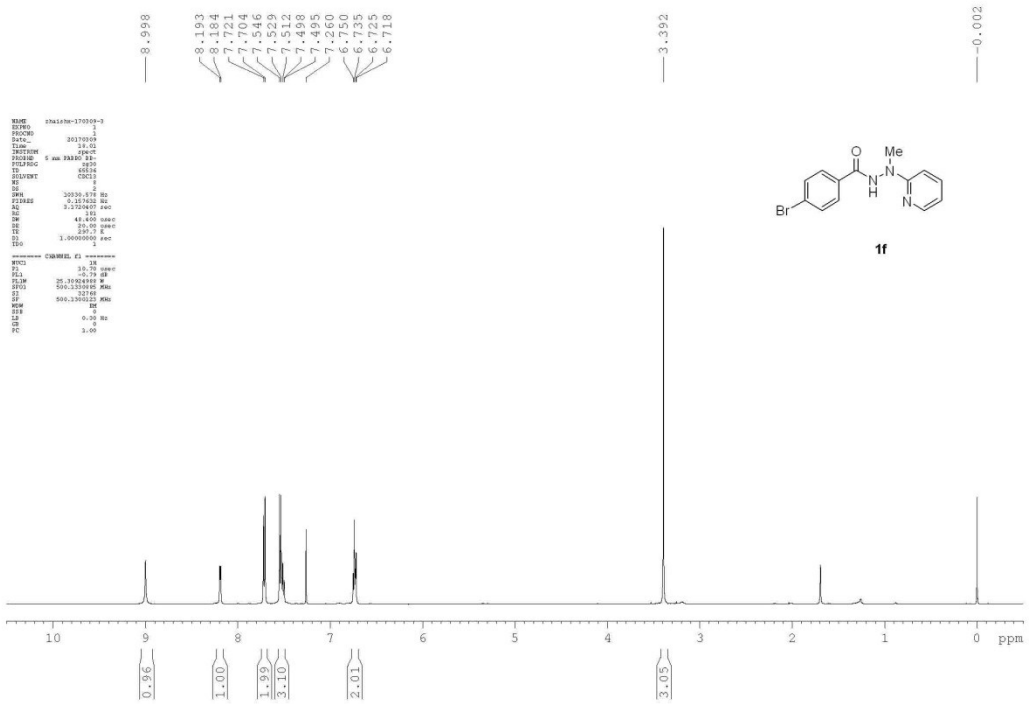

Fig. S12. ^{1}H NMR Spectrum of **1f** (500 MHz, $CDCl_3$).

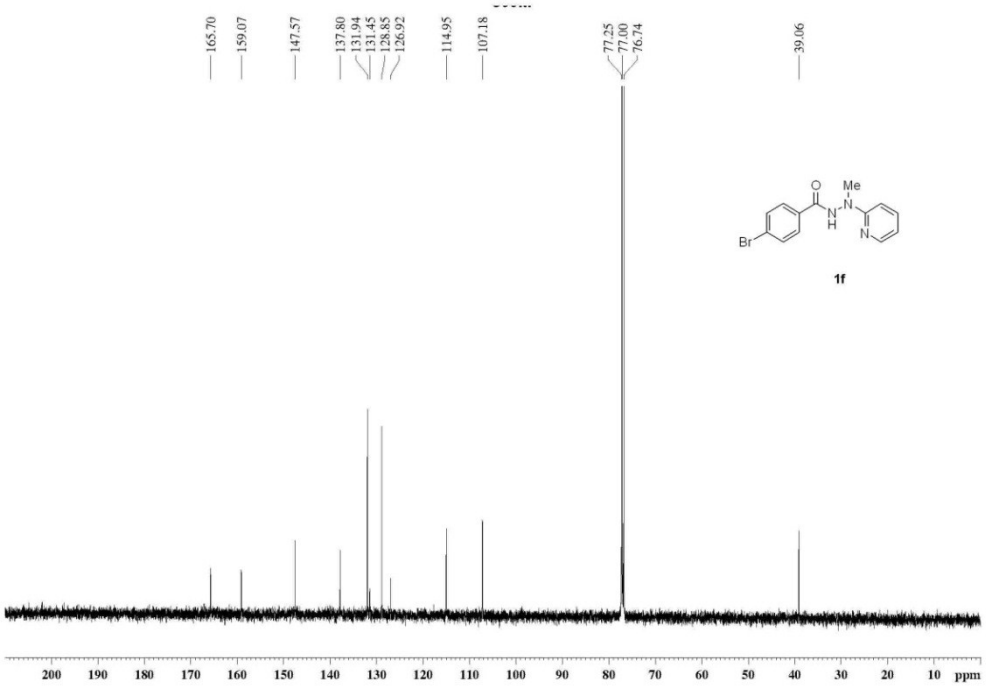

Fig. S13. ^{13}C NMR Spectrum of **1f** (125 MHz, $CDCl_3$).

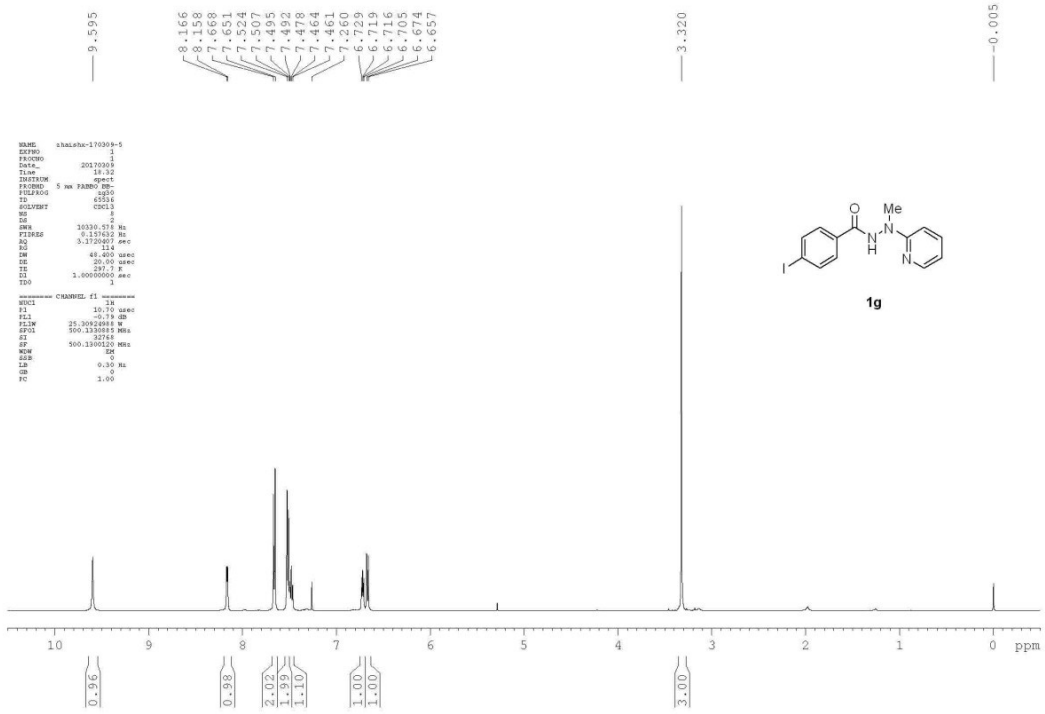

Fig. S14. ^{1}H NMR Spectrum of **1g** (500 MHz, $CDCl_3$).

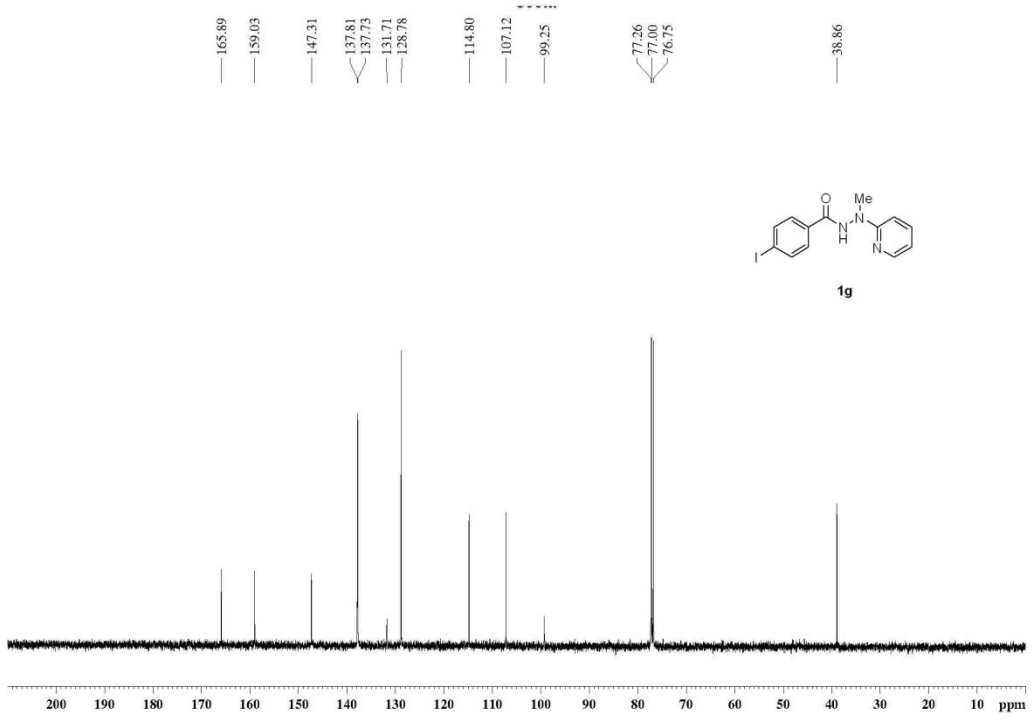

Fig. S15. ^{1}H NMR Spectrum of **1g** (125 MHz, $CDCl_3$).

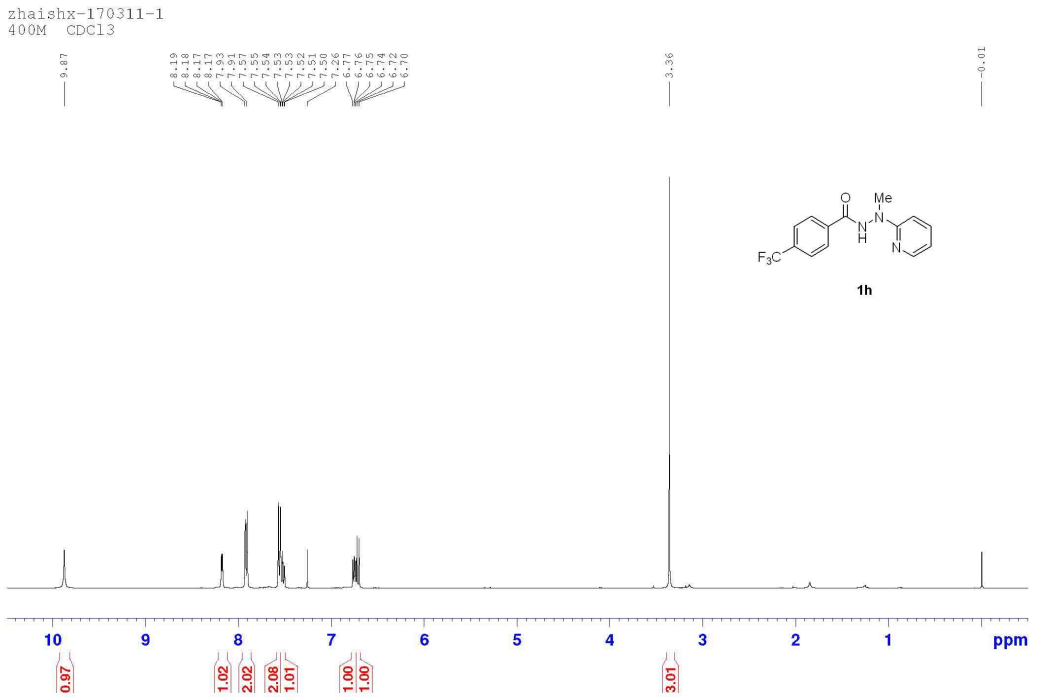

Fig. S16. ^{1}H NMR Spectrum of **1h** (400 MHz, $CDCl_3$).

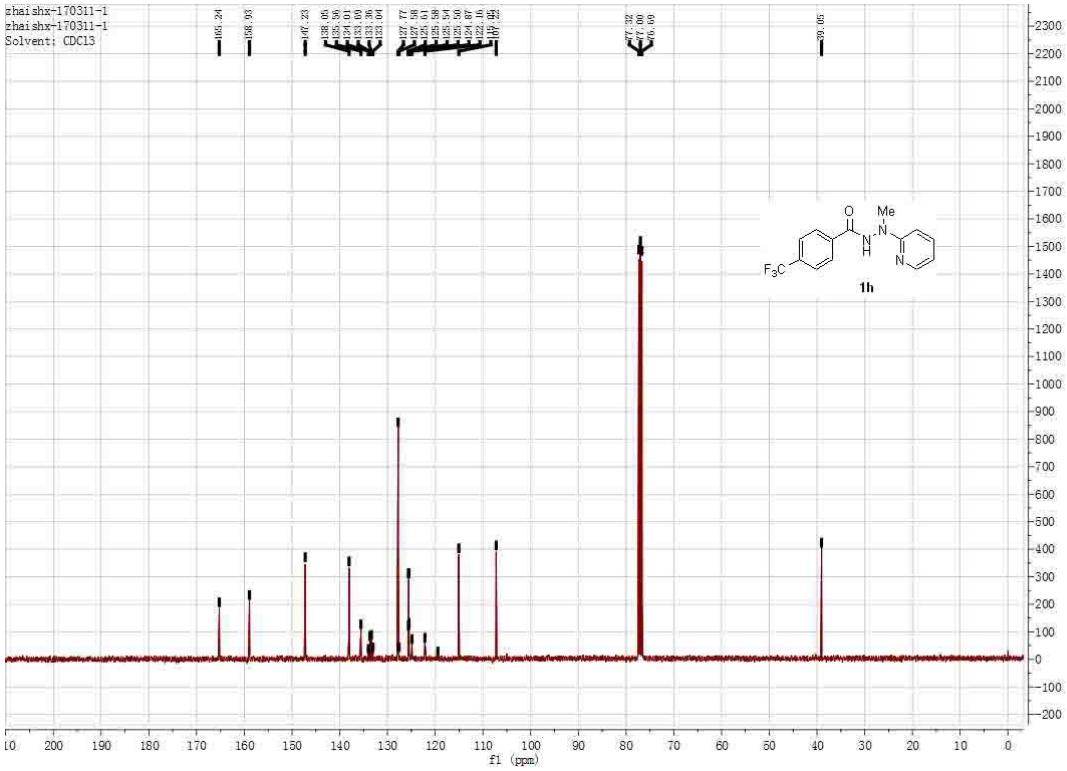

Fig. S17. ^{13}C NMR Spectrum of **1h** (100 MHz, $CDCl_3$).

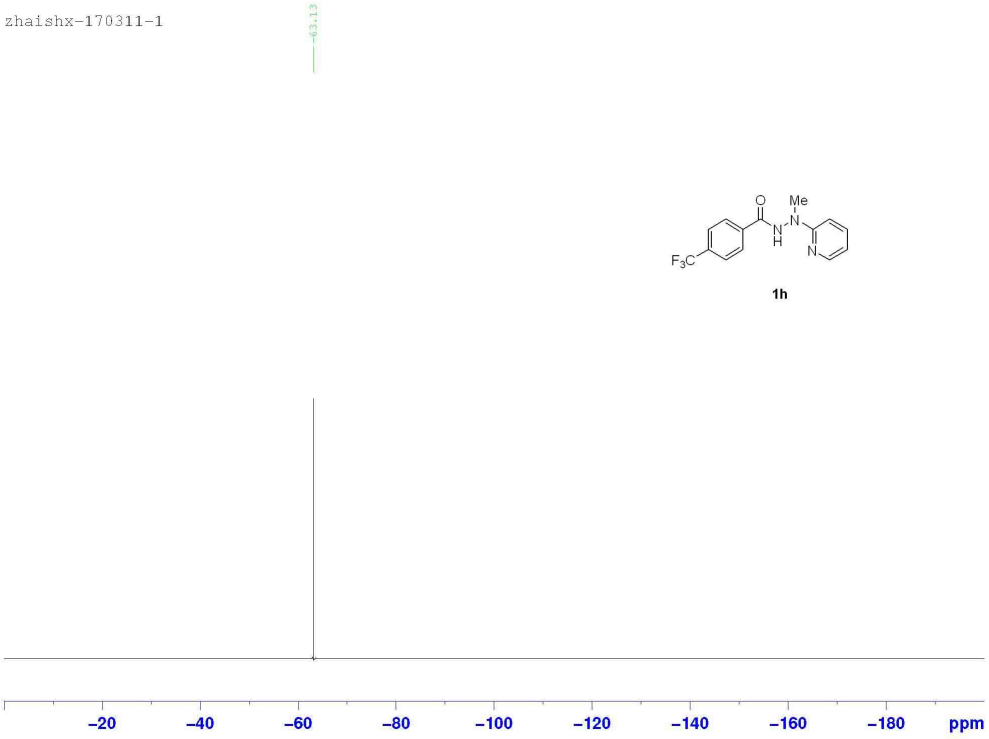

Fig. S18. ^{19}F NMR Spectrum of **1h** (376 MHz, $CDCl_3$).

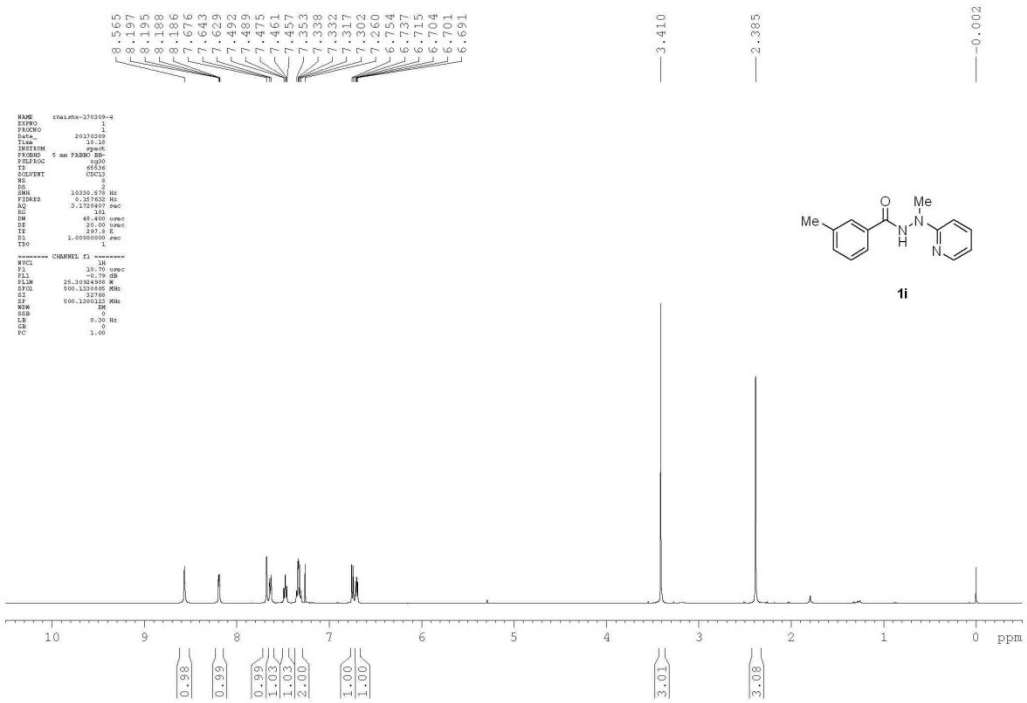

Fig. S19. ^{1}H NMR Spectrum of **1i** (500 MHz, $CDCl_3$).

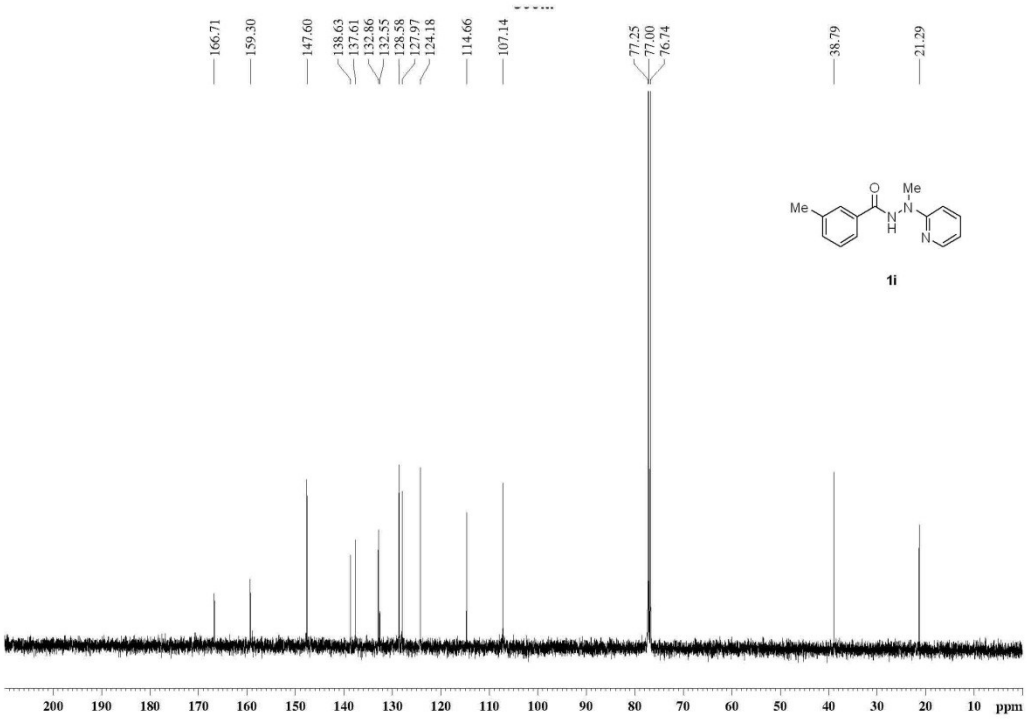

Fig. S20. ^{13}C NMR Spectrum of **1i** (125 MHz, $CDCl_3$).

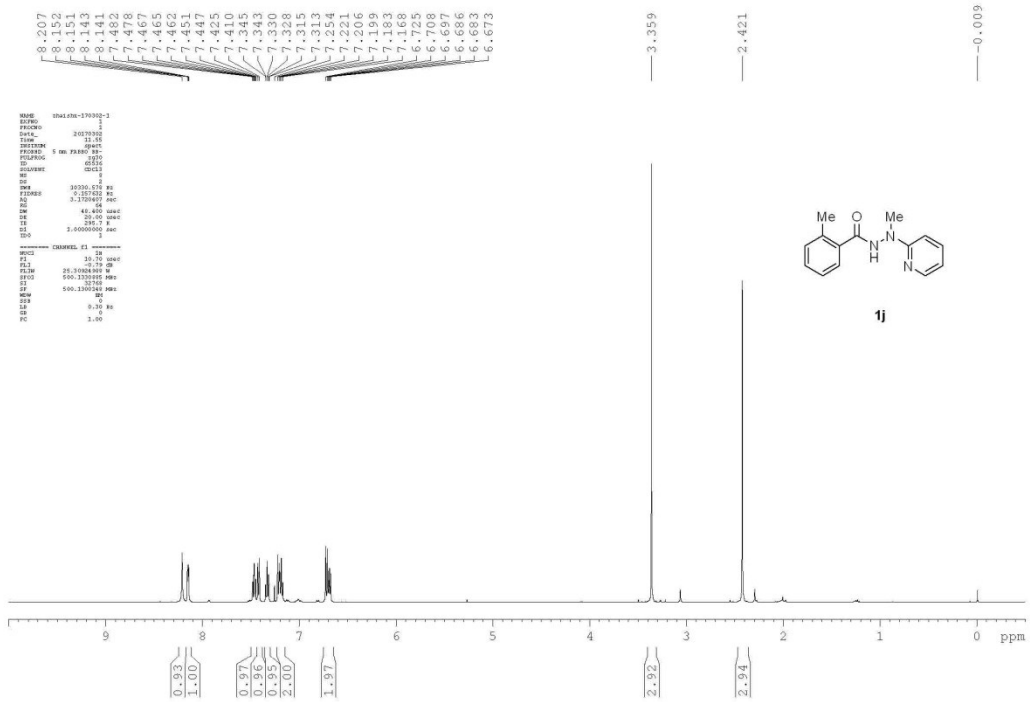

Fig. S21. ^{1}H NMR Spectrum of **1j** (500 MHz, $CDCl_3$).

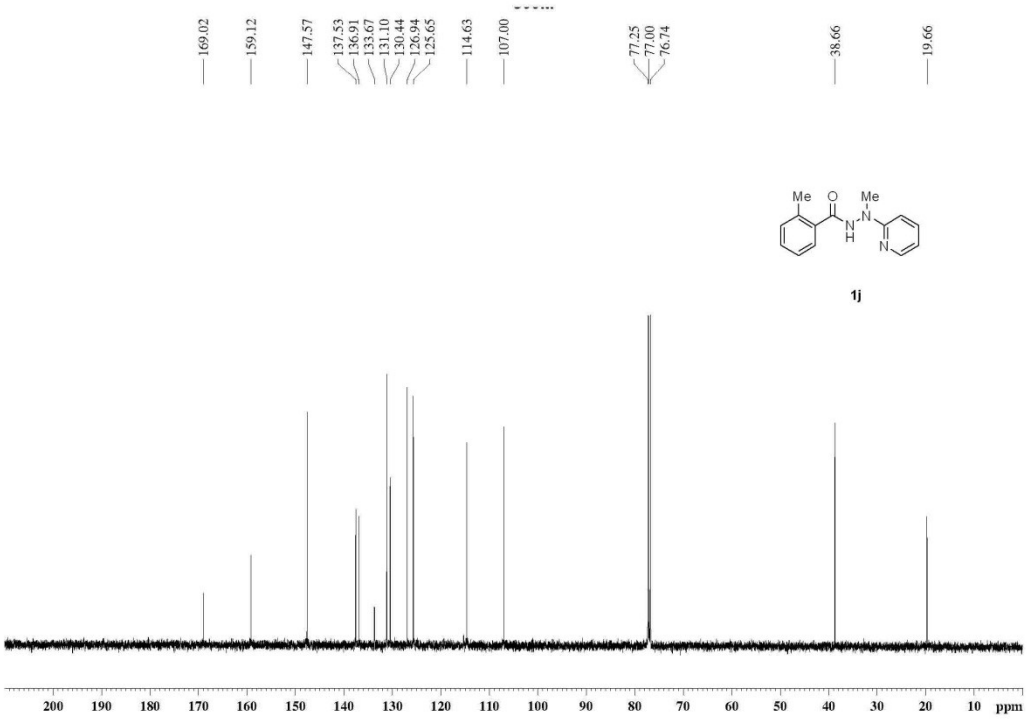

Fig. S22. ^{13}C NMR Spectrum of **1j** (125 MHz, $CDCl_3$).

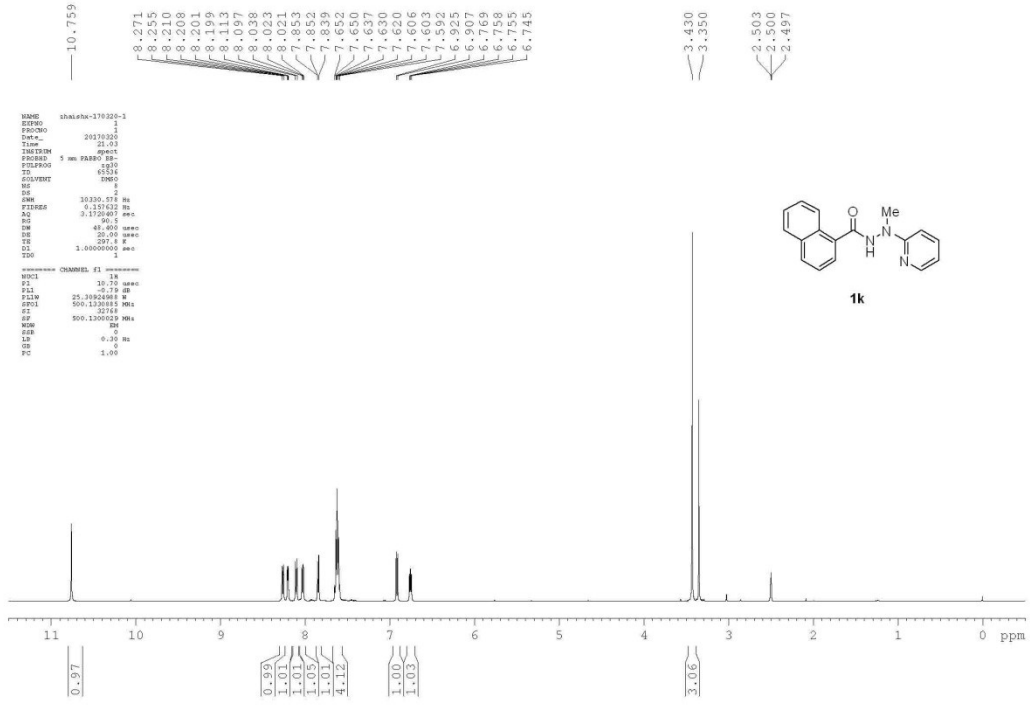

Fig. S23. ^{1}H NMR Spectrum of **1k** (500 MHz, DMSO).

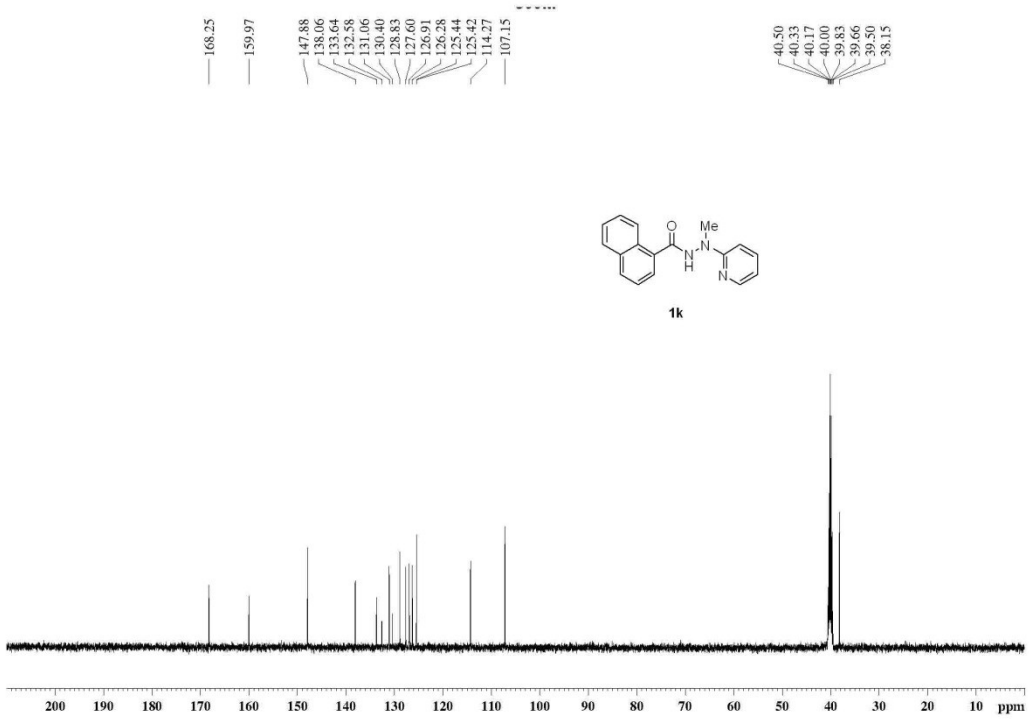

Fig. S24. ^{13}C NMR Spectrum of **1k** (125 MHz, DMSO).

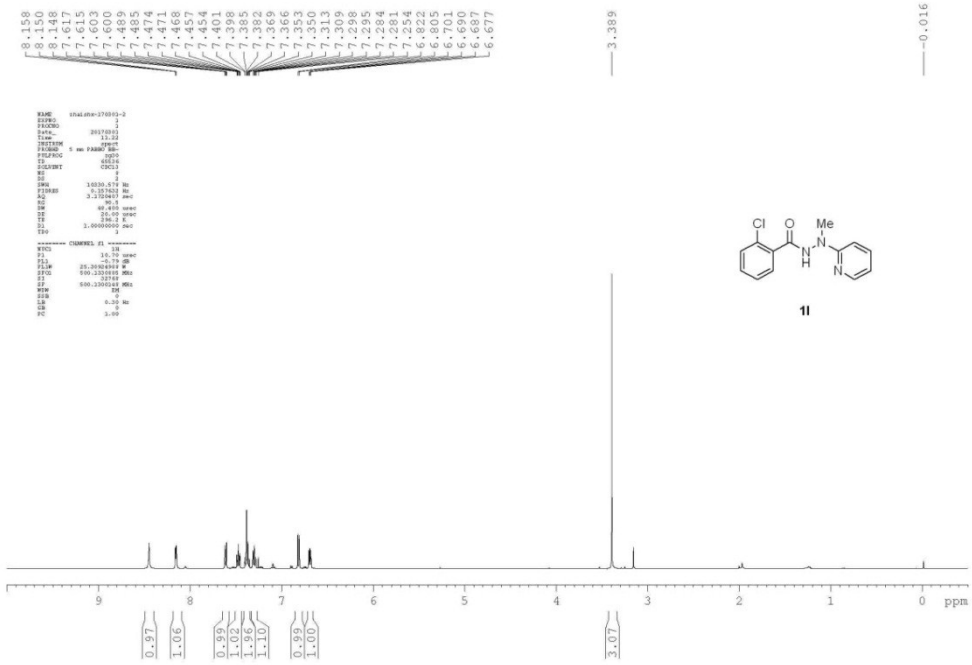

Fig. S25. ^{1}H NMR Spectrum of **1l** (500 MHz, $CDCl_3$).

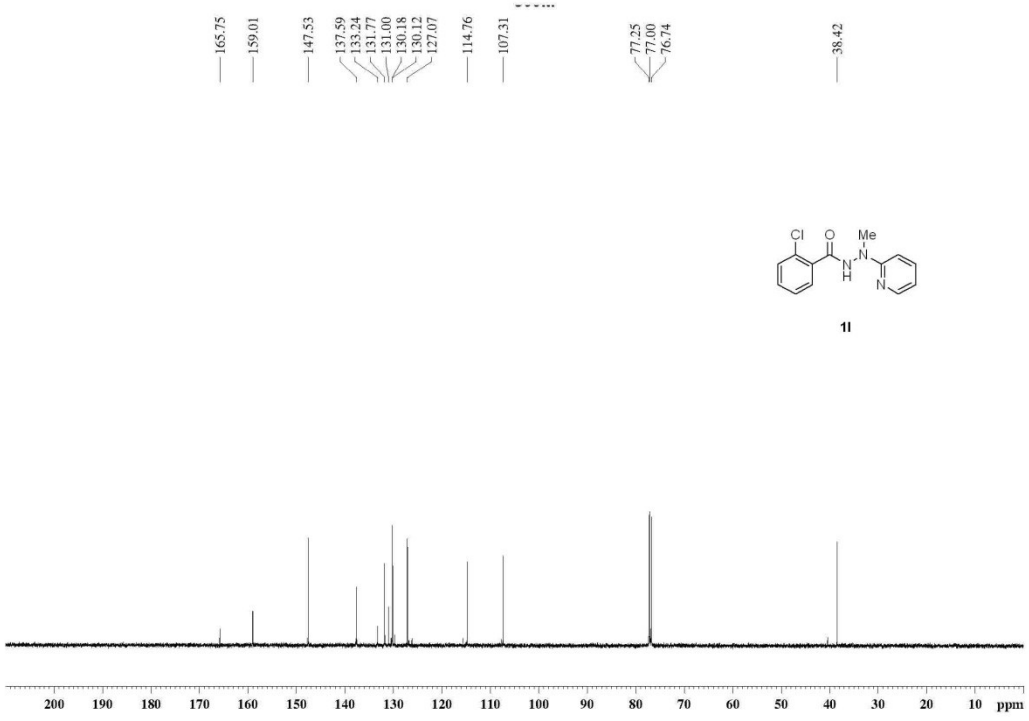

Fig. S26. ^{13}C NMR Spectrum of **1l** (125 MHz, $CDCl_3$).

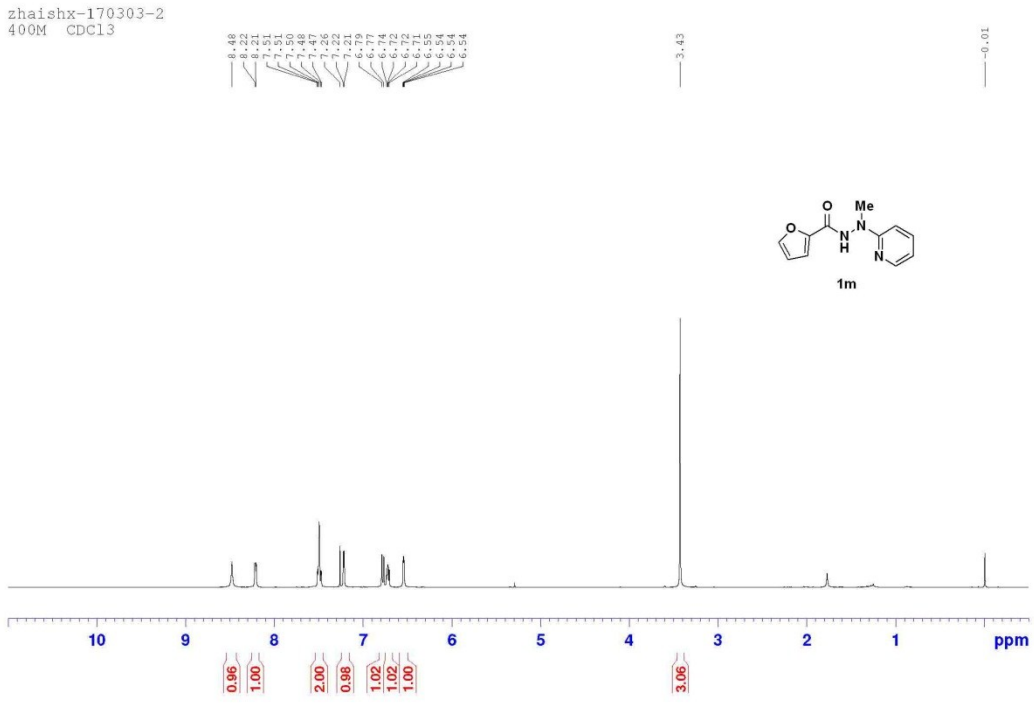

Fig. S27. ^{1}H NMR Spectrum of **1m** (400 MHz, $CDCl_3$).

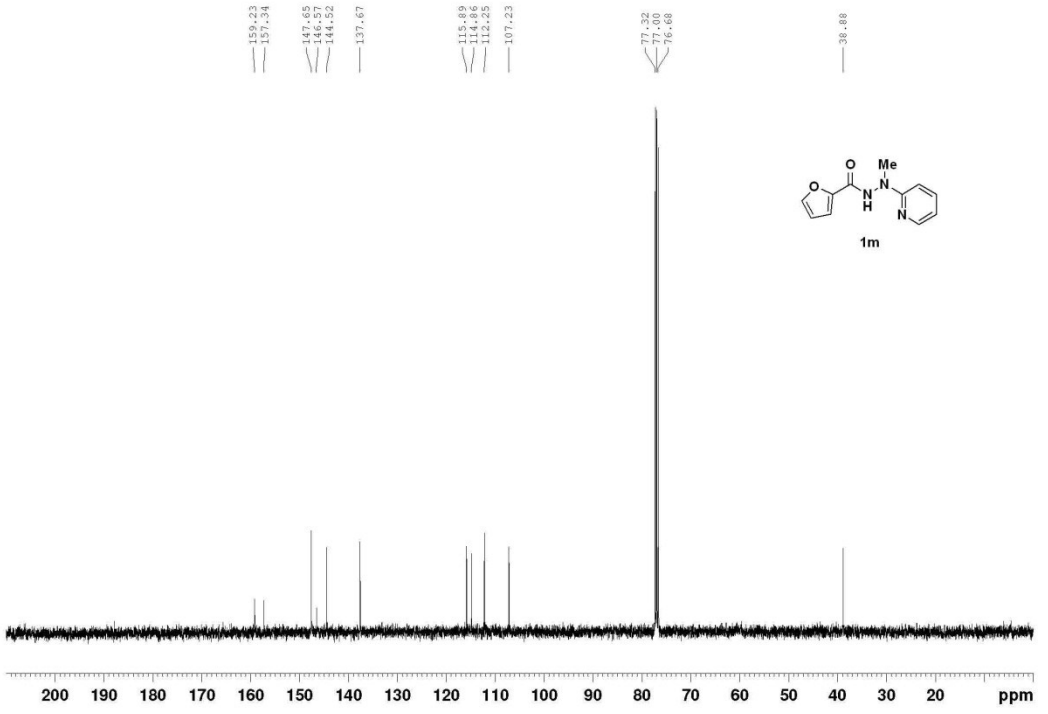

Fig. S28. ^{13}C NMR Spectrum of **1m** (100 MHz, $CDCl_3$).

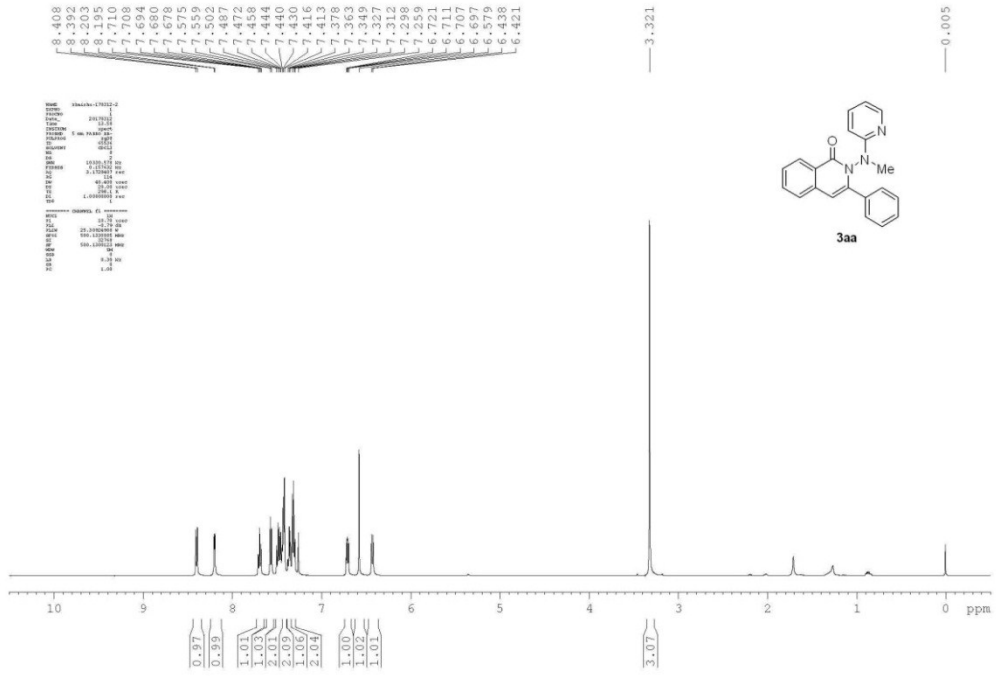

Fig. S29. ^{1}H NMR Spectrum of **3aa** (500 MHz, $CDCl_3$).

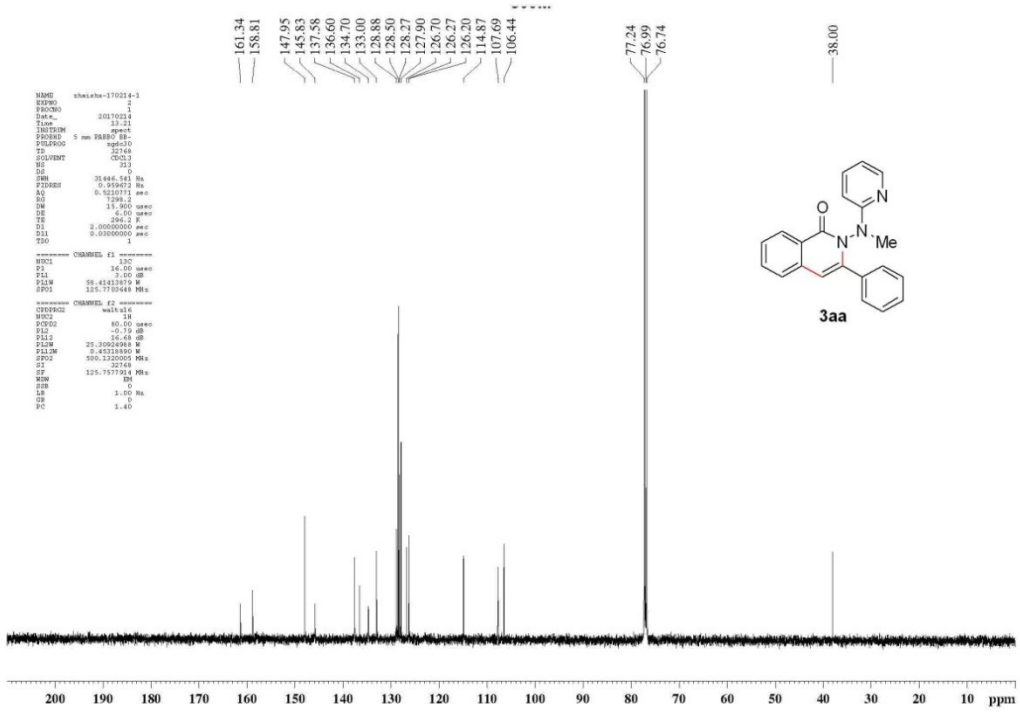

Fig. S30. ^{13}C NMR Spectrum of **3aa** (125 MHz, $CDCl_3$).

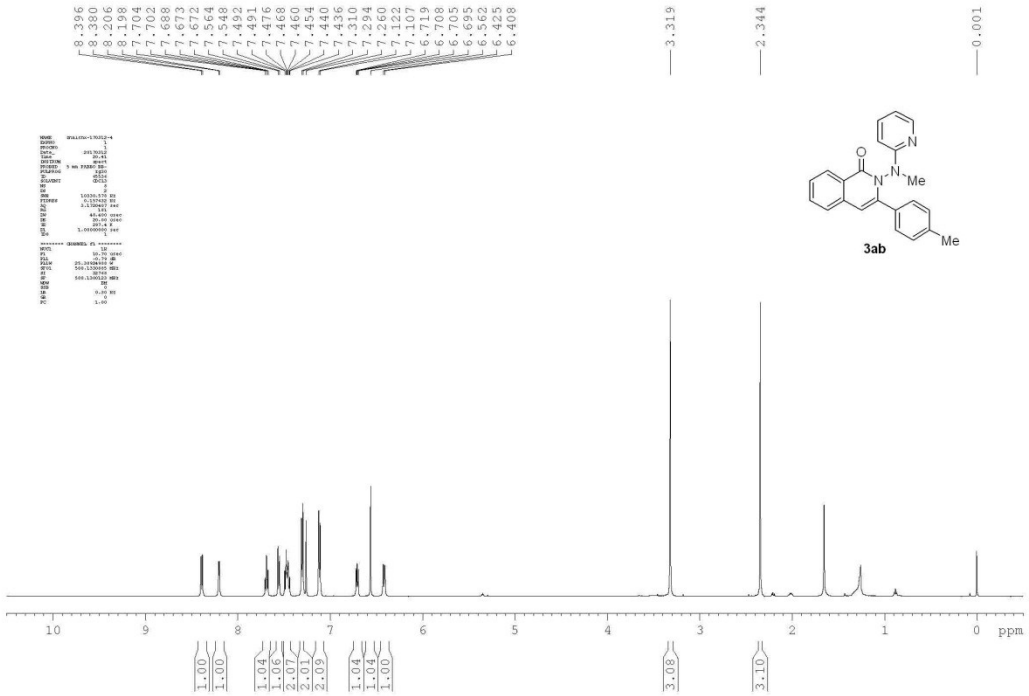

Fig. S31. ^{1}H NMR Spectrum of **3ab** (500 MHz, $CDCl_3$).

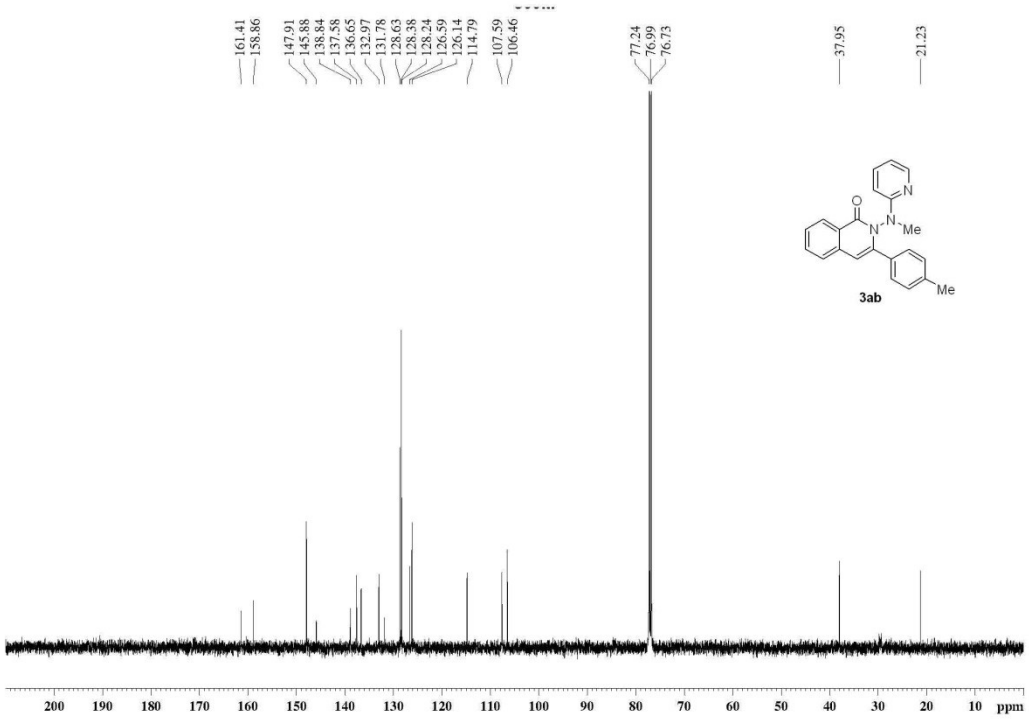

Fig. S32. ^{13}C NMR Spectrum of **3ab** (125 MHz, $CDCl_3$).

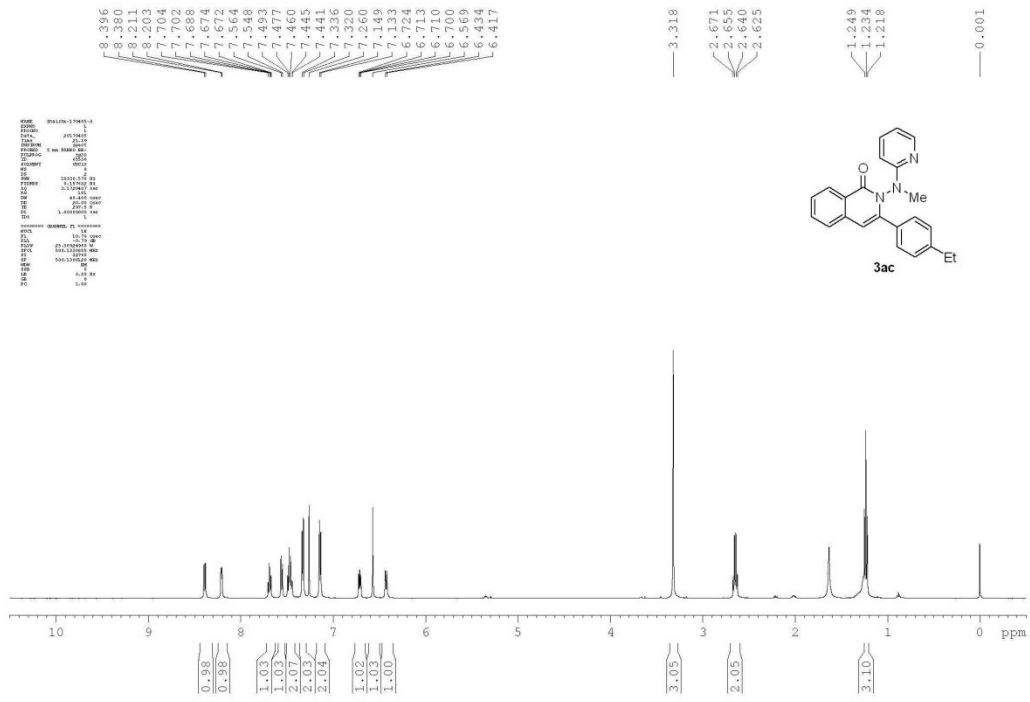

Fig. S33. ^{1}H NMR Spectrum of **3ac** (500 MHz, $CDCl_3$).

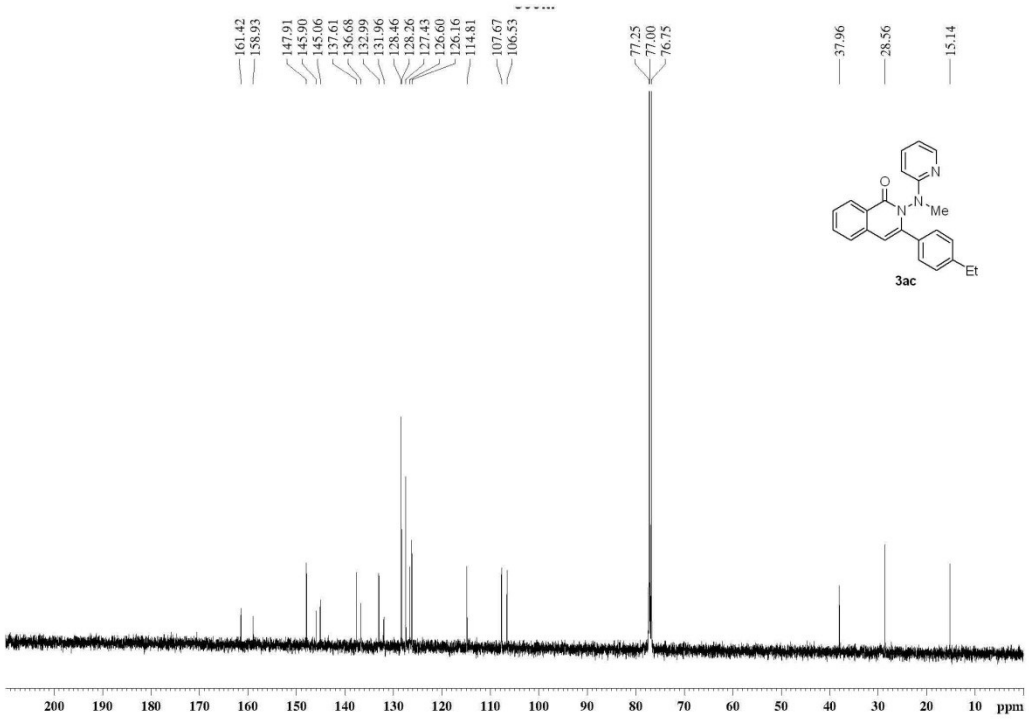

Fig. S34. ^{13}C NMR Spectrum of **3ac** (125 MHz, $CDCl_3$).

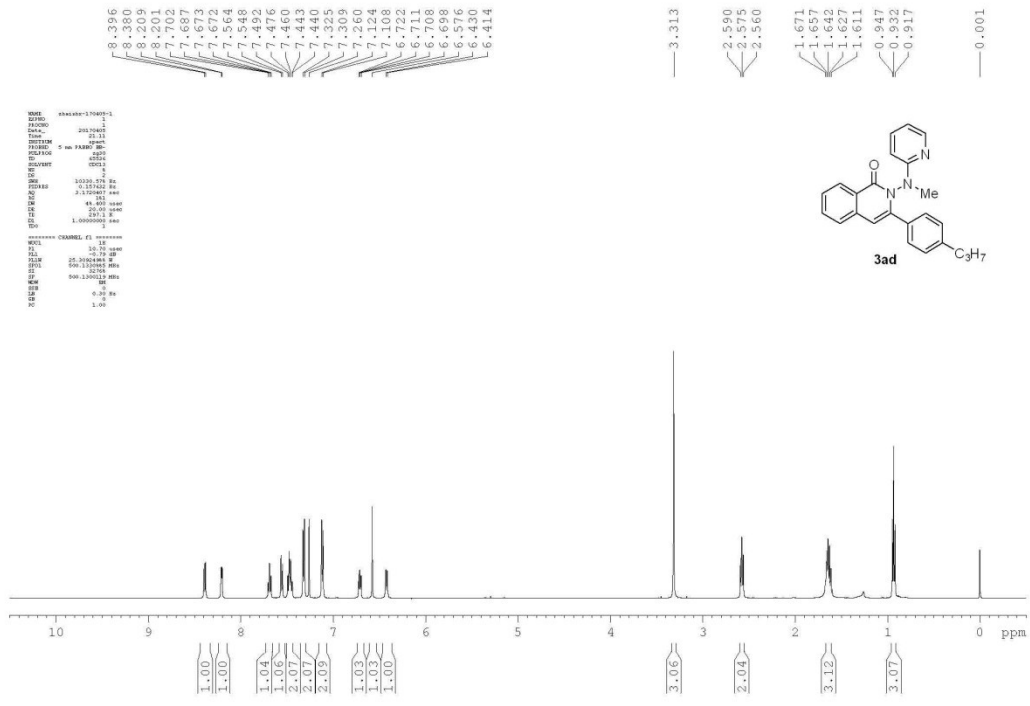

Fig. S35. ^{1}H NMR Spectrum of **3ad** (500 MHz, $CDCl_3$).

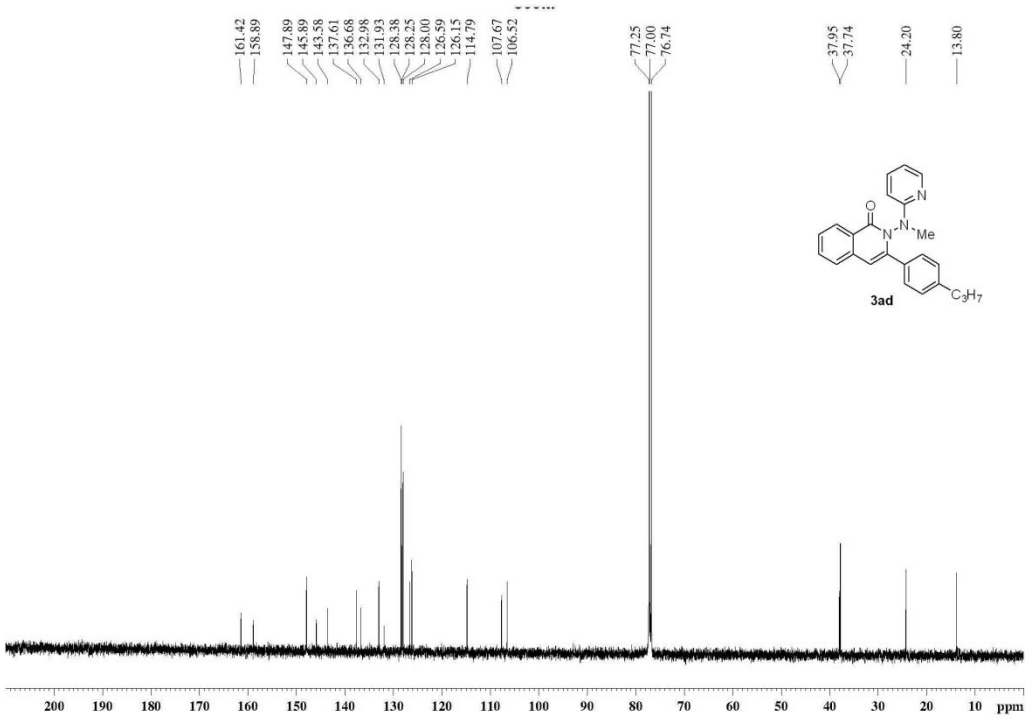

Fig. S36. ^{13}C NMR Spectrum of **3ad** (125 MHz, $CDCl_3$).

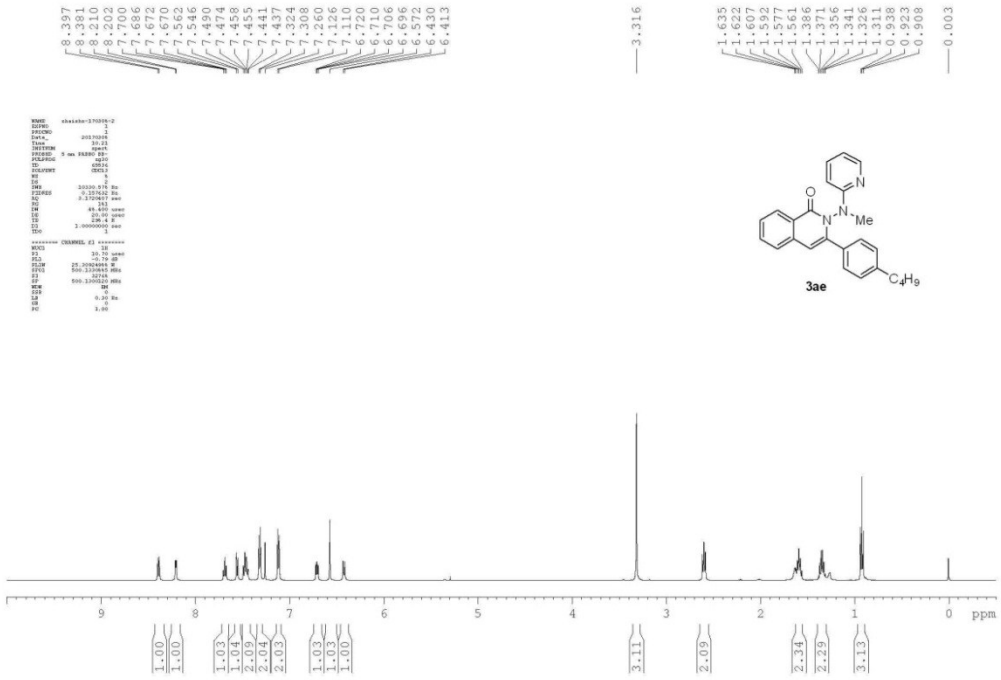

Fig. S37. ^{1}H NMR Spectrum of **3ae** (500 MHz, $CDCl_3$).

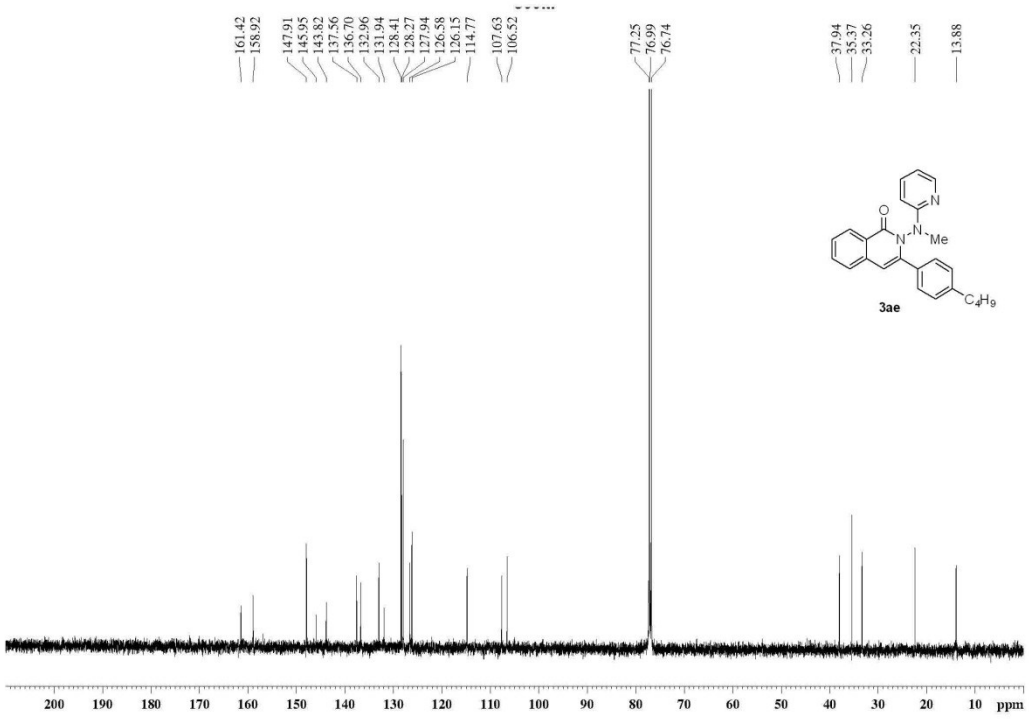

Fig. S38. ^{13}C NMR Spectrum of **3ae** (125 MHz, $CDCl_3$).

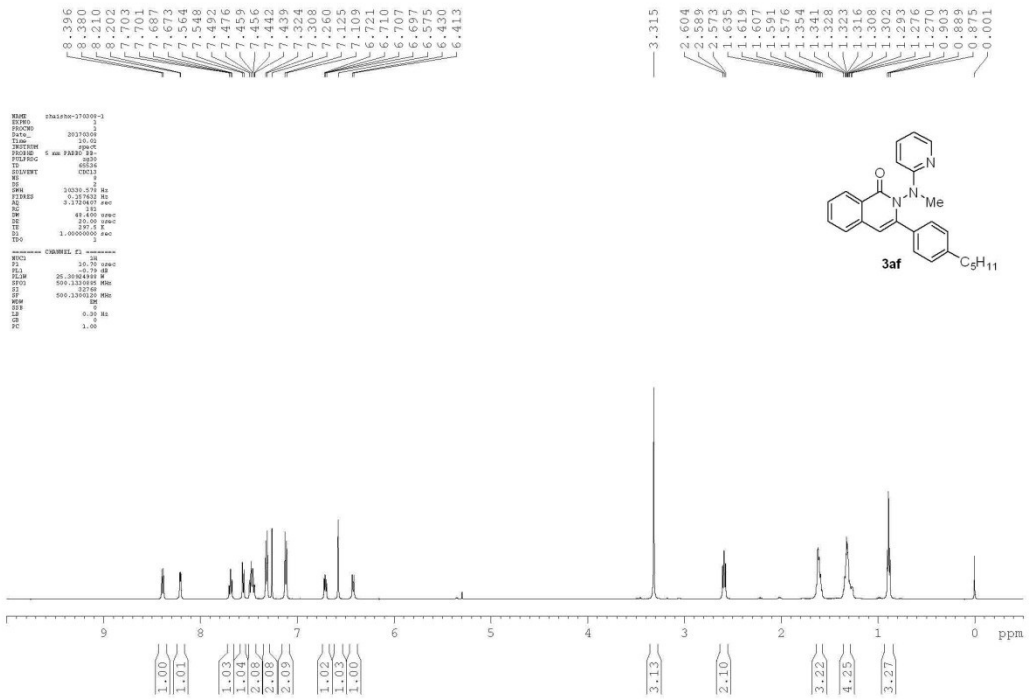

Fig. S39. ^{1}H NMR Spectrum of **3af** (500 MHz, $CDCl_3$).

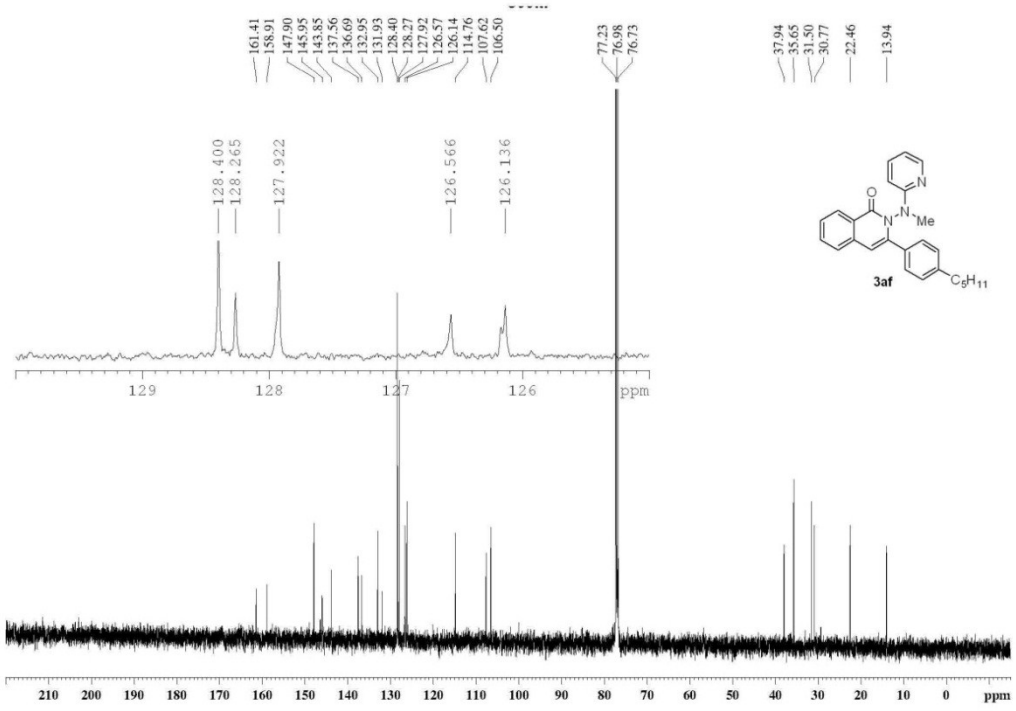

Fig. S40. ^{13}C NMR Spectrum of **3af** (125 MHz, $CDCl_3$).

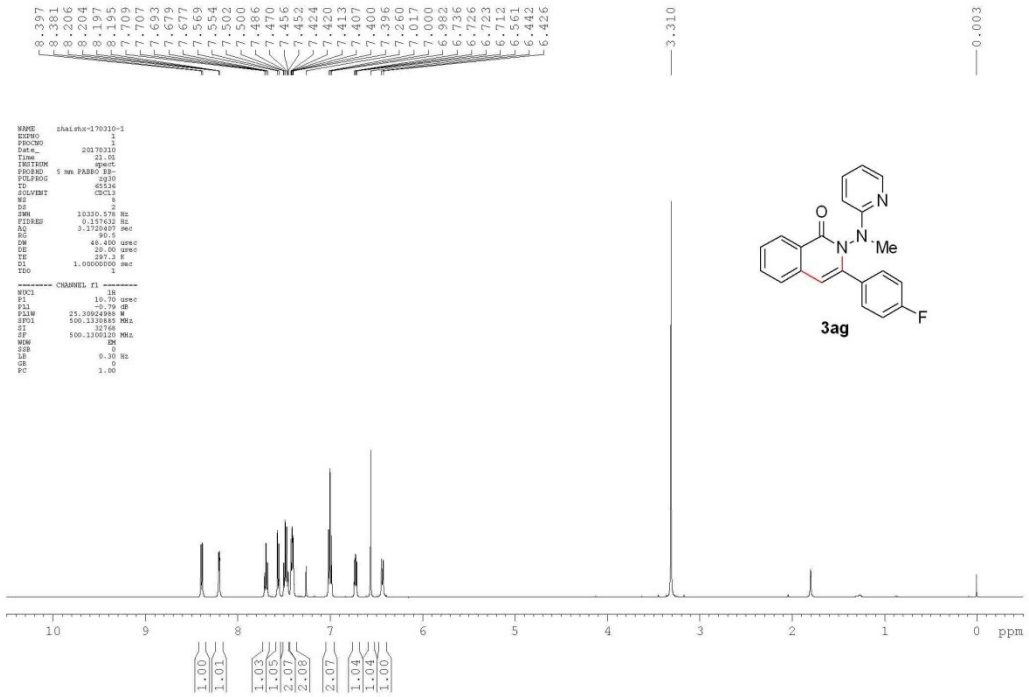

Fig. S41. ^{1}H NMR Spectrum of **3ag** (500 MHz, $CDCl_3$).

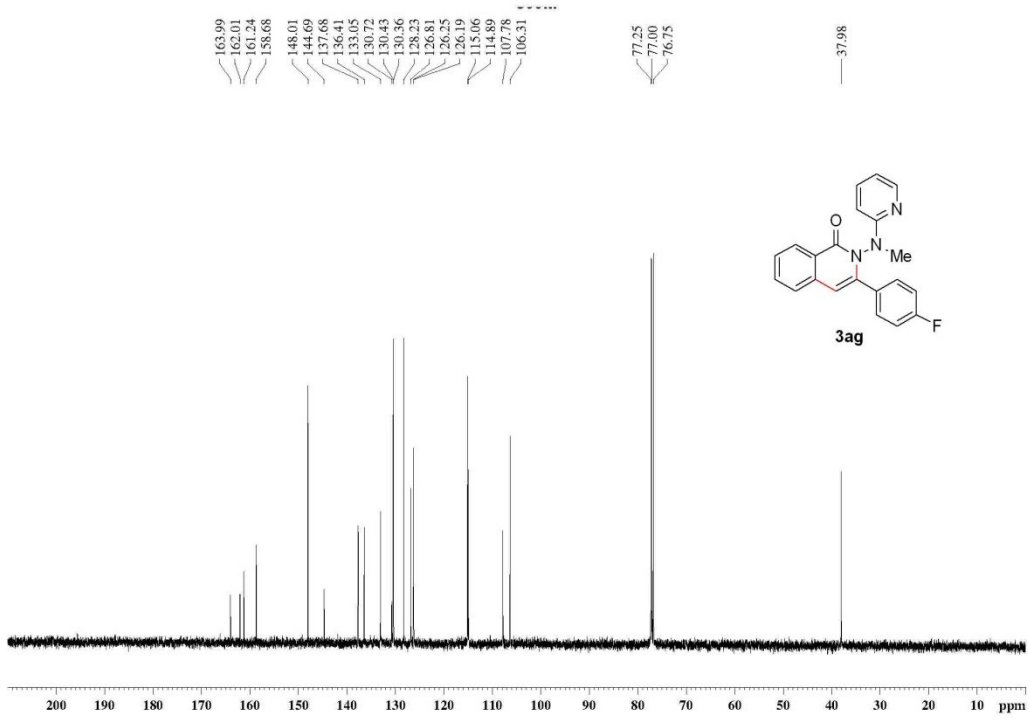

Fig. S42. ^{13}C NMR Spectrum of **3ag** (125 MHz, $CDCl_3$).

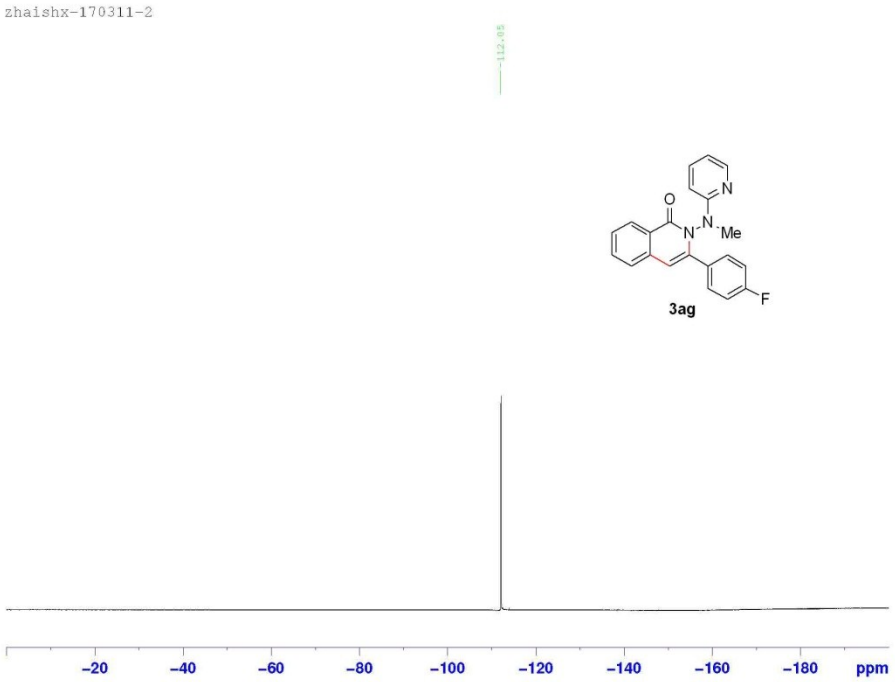

Fig. S43. ^{19}F NMR Spectrum of **3ag** (376 MHz, $CDCl_3$).

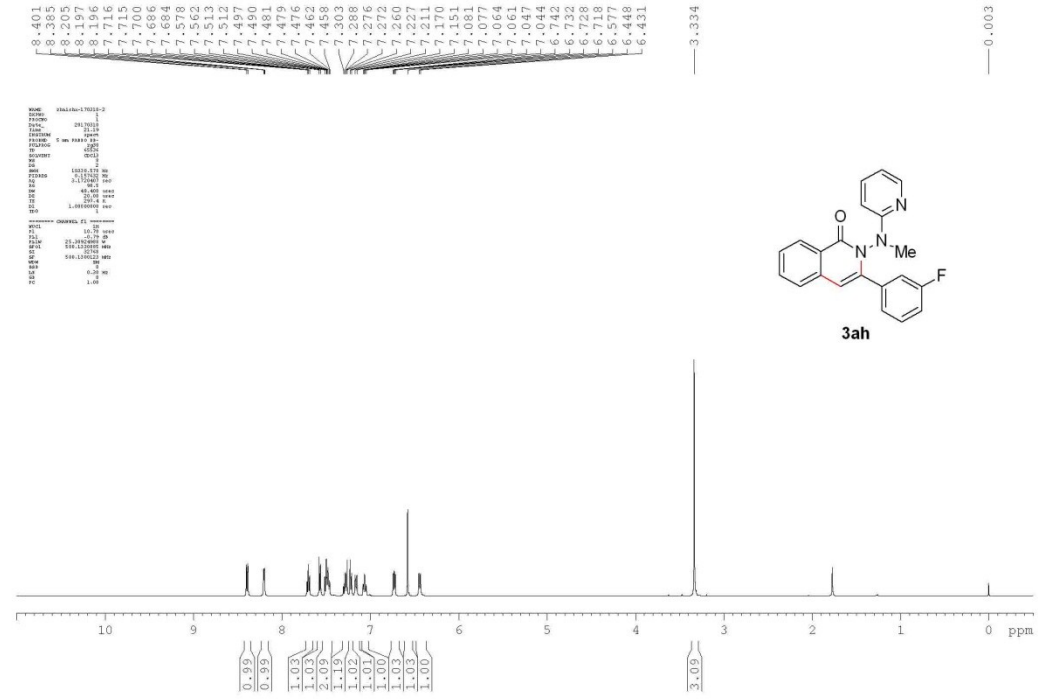

Fig. S44. ^{1}H NMR Spectrum of **3ah** (500 MHz, $CDCl_3$).

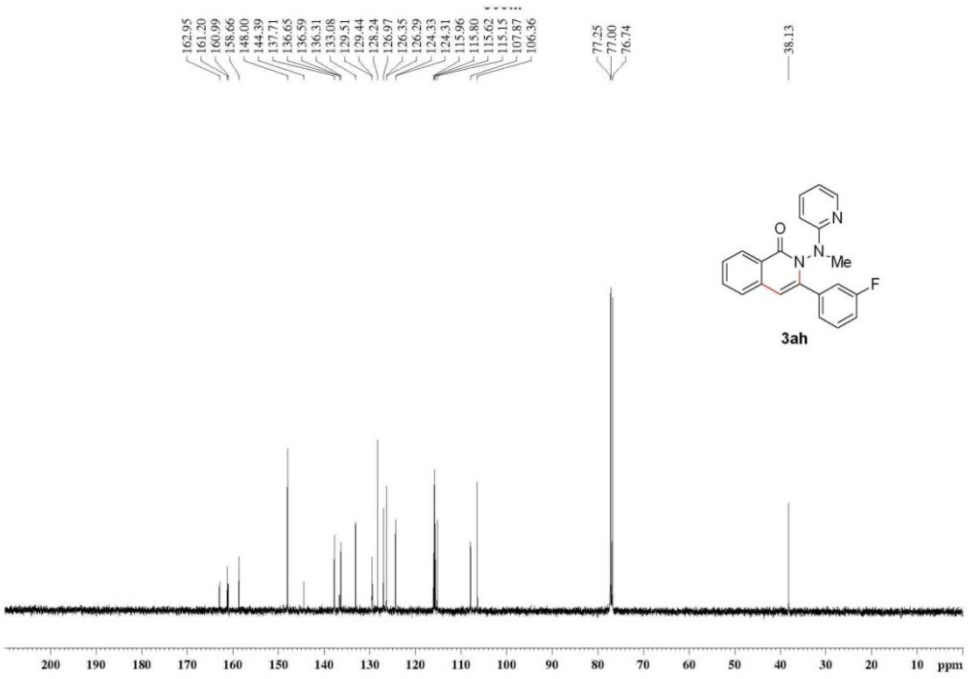

Fig. S45. ^{13}C NMR Spectrum of **3ah** (125 MHz, $CDCl_3$).

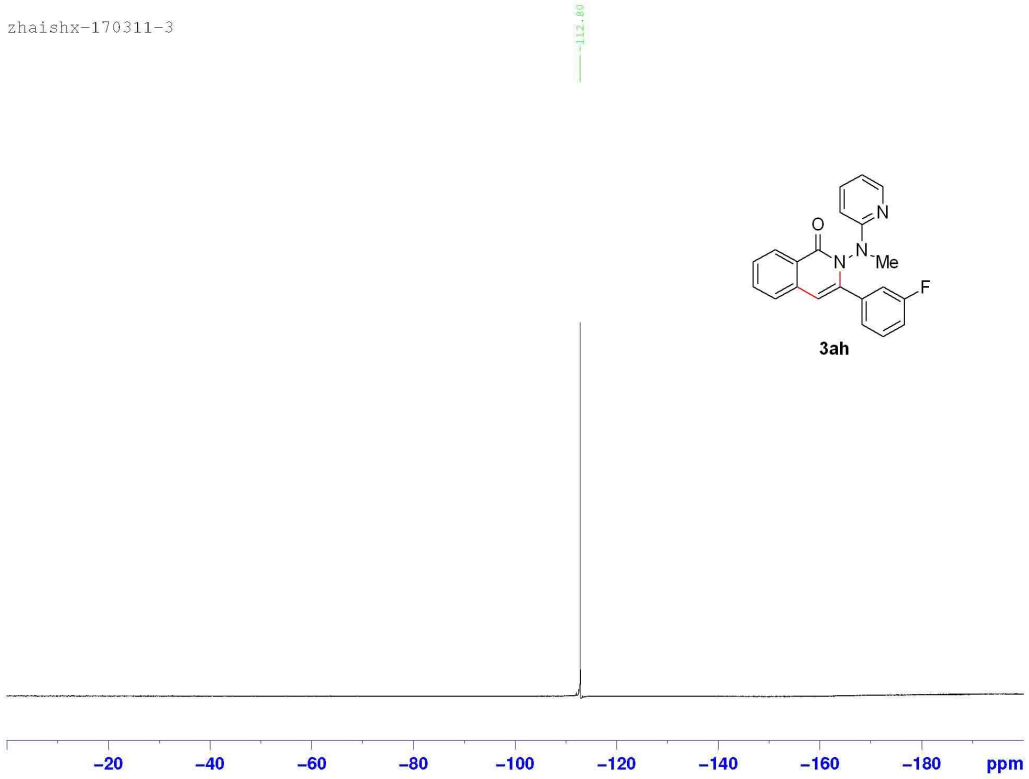

Fig. S46. ^{19}F NMR Spectrum of **3ah** (376 MHz, $CDCl_3$).

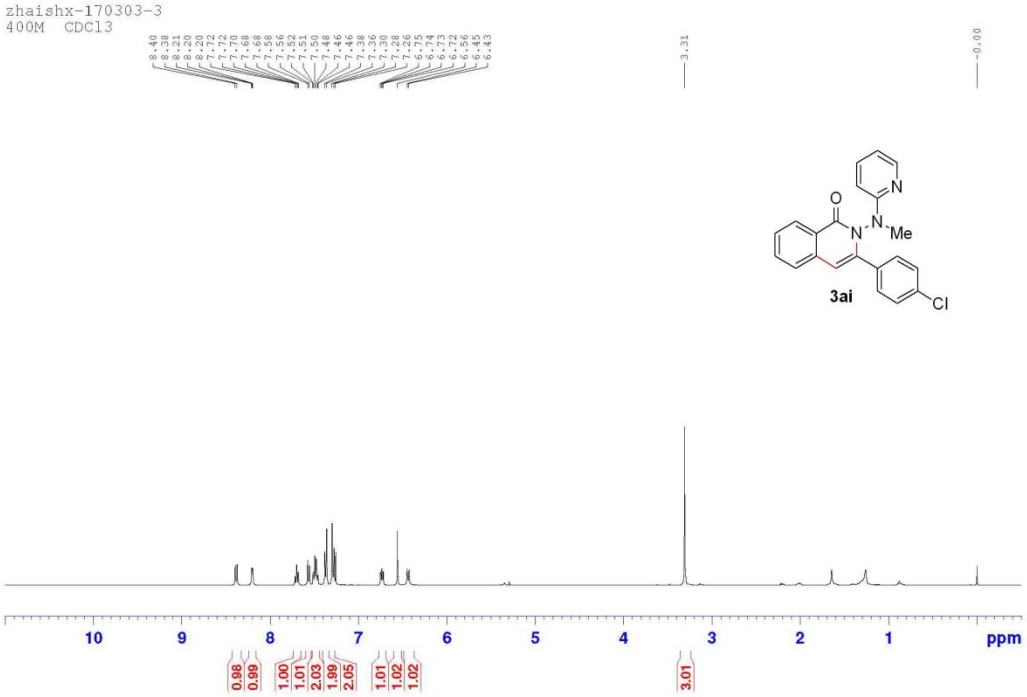

Fig. S47. ^{1}H NMR Spectrum of **3ai** (400 MHz, $CDCl_3$).

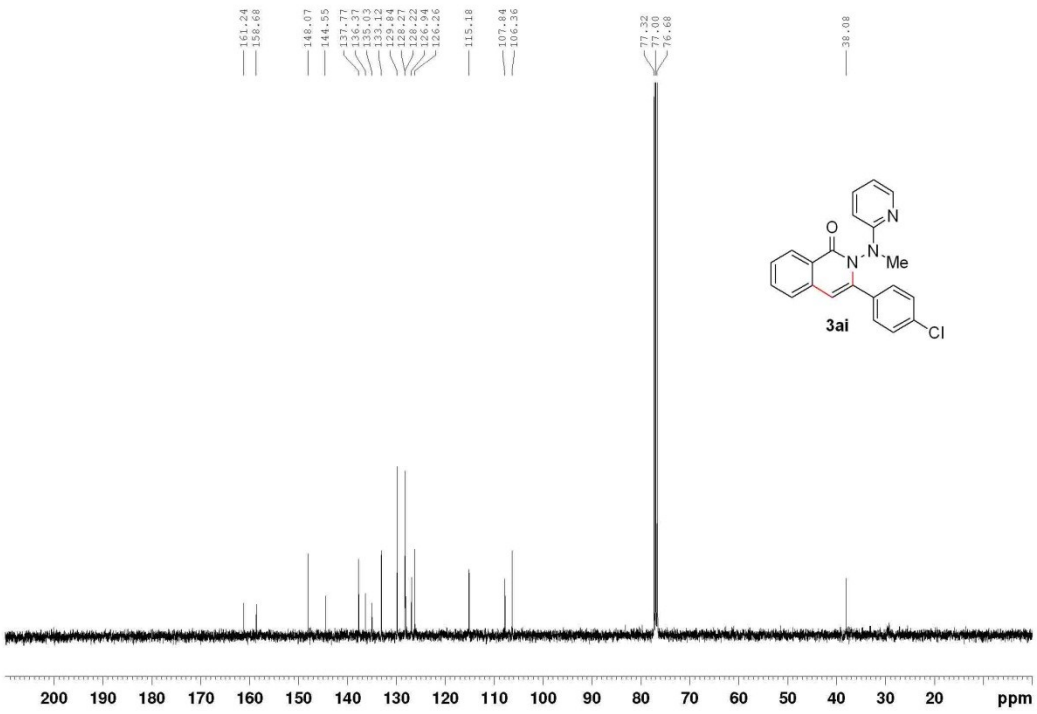

Fig. S48. ^{13}C NMR Spectrum of **3ai** (100 MHz, $CDCl_3$).

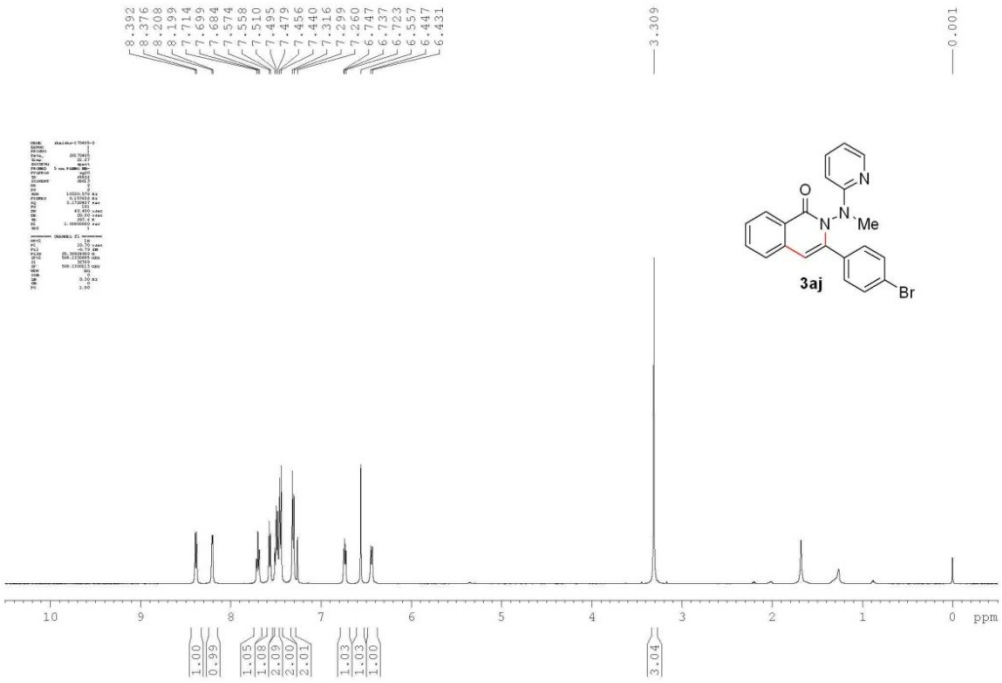

Fig. S49. ^{1}H NMR Spectrum of **3aj** (500 MHz, $CDCl_3$).

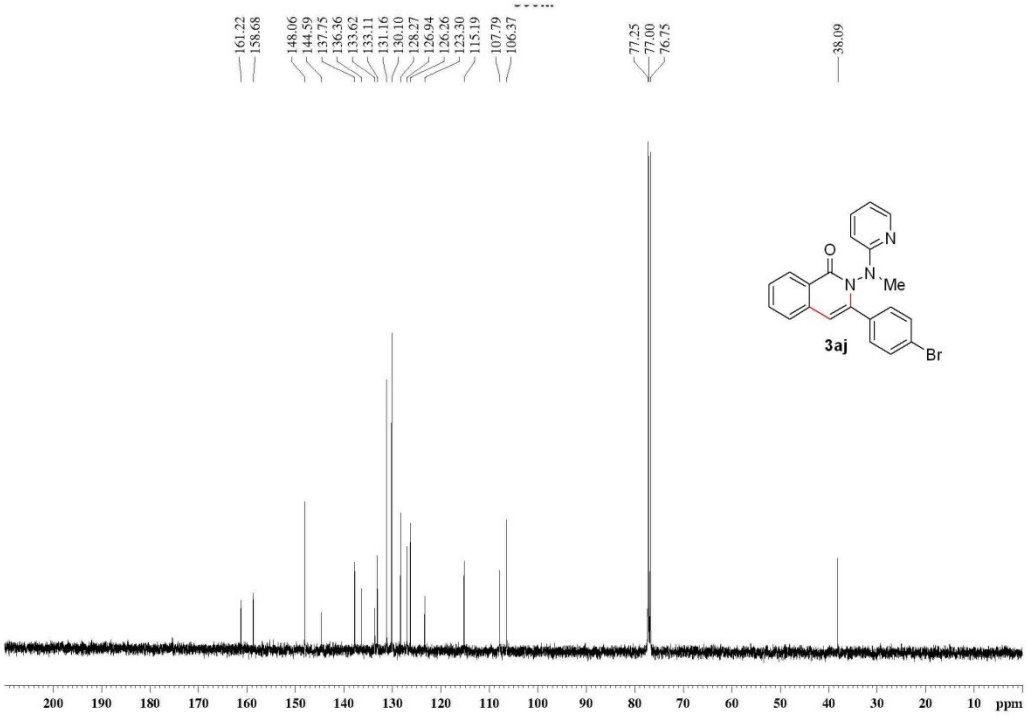

Fig. S50. ^{13}C NMR Spectrum of **3aj** (125 MHz, $CDCl_3$).

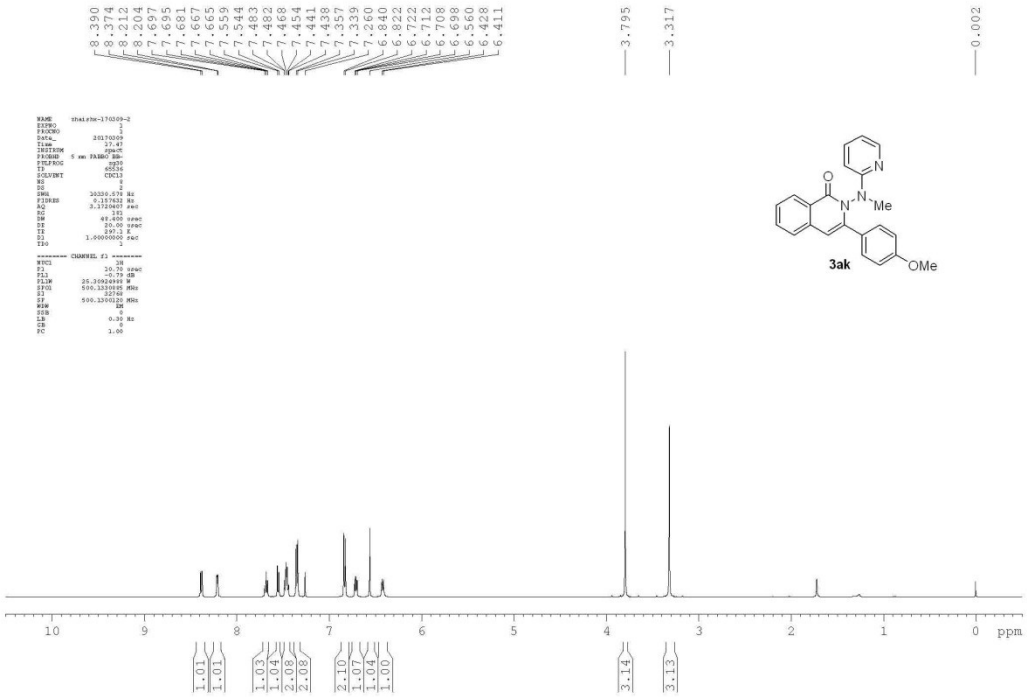

Fig. S51. ^{1}H NMR Spectrum of **3ak** (500 MHz, $CDCl_3$).

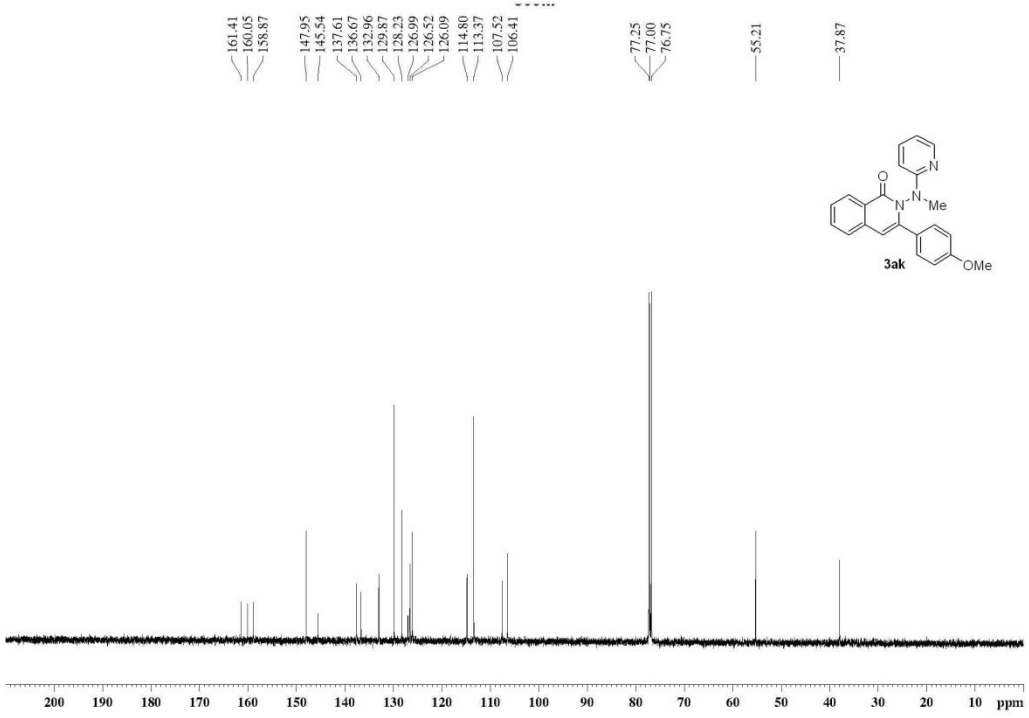

Fig. S52. ^{13}C NMR Spectrum of **3ak** (125 MHz, $CDCl_3$).

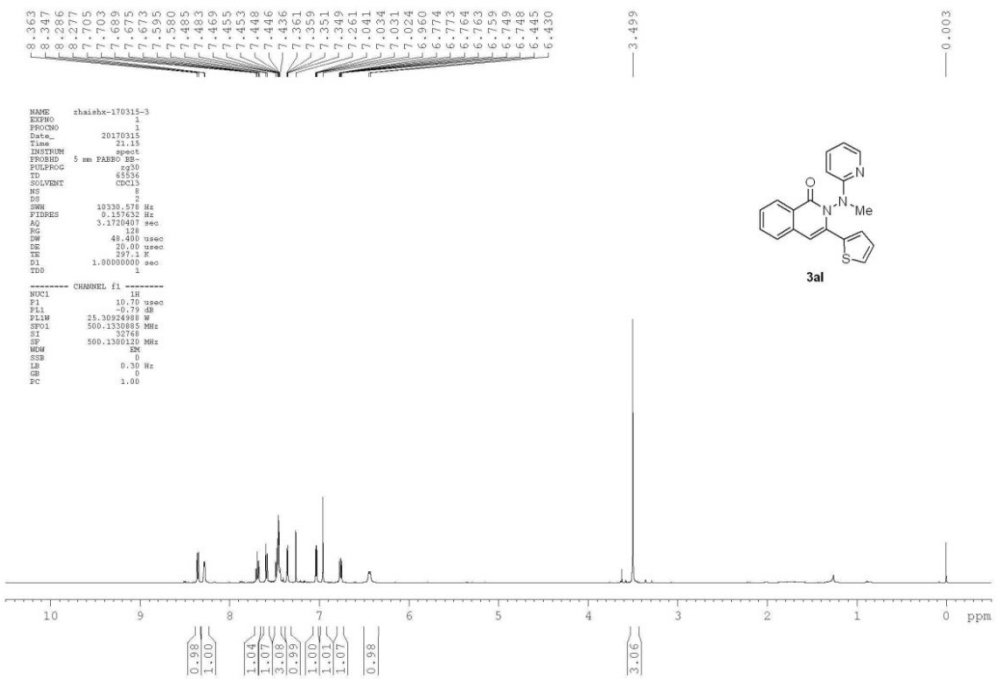

Fig. S53. ^{1}H NMR Spectrum of **3al** (500 MHz, $CDCl_3$).

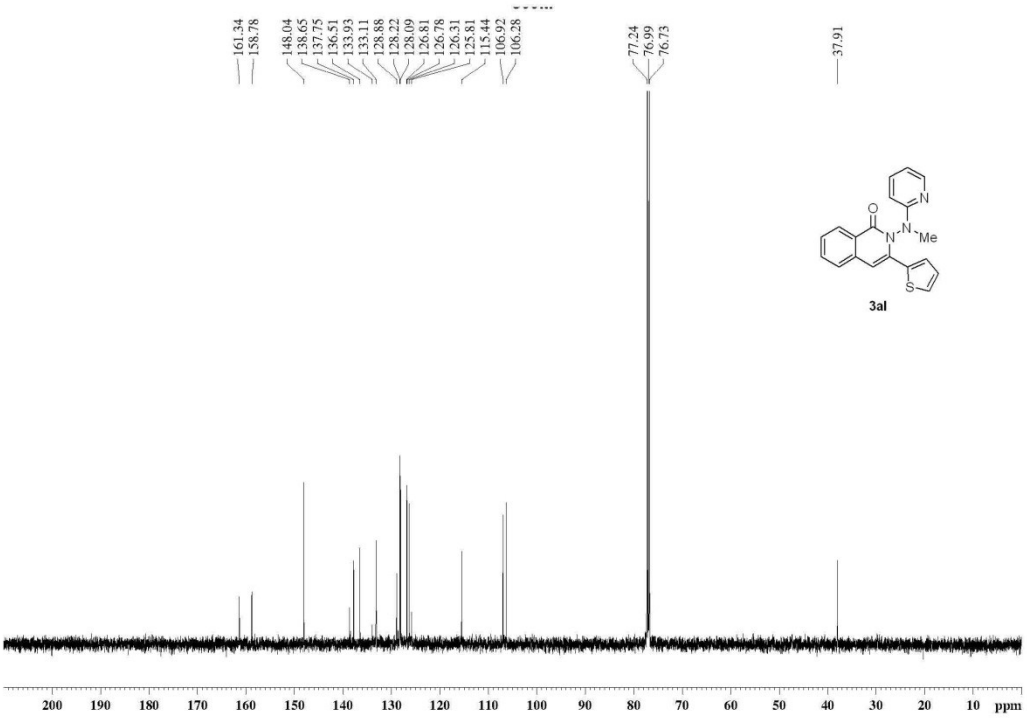

Fig. S54. ^{13}C NMR Spectrum of **3al** (125 MHz, $CDCl_3$).

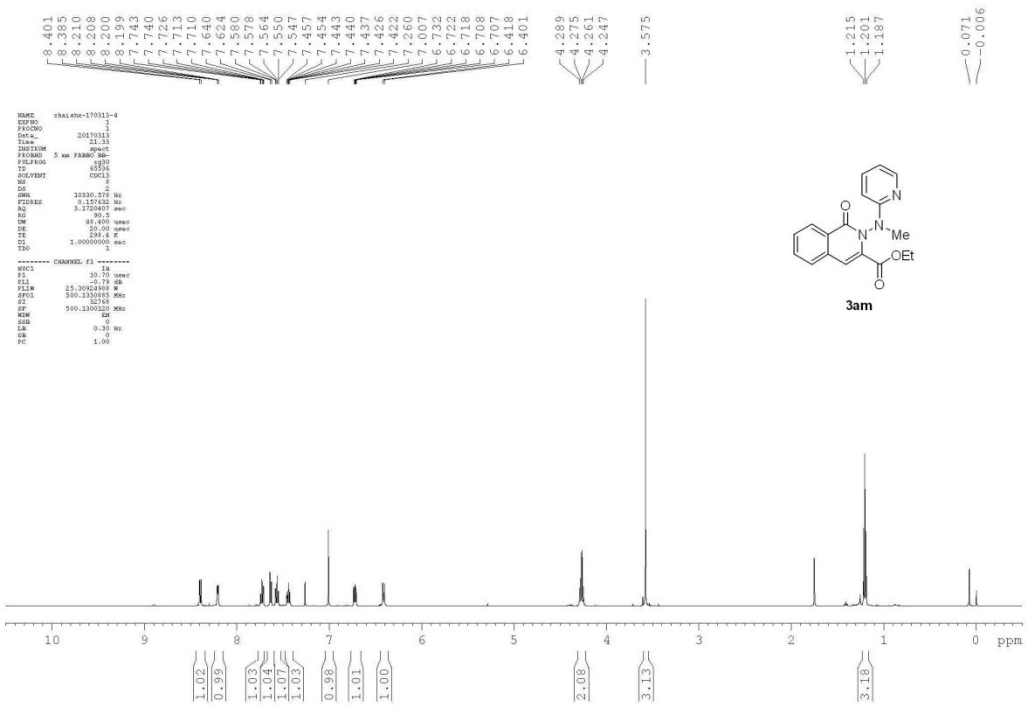

Fig. S55. ^{1}H NMR Spectrum of **3am** (500 MHz, $CDCl_3$).

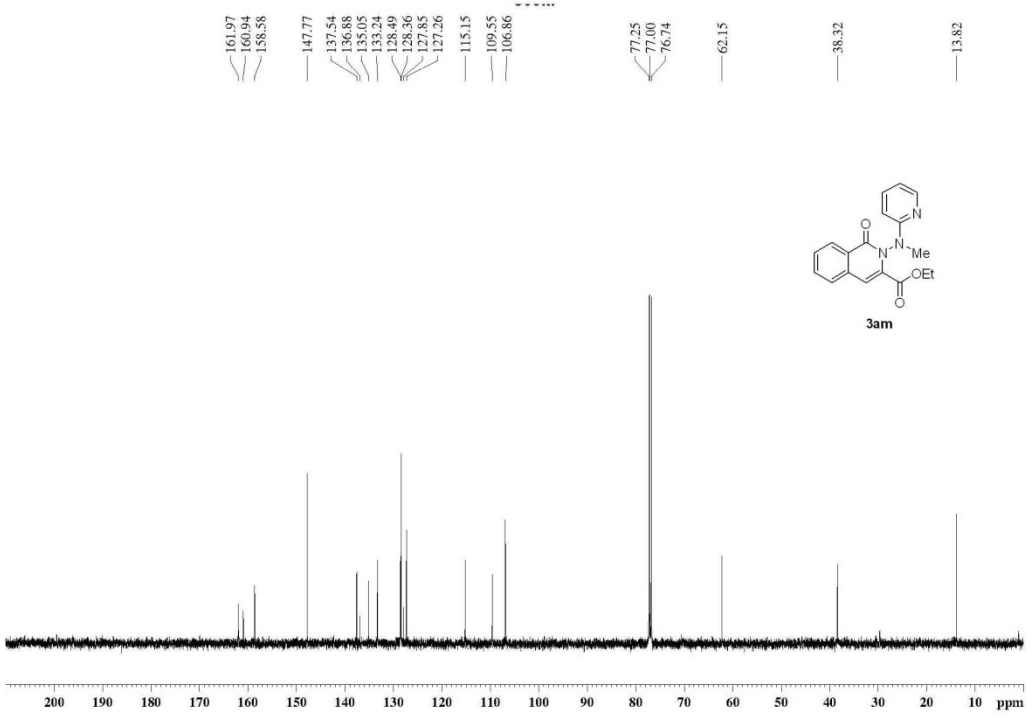

Fig. S56. ^{13}C NMR Spectrum of **3am** (125 MHz, $CDCl_3$).

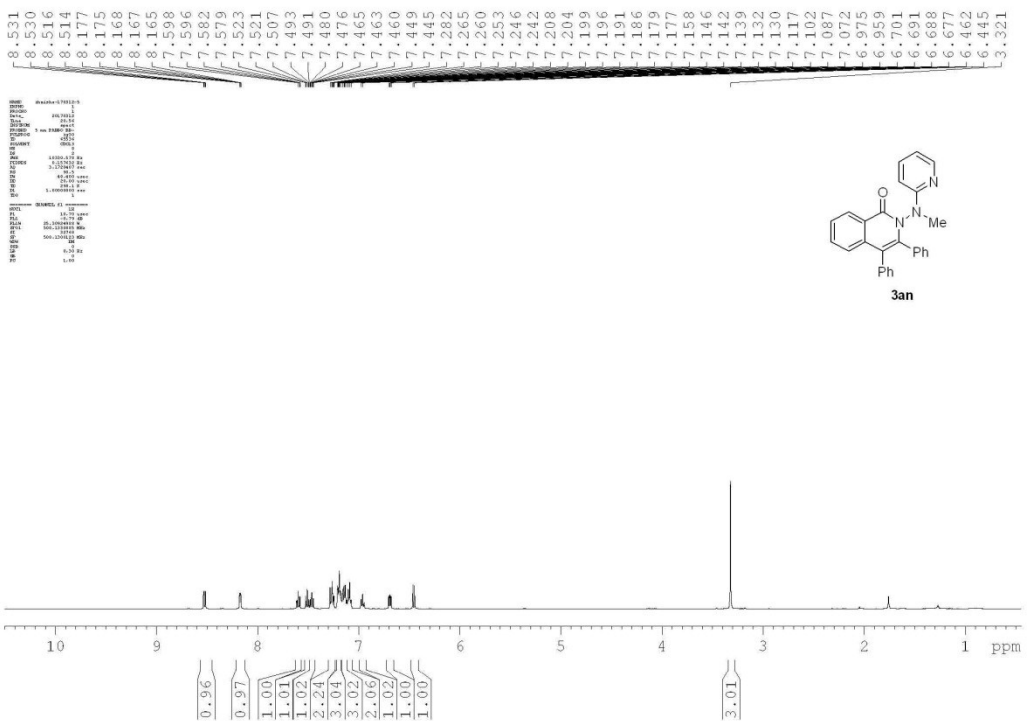

Fig. S57. ^{1}H NMR Spectrum of **3an** (500 MHz, $CDCl_3$).

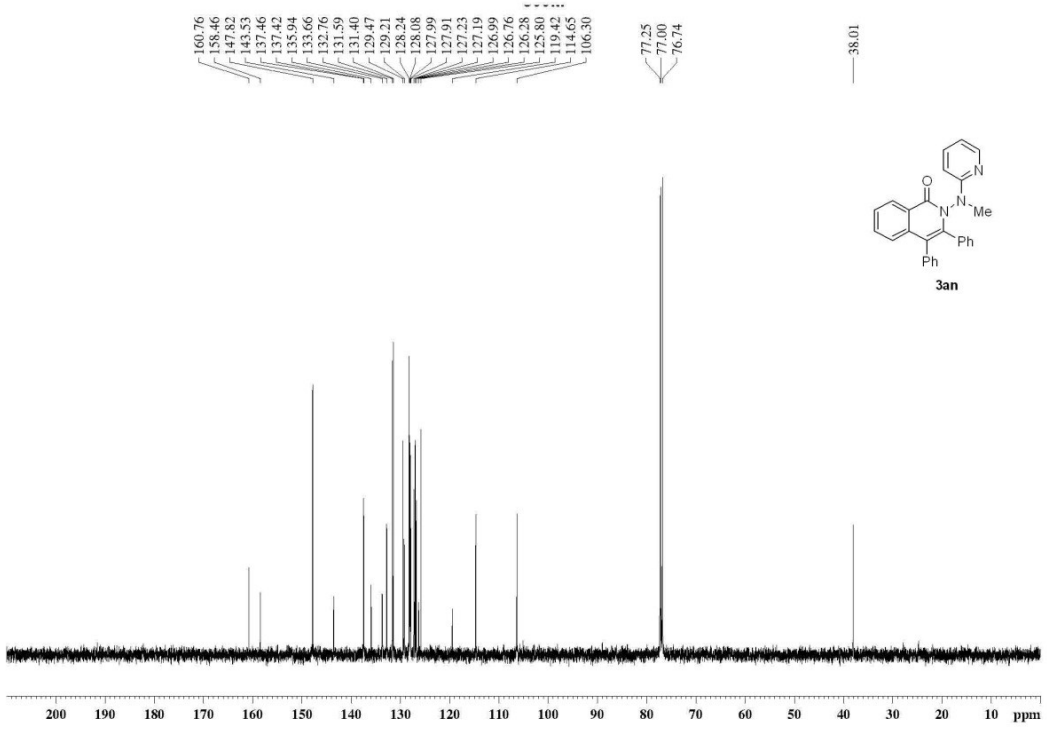

Fig. S58. ^{13}C NMR Spectrum of **3an** (125 MHz, $CDCl_3$).

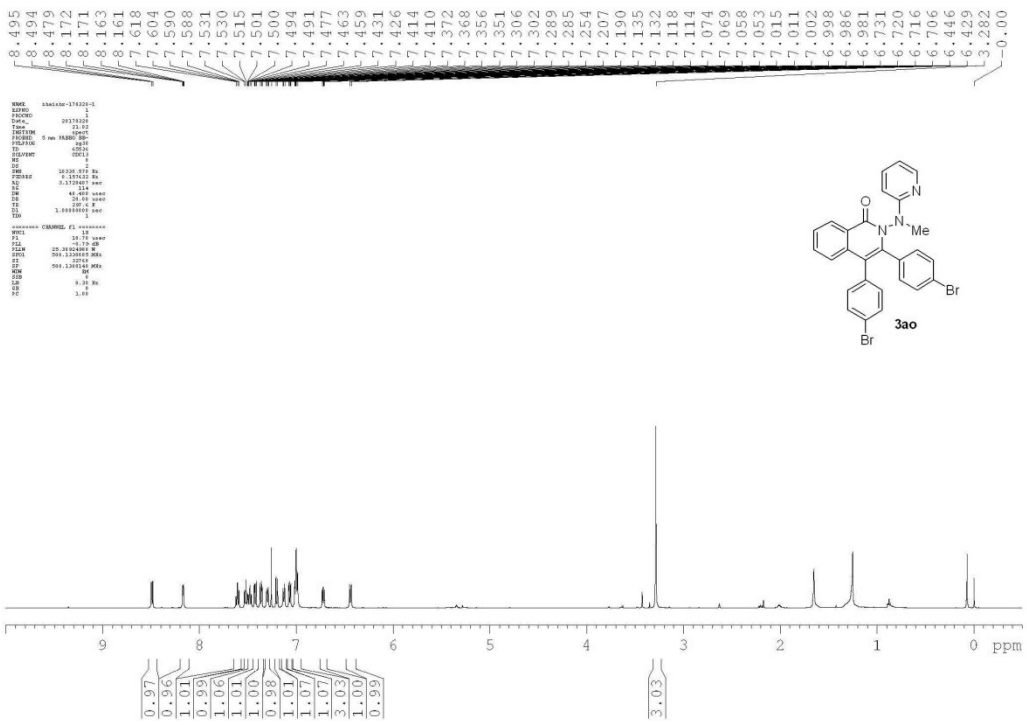

Fig. S59. ^{1}H NMR Spectrum of **3ao** (500 MHz, $CDCl_3$).

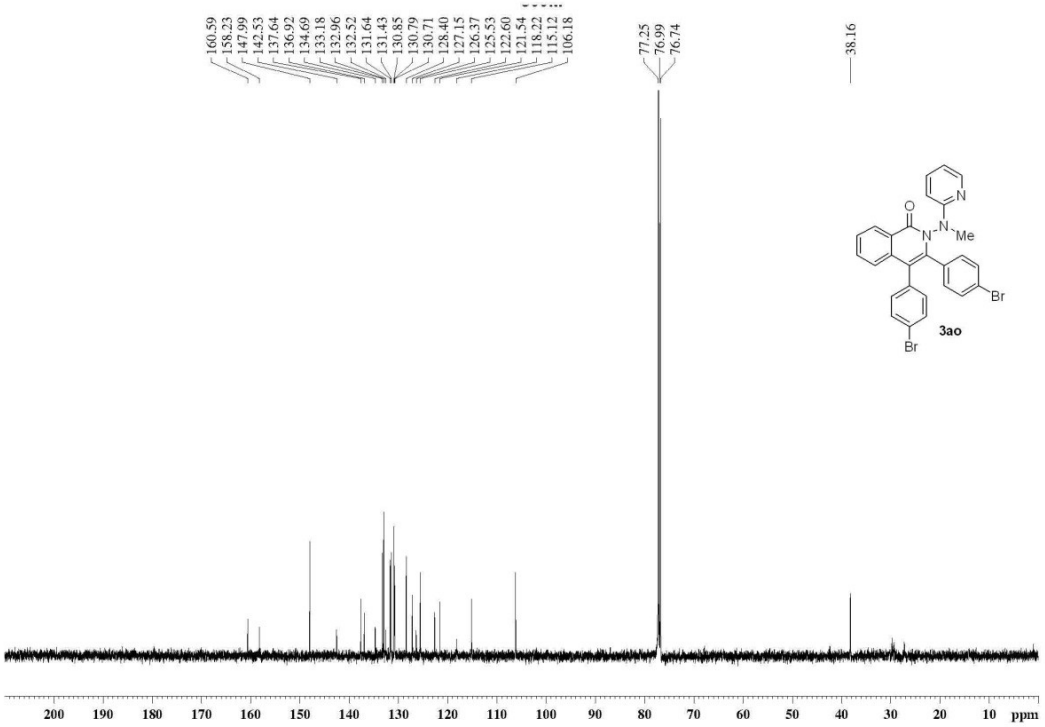

Fig. S60. ^{13}C NMR Spectrum of **3ao** (125 MHz, $CDCl_3$).

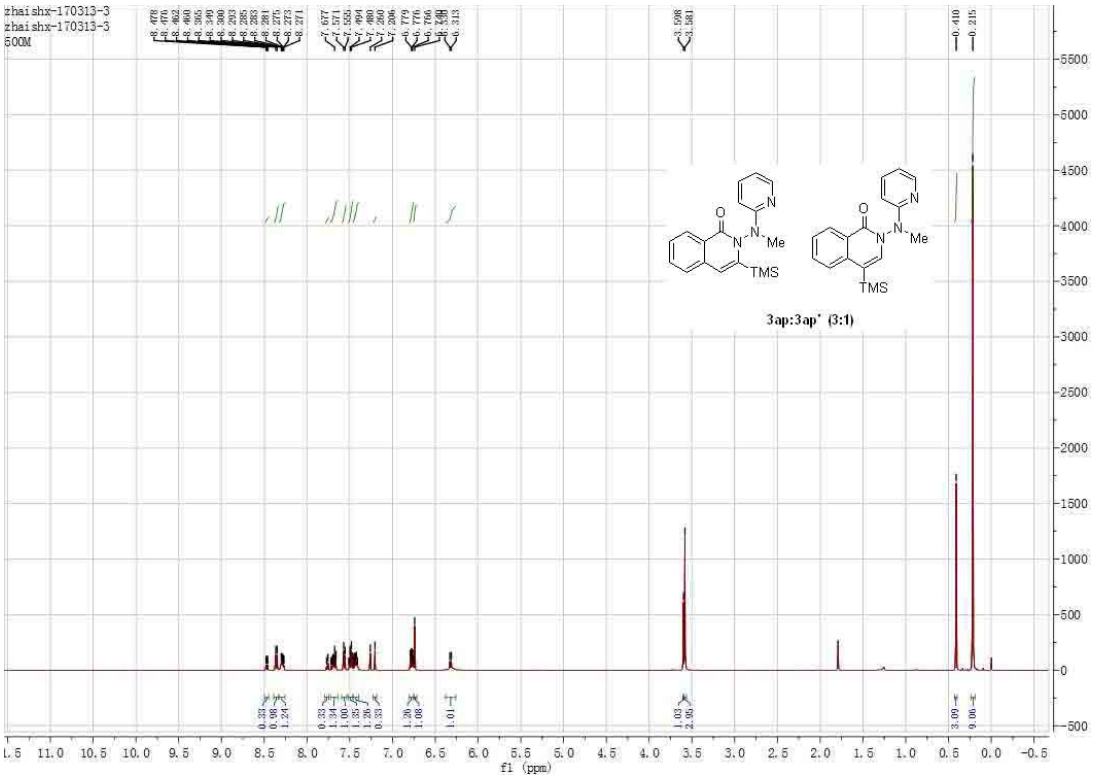

Fig. S61. ^{1}H NMR Spectrum of **3ap** (500 MHz, $CDCl_3$).

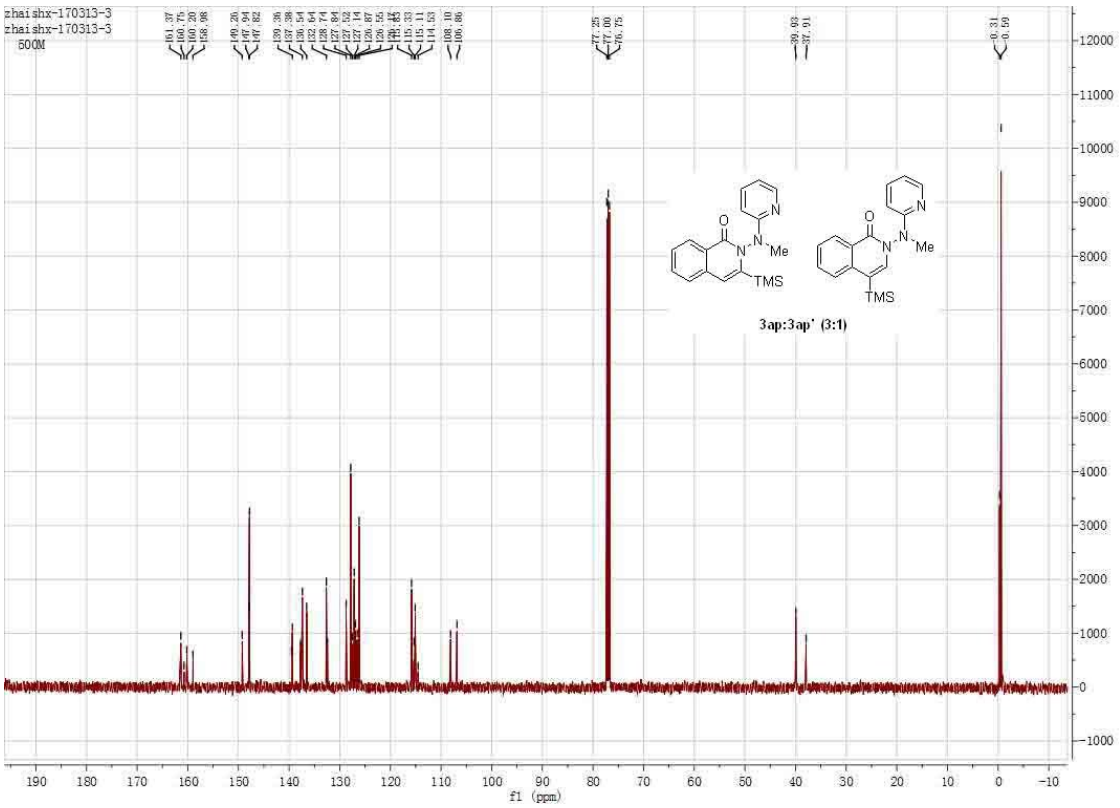

Fig. S62. ^{13}C NMR Spectrum of **3ap** (125 MHz, $CDCl_3$).

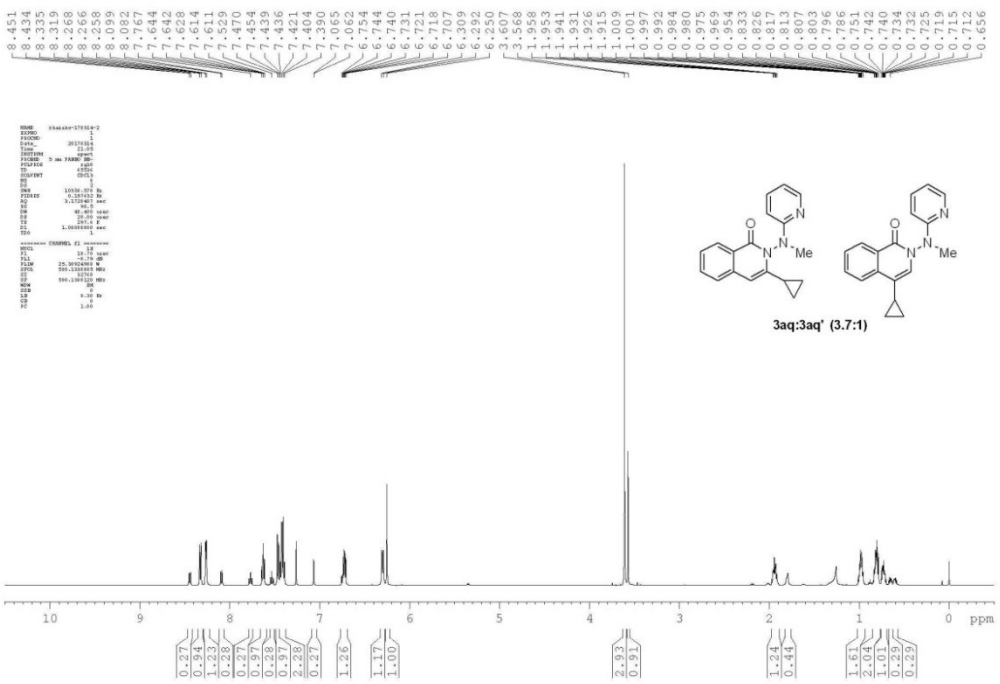

Fig. S63. ^{1}H NMR Spectrum of **3aq** (500 MHz, $CDCl_3$).

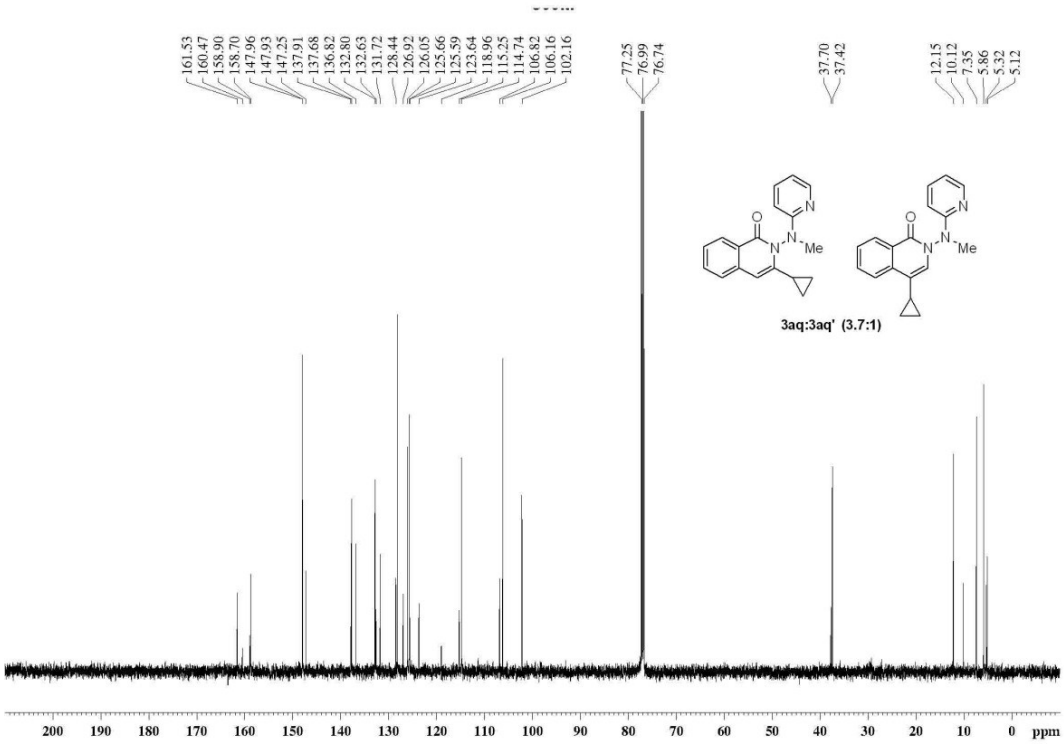

Fig. S64. ^{13}C NMR Spectrum of **3aq** (125 MHz, $CDCl_3$).

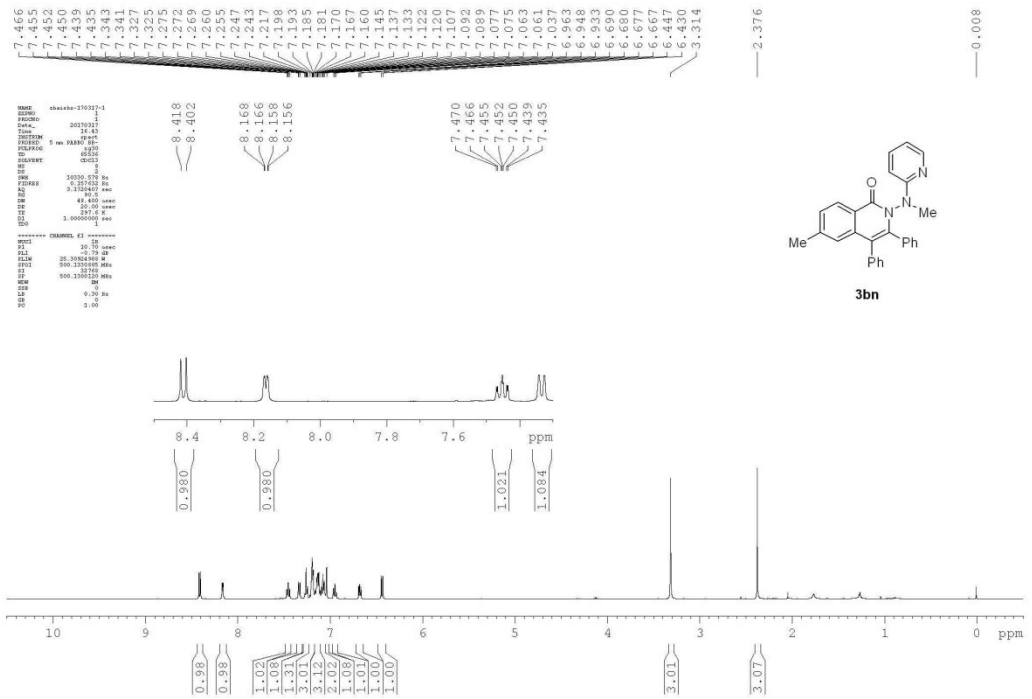

Fig. S65. ^{1}H NMR Spectrum of **3bn** (500 MHz, $CDCl_3$).

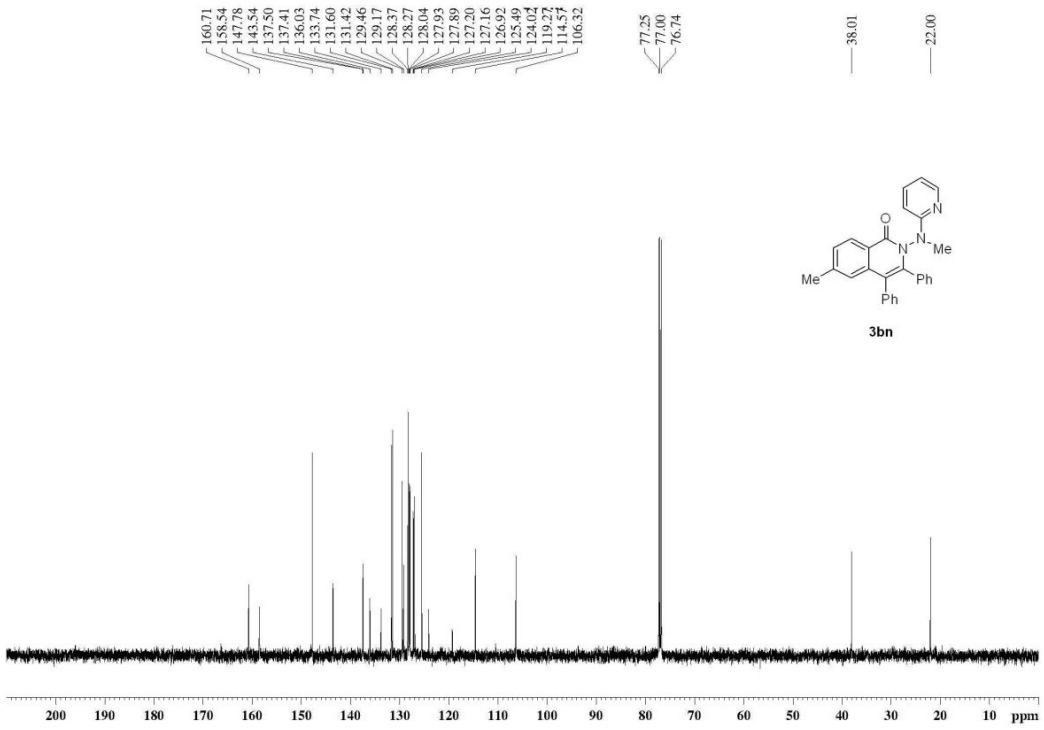

Fig. S66. ^{13}C NMR Spectrum of **3bn** (125 MHz, $CDCl_3$).

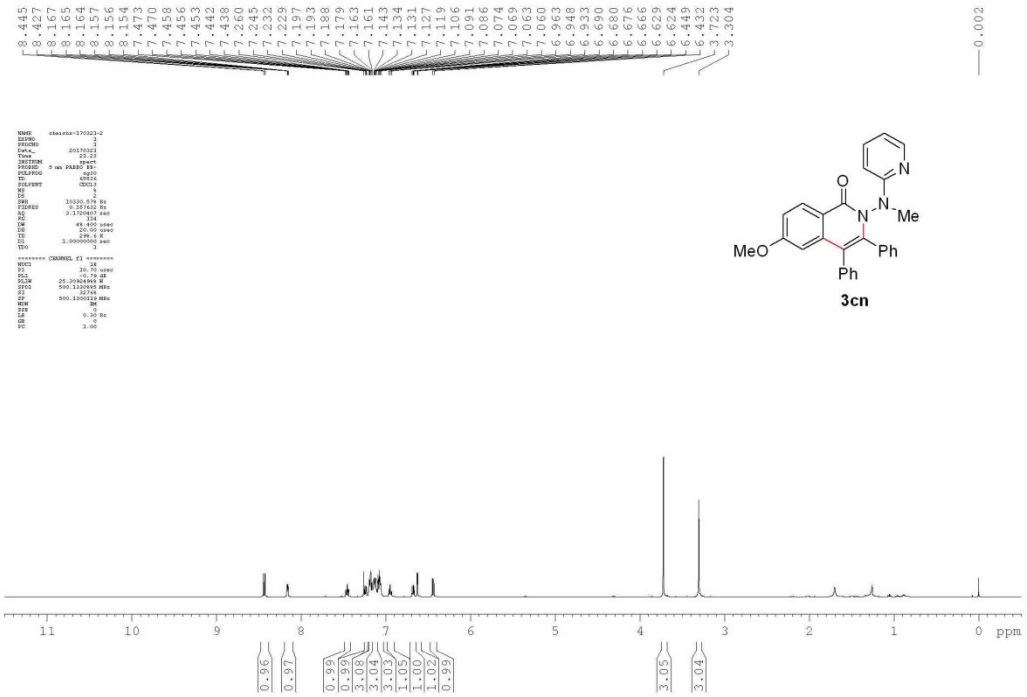

Fig. S67. ^{1}H NMR Spectrum of **3cn** (500 MHz, $CDCl_3$).

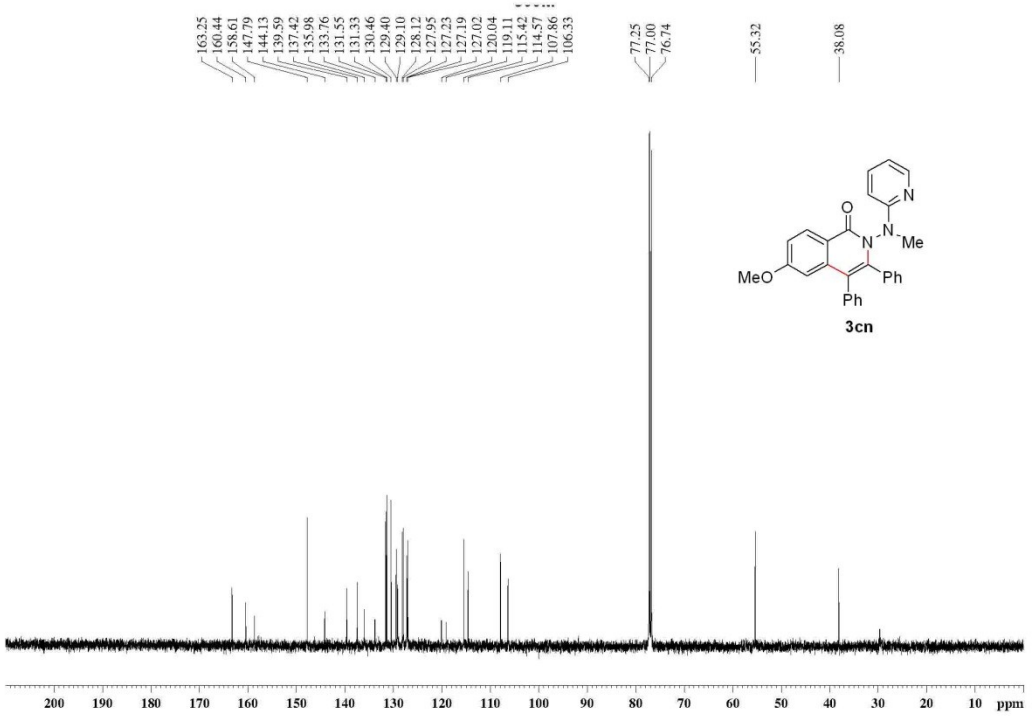

Fig. S68. ^{13}C NMR Spectrum of **3cn** (125 MHz, $CDCl_3$).

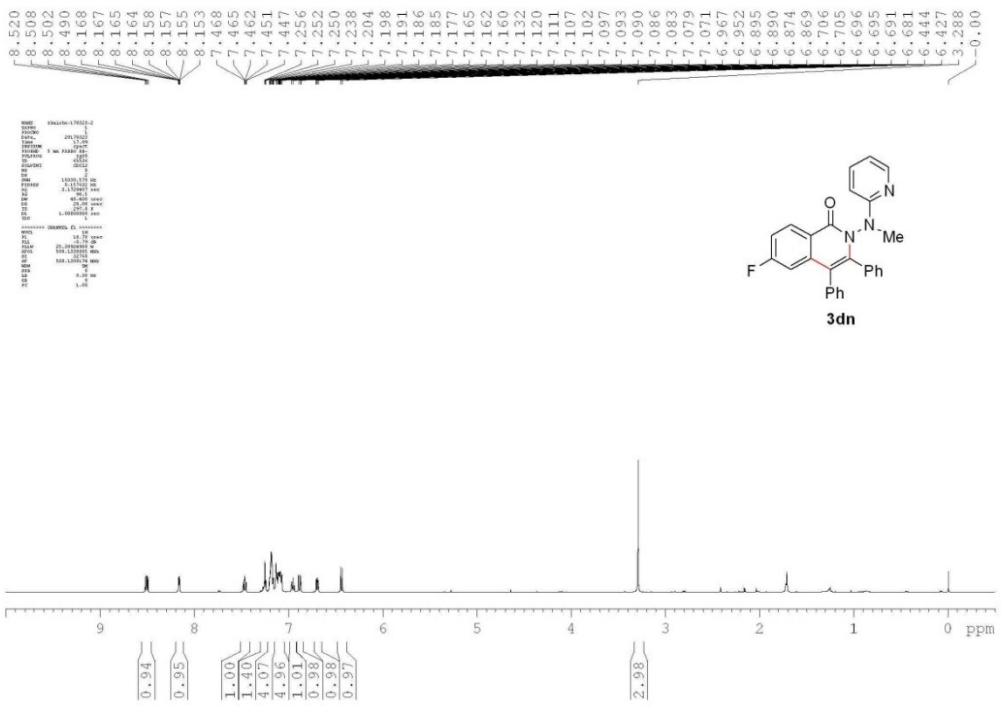

Fig. S69. ^{1}H NMR Spectrum of **3dn** (500 MHz, $CDCl_3$).

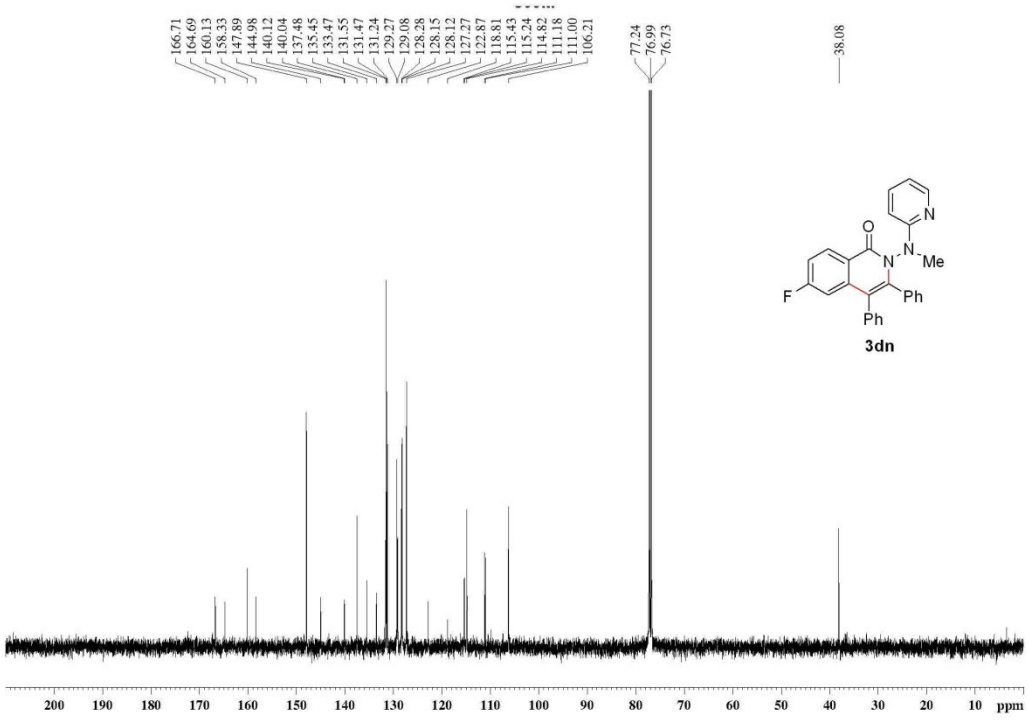

Fig. S70. ^{13}C NMR Spectrum of **3dn** (125 MHz, $CDCl_3$).

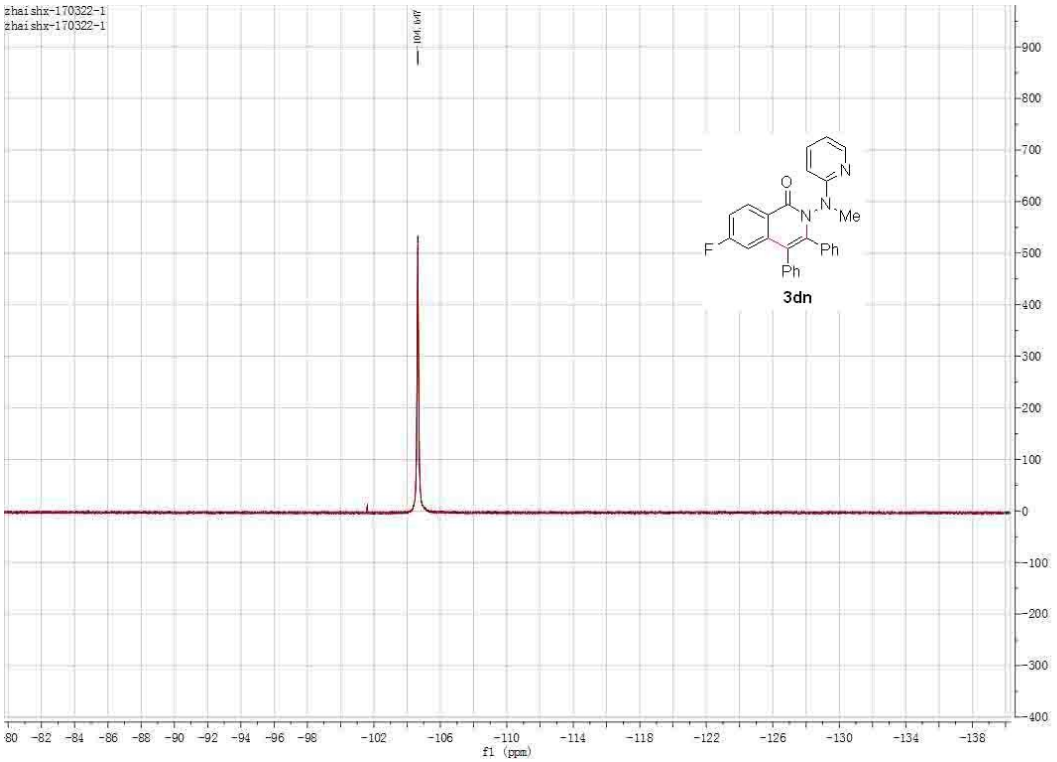

Fig. S71. ^{19}F NMR Spectrum of **3dn** (376 MHz, $CDCl_3$).

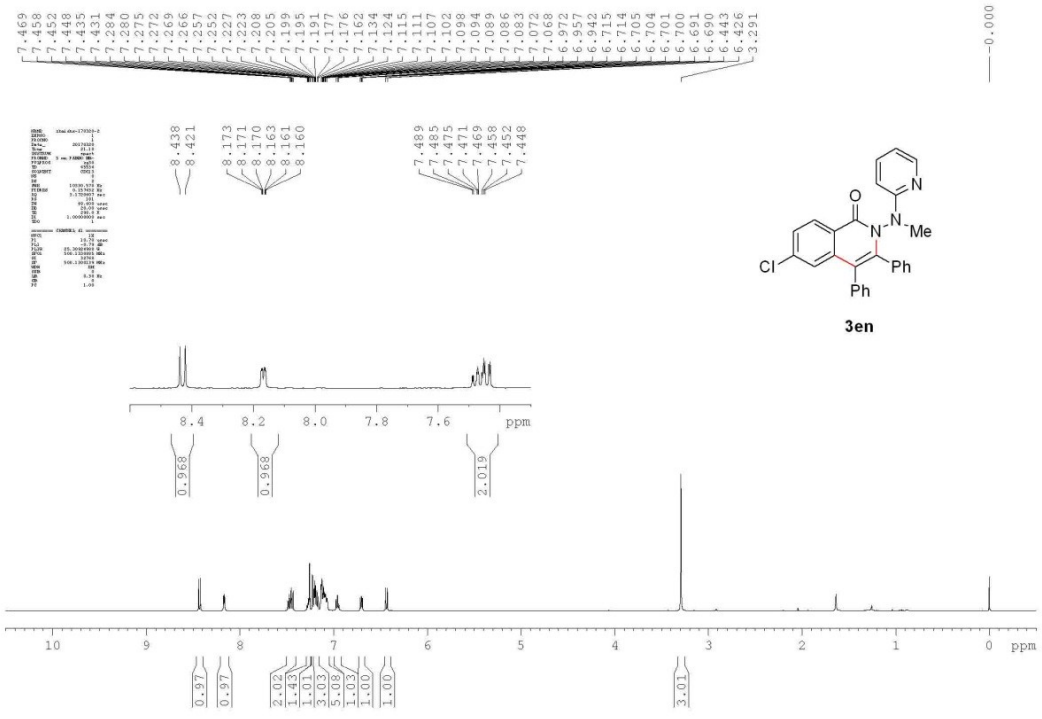

Fig. S72. ^{1}H NMR Spectrum of **3en** (500 MHz, $CDCl_3$).

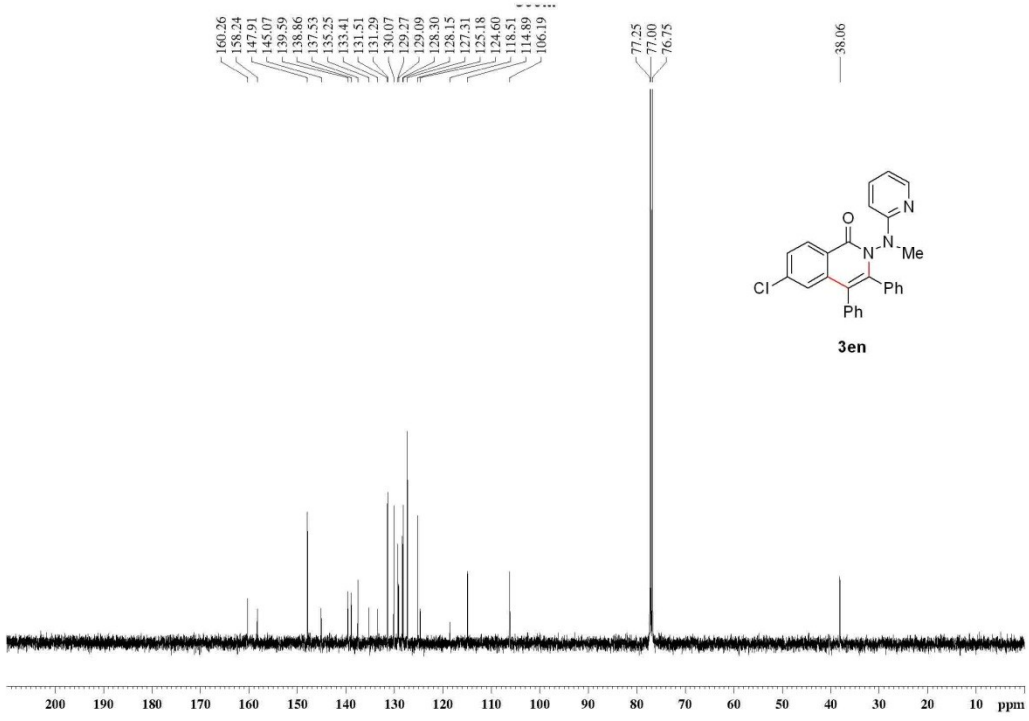

Fig. S73. ^{13}C NMR Spectrum of **3en** (125 MHz, $CDCl_3$).

Fig. S74. ^{1}H NMR Spectrum of **3fn** (500 MHz, $CDCl_3$).

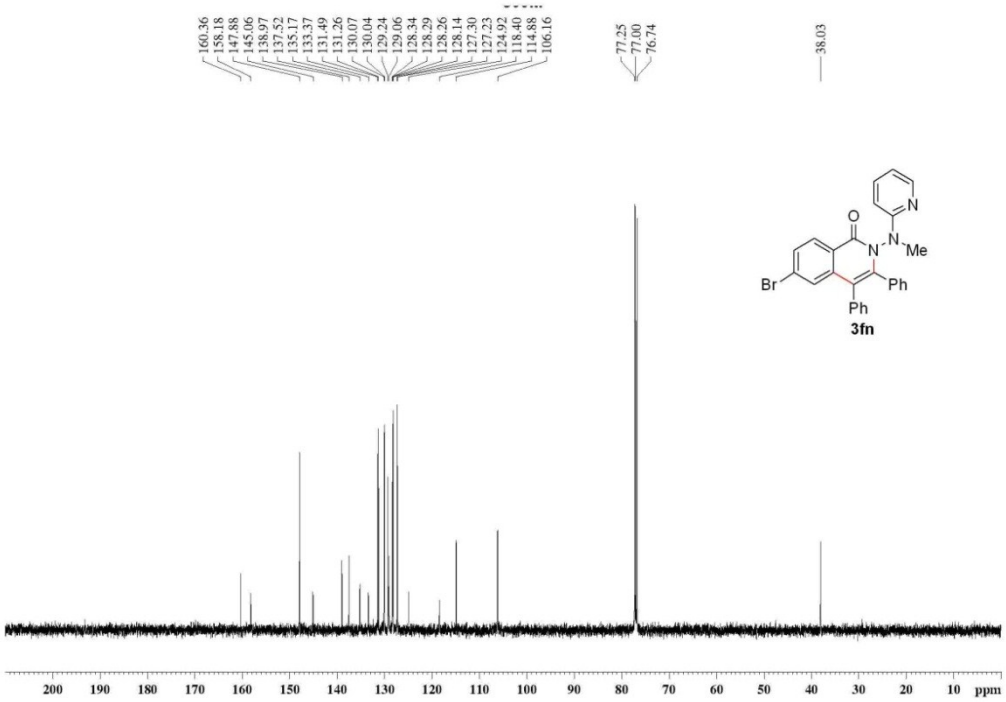

Fig. S75. ^{13}C NMR Spectrum of **3fn** (125 MHz, $CDCl_3$).

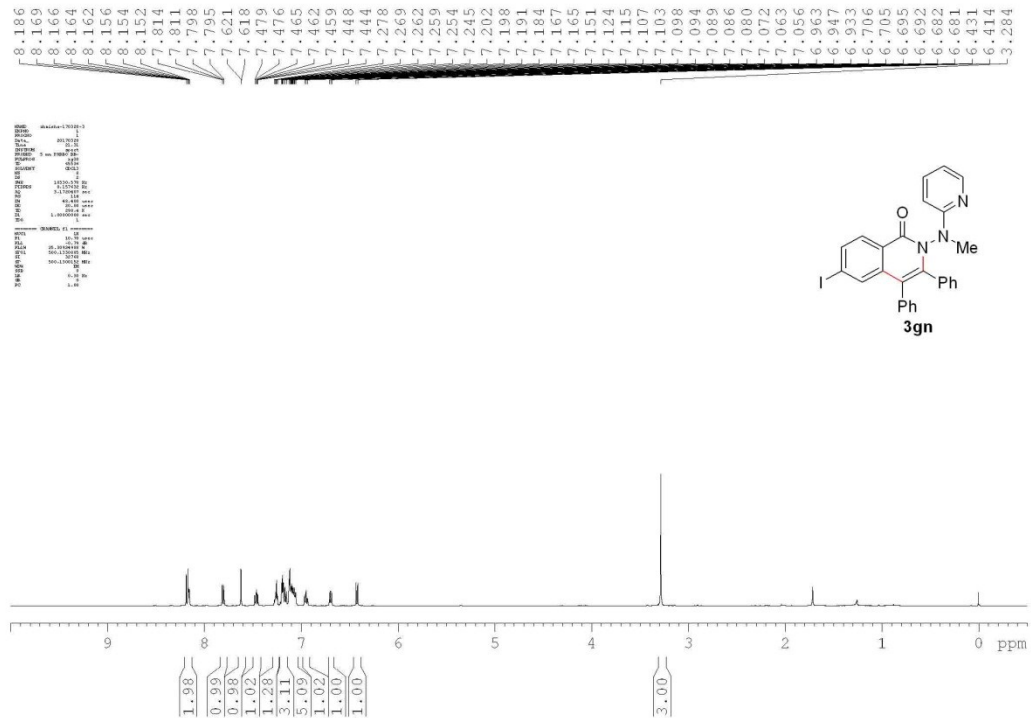

Fig. S76. ^{1}H NMR Spectrum of **3gn** (500 MHz, $CDCl_3$).

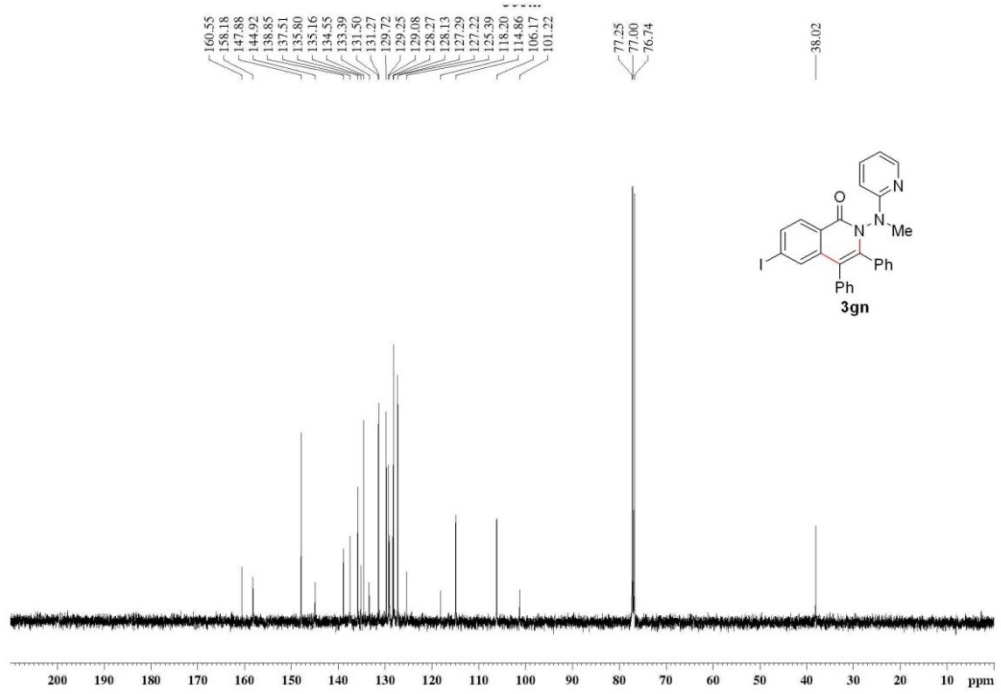

Fig. S77. ^{13}C NMR Spectrum of **3gn** (125 MHz, $CDCl_3$).

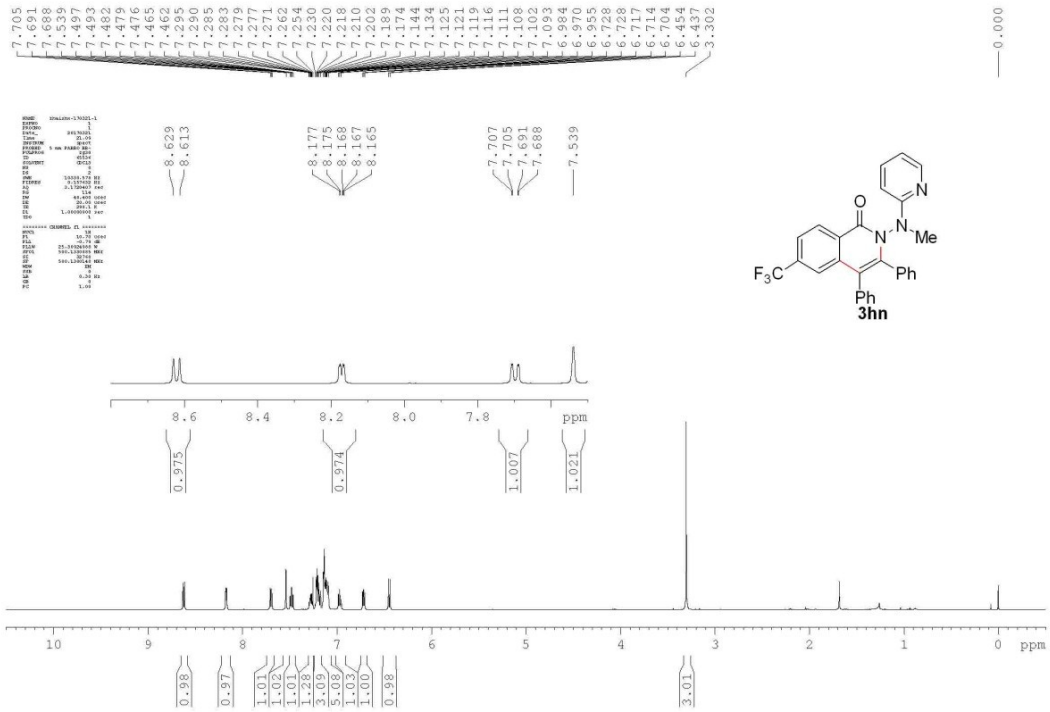

Fig. S78. ^{1}H NMR Spectrum of **3hn** (500 MHz, $CDCl_3$).

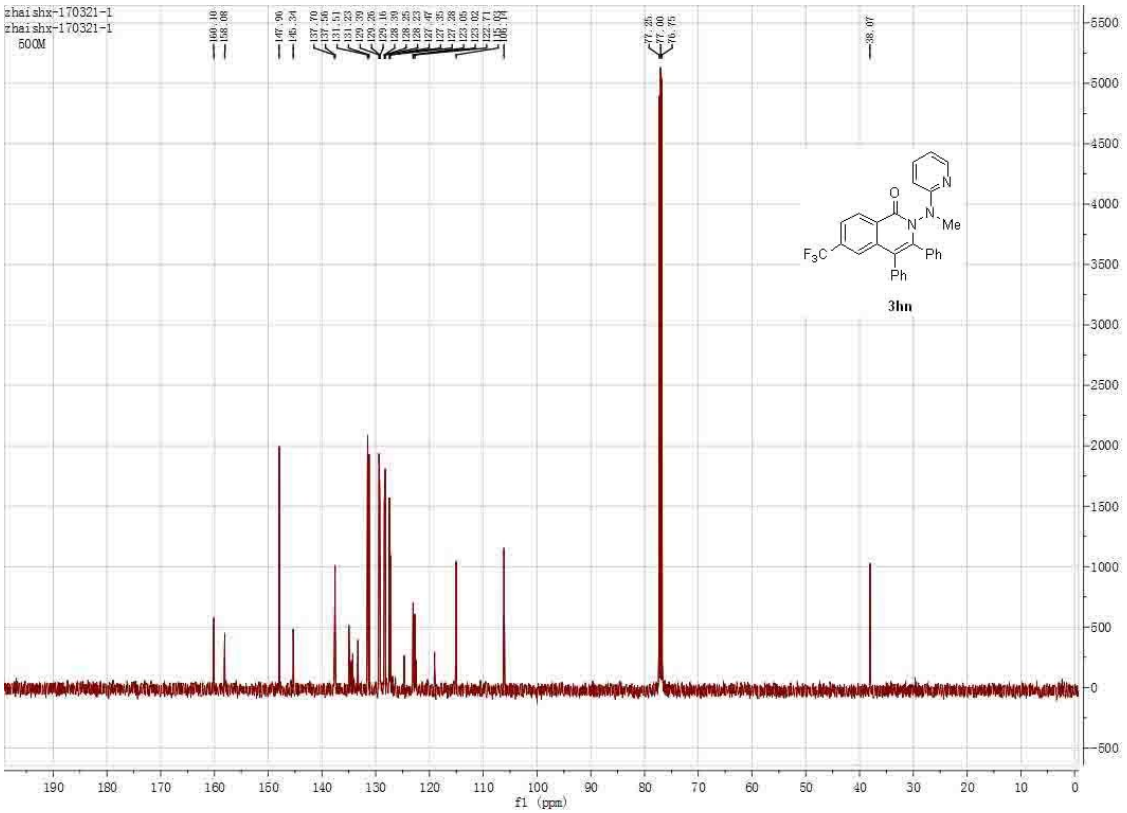

Fig. S79. ^{13}C NMR Spectrum of **3hn** (125 MHz, $CDCl_3$).

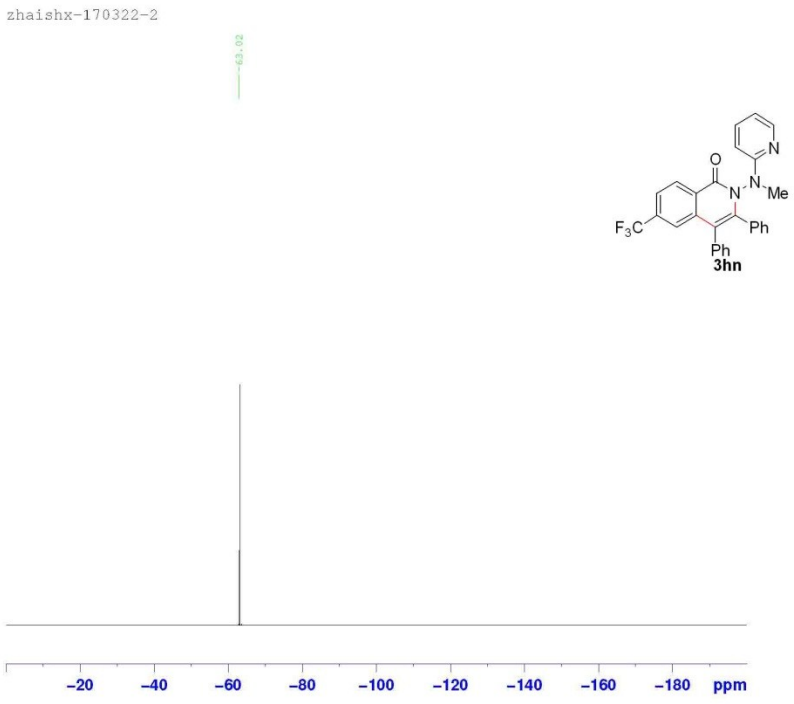

Fig. S80. ^{19}F NMR Spectrum of **3hn** (376 MHz, $CDCl_3$).

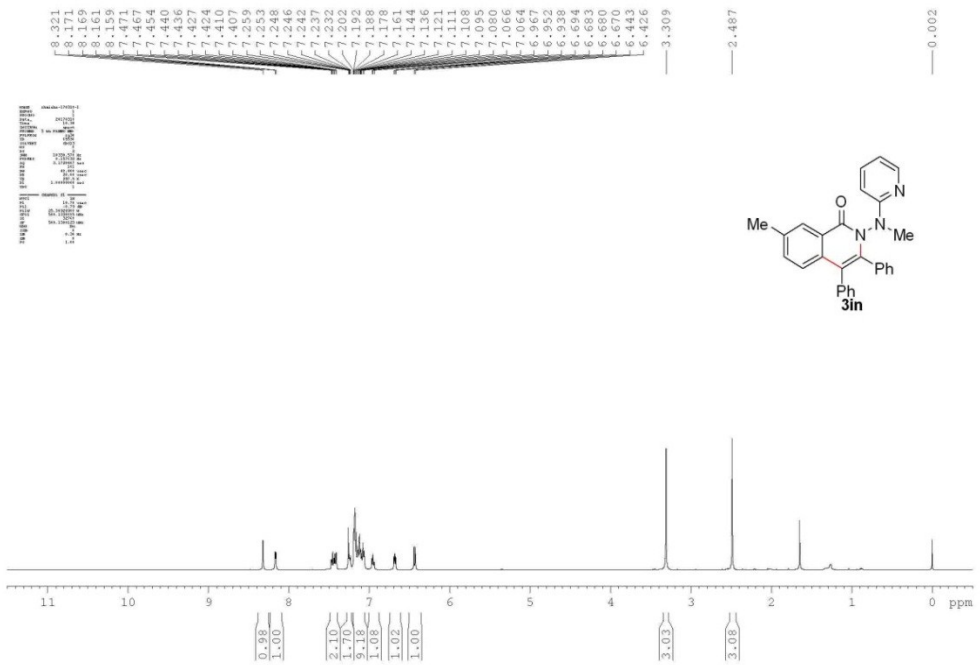

Fig. S81. ^{1}H NMR Spectrum of **3in** (500 MHz, $CDCl_3$).

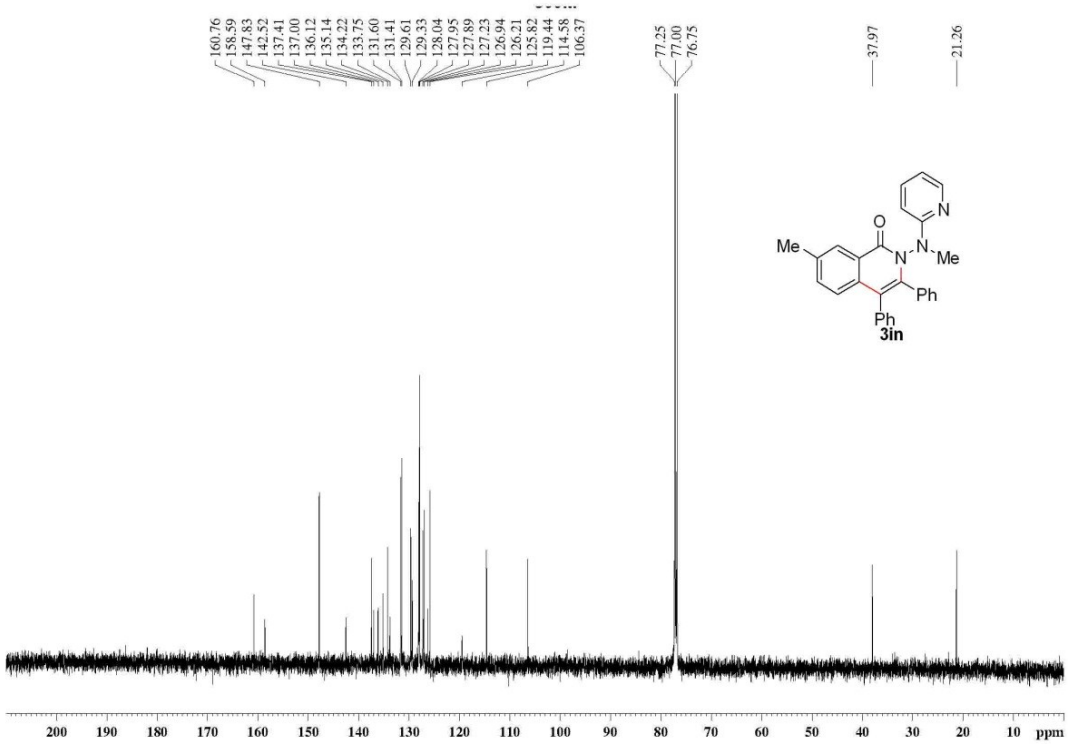

Fig. S82. ^{13}C NMR Spectrum of **3in** (125 MHz, $CDCl_3$).

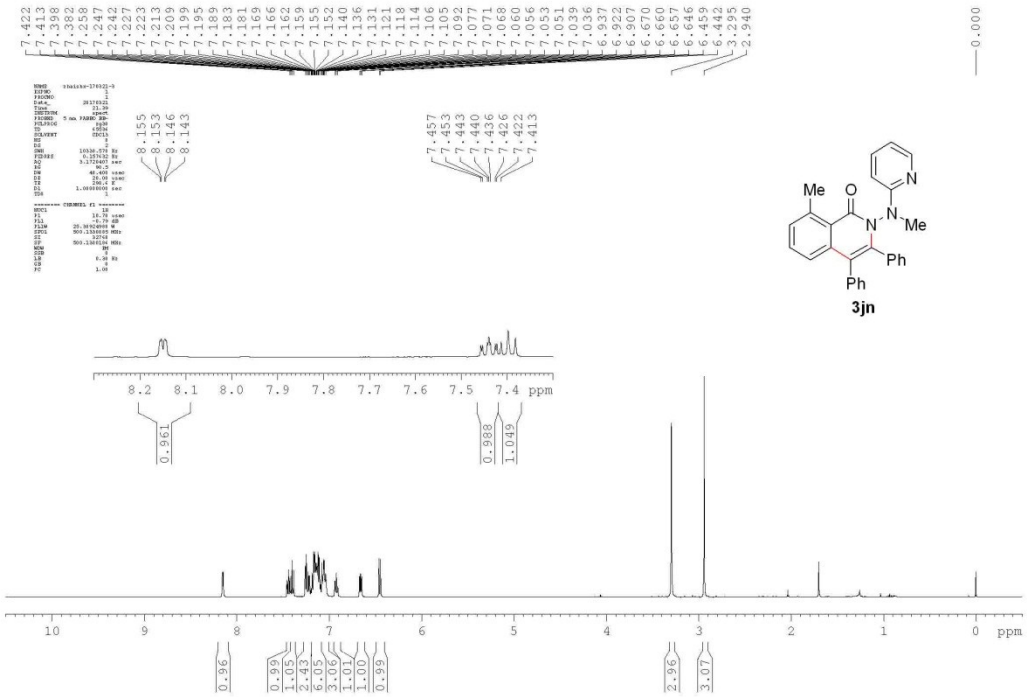

Fig. S83. ^{1}H NMR Spectrum of **3jn** (500 MHz, $CDCl_3$).

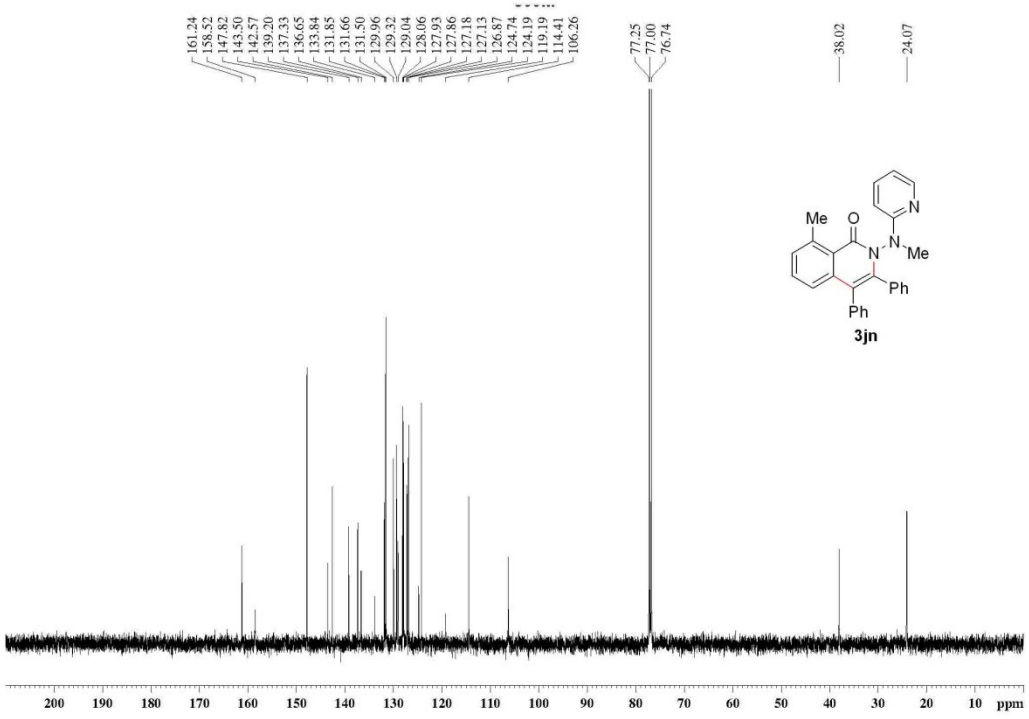

Fig. S84. ^{13}C NMR Spectrum of **3jn** (125 MHz, $CDCl_3$).

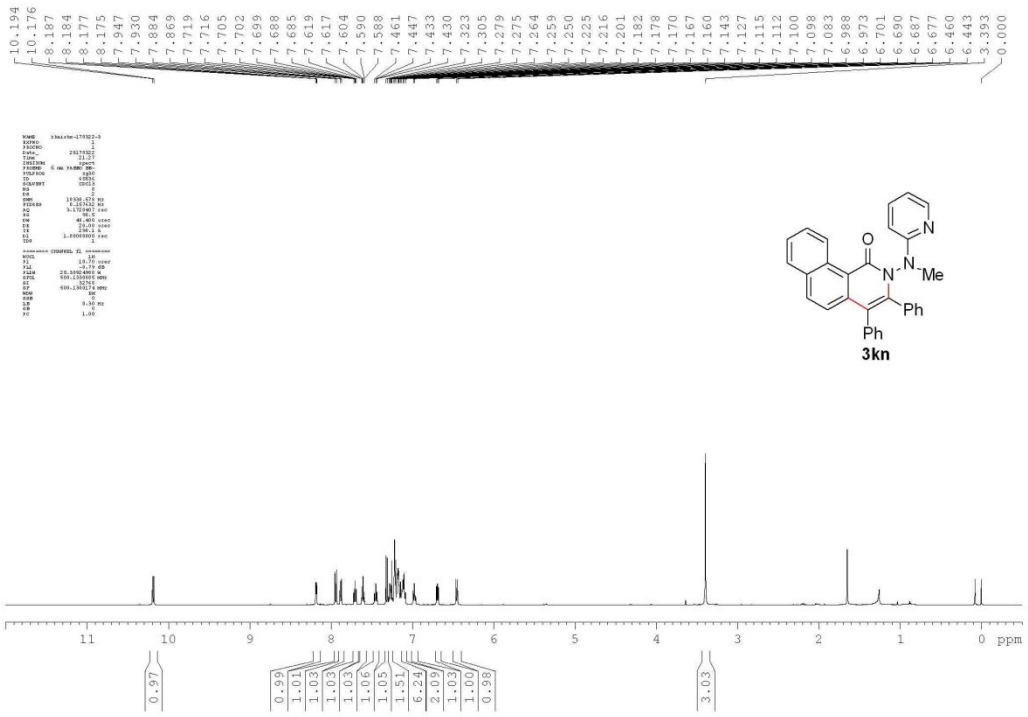

Fig. S85. ^{1}H NMR Spectrum of **3kn** (500 MHz, $CDCl_3$).

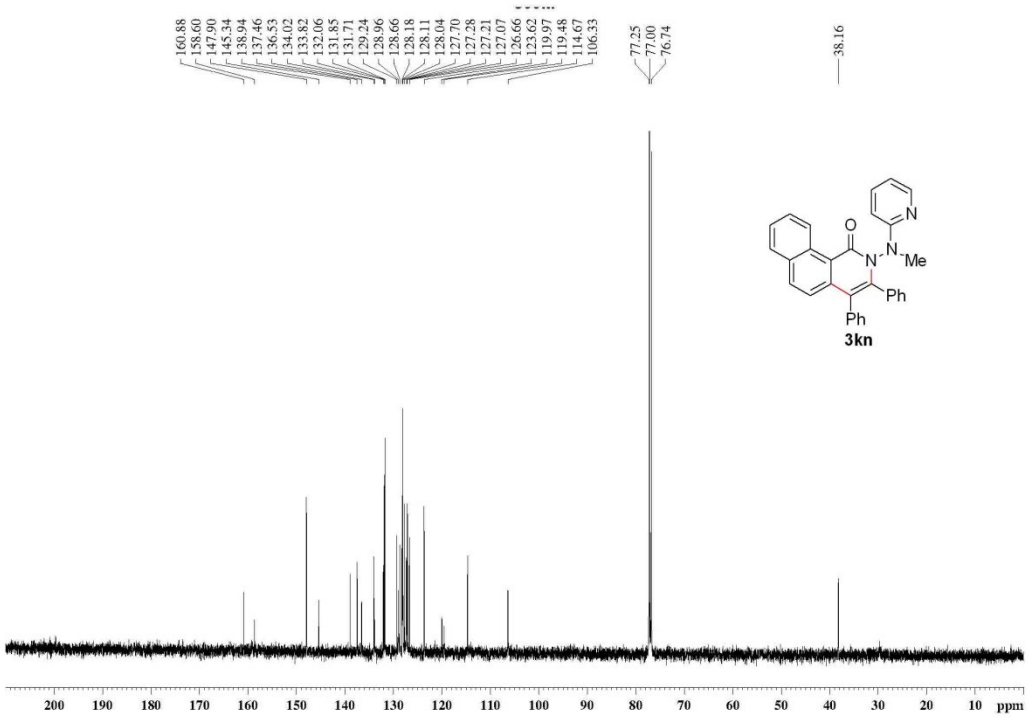

Fig. S86. ^{13}C NMR Spectrum of **3kn** (125 MHz, $CDCl_3$).

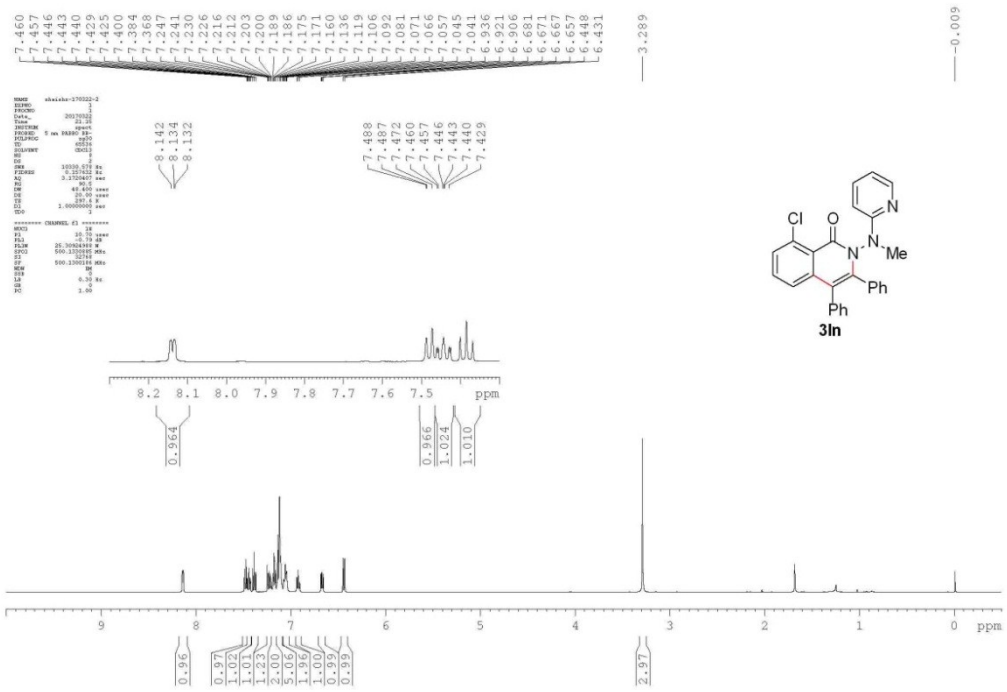

Fig. S87. ^{1}H NMR Spectrum of **3ln** (500 MHz, $CDCl_3$).

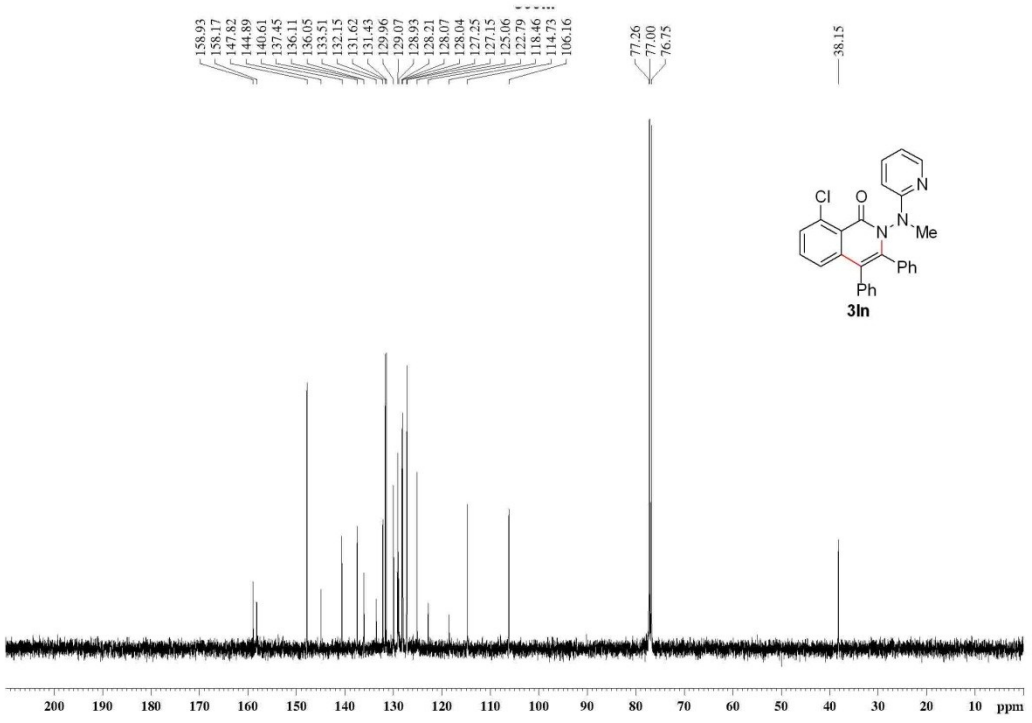

Fig. S88. ^{13}C NMR Spectrum of **3ln** (125 MHz, $CDCl_3$).

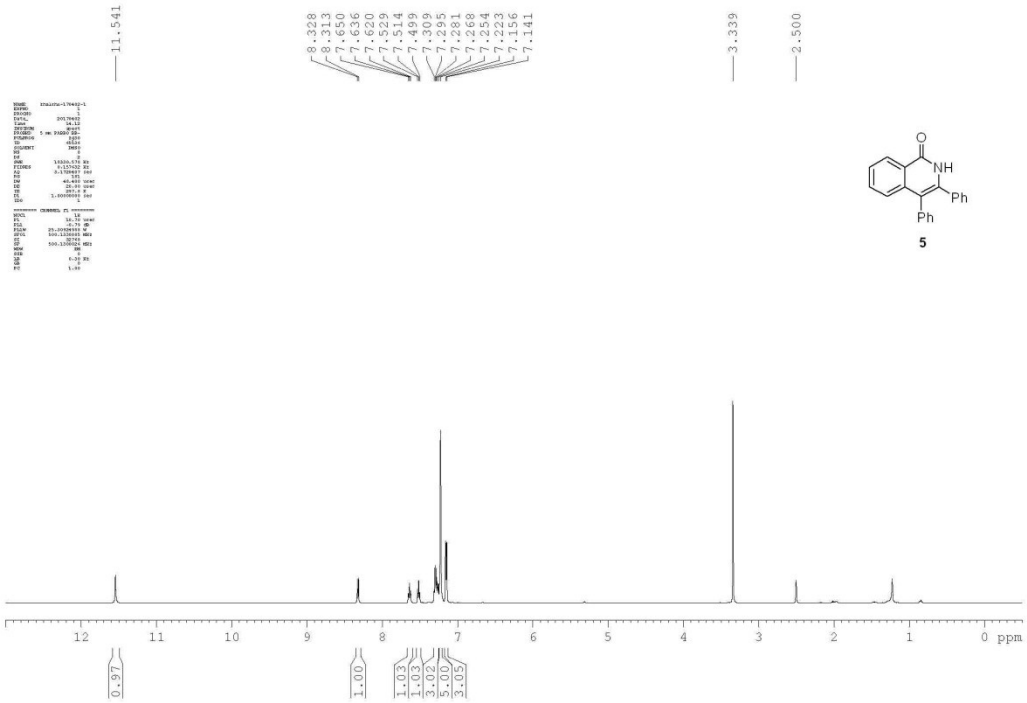

Fig. S89. ^{1}H NMR Spectrum of **5** (500 MHz, DMSO).

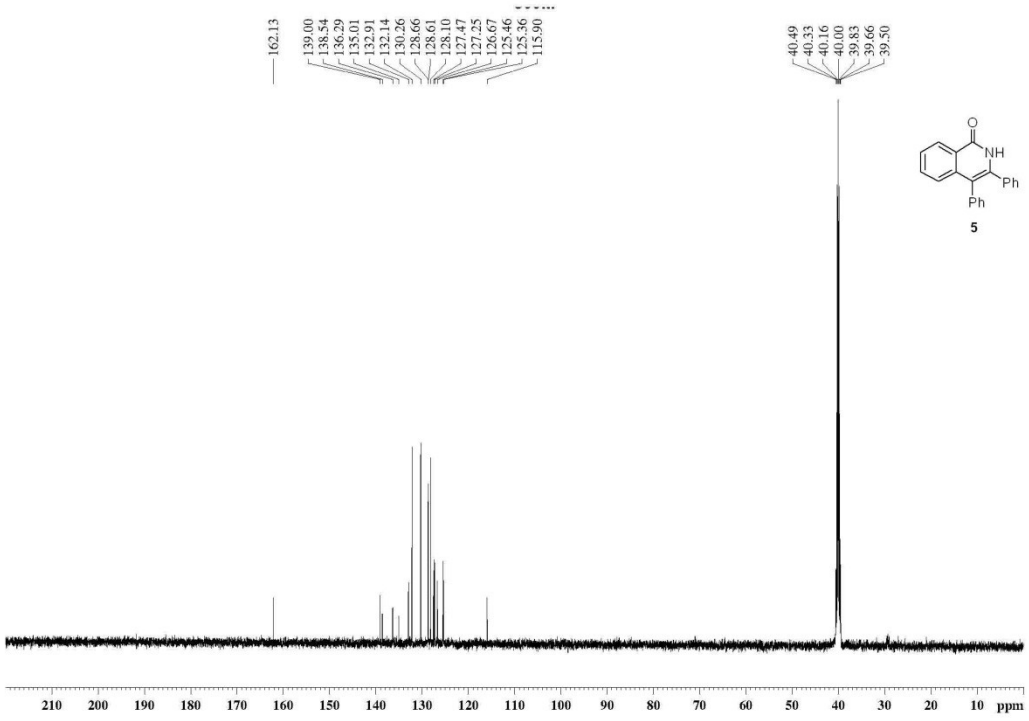

Fig. S90. ^{13}C NMR Spectrum of **5** (125 MHz, DMSO).

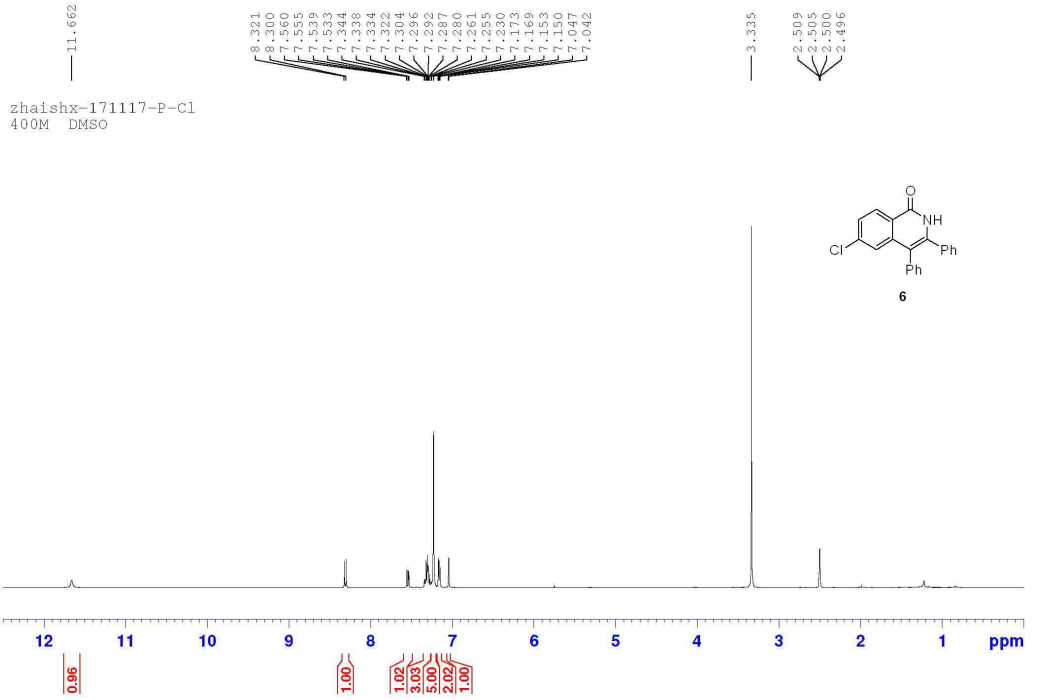

Fig. S91. [1]H NMR Spectrum of **6** (400 MHz, DMSO).

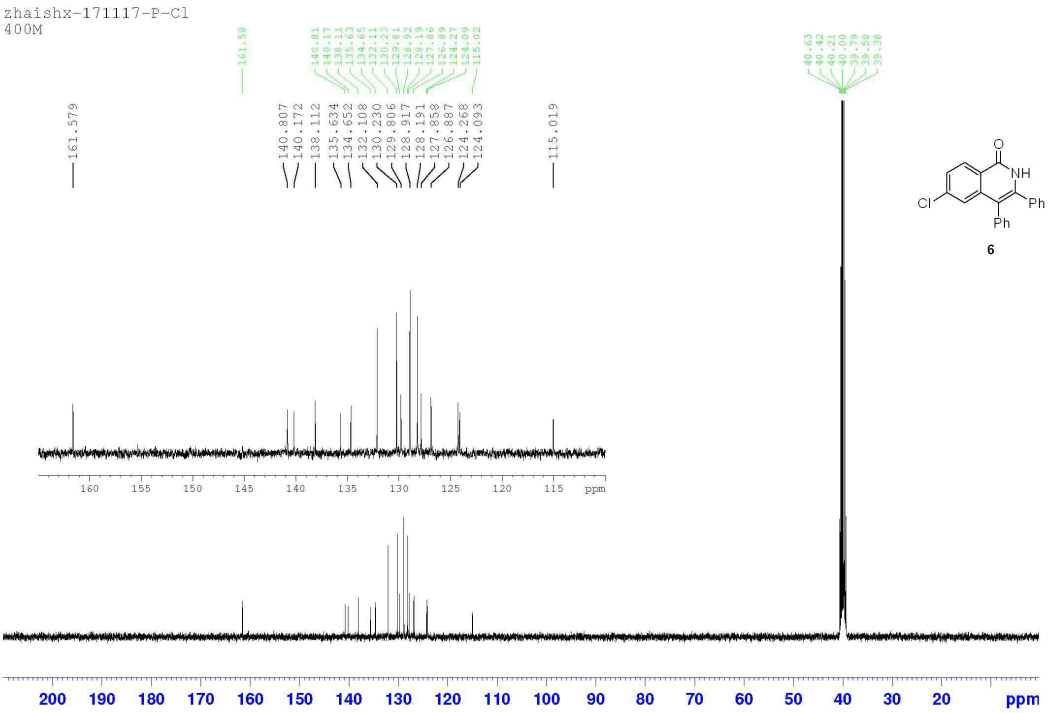

Fig. S92. [13]C NMR Spectrum of **6** (100 MHz, DMSO).

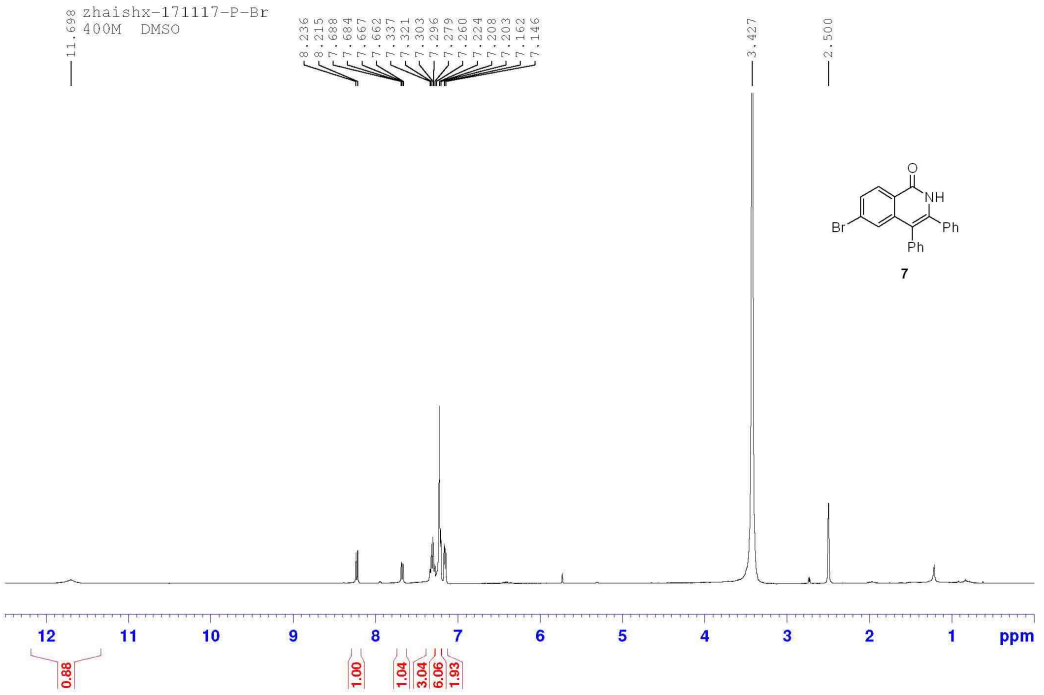

Fig. S93. [1]H NMR Spectrum of **7** (400 MHz, DMSO).

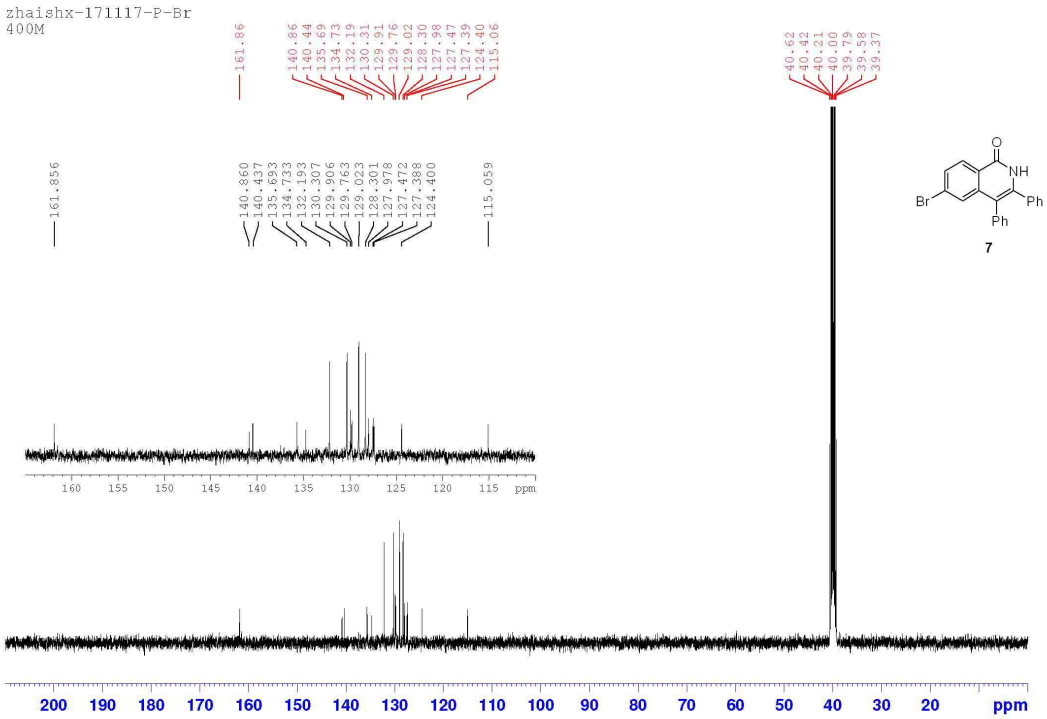

Fig. S94. [13]H NMR Spectrum of **7** (100 MHz, DMSO).