Supporting Information

Copper-Catalyzed Regioselective C–H Iodination of Aromatic Carboxamides

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General information

Reagents and solvents were purchased from commercial suppliers and used as received, unless otherwise indicated. Column chromatography was performed using silica gel (200-300 mesh). $^1$H and $^{13}$C NMR spectra were measured using a Varian Mercury-300 or Bruker AVANCE-400 NMR spectrometer. High resolution mass spectra (HRMS) were obtained using Agilent1290-microTOF Q II.

General procedure for the preparation of aromatic carboxamide

To a 50 mL three-necked flask, isonicotinic acid (2.5 g, 20 mmol), DMF (5 drops) and anhydrous CH$_2$Cl$_2$ (30 mL) were added under a N$_2$ atmosphere. Oxalyl chloride (2.1 mL, 24 mmol, 1.2 equiv) was added dropwise at 0 °C resulting in vigorous bubbling. The mixture was stirred for 5 h at room temperature, and the solvent was then removed in vacuo. The resulting acid chloride was used immediately without further purification. To a 100 mL three-necked flask, 8-aminoquinoline (3.8 g, 26 mmol, 1.3 equiv), Et$_3$N (5.7 mL, 40 mmol, 2 equiv) and anhydrous CH$_2$Cl$_2$ (30 mL) were added. A solution of the acid chloride in anhydrous CH$_2$Cl$_2$ (10 mL) was added dropwise to the solution at 0 °C, and the solution was then warmed to room temperature. After stirring overnight, the reaction system was quenched with NaHCO$_3$ (30 mL of saturated aqueous solution) and the organic layer was separated. The aqueous layer was extracted with CH$_2$Cl$_2$ (2 × 15 mL). The combined organic layers were washed with aqueous HCl (30 mL, 1 M) and brine (30 mL), dried over MgSO$_4$, filtered and evaporated in vacuo. The obtained crude amide was purified by column chromatography on silica gel (eluant: dichloromethane/Petroleum ether = 5/1) to afford the desired amide.

General procedure for copper-catalyzed C–H iodination of aromatic carboxamides

A mixture of 1 (74.5 mg, 0.3 mmol), I$_2$ (76.2 mg, 0.3 mmol), PhI(OAc)$_2$ (193.2 mg, 0.6 mmol) and Cu(OAc)$_2$ (10.9 mg, 0.06 mmol) in NMP (2 mL) was stirred at 100 °C under O$_2$ (1 atm) for 20 h. The reaction mixture was cooled to room temperature and diluted with CH$_2$Cl$_2$ (2 mL). The suspension was filtered through a pad of Celite and the residue was washed three times with CH$_2$Cl$_2$ (3 × 5 mL). The filtrate was concentrated under reduced pressure. The obtained crude
product was purified by silica gel column chromatography to afford the desired product \textbf{1a}.

**Copper-catalyzed cyanation of N-(quinolin-8-yl)-benzamide**

A mixture of \textbf{1} (124.2 mg, 0.5 mmol), I$_2$ (127.0 mg, 0.5 mmol), K$_3$[Fe(CN)$_6$] (164.6 mg, 0.5 mmol), and Cu(OAc)$_2$ (18.2 mg, 0.1 mmol) in DMSO (3 mL) was stirred at 100 °C under O$_2$ (1 atm) for 20 h. The reaction mixture was cooled to room temperature and diluted with CH$_2$Cl$_2$ (5 mL). The suspension was filtered through a pad of Celite and the residue was washed three times with CH$_2$Cl$_2$ (3 × 10 mL). The filtrate was concentrated under reduced pressure. The crude product was purified by silica gel column chromatography to afford the cyanation product.

**Copper-catalyzed dimerization of N-(quinolin-8-yl)-benzamide**

A mixture of \textbf{1} (124.2 mg, 0.5 mmol), K$_3$[Fe(CN)$_6$] (164.6 mg, 0.5 mmol) and Cu(OAc)$_2$ (18.2 mg, 0.1 mmol) in DMSO (2 mL) was stirred at 170 °C under O$_2$ (1 atm) for 24 h. The reaction mixture was cooled to room temperature and diluted with CH$_2$Cl$_2$ (5 mL). The suspension was filtered through a pad of Celite and the residue was washed three times with CH$_2$Cl$_2$ (3 × 10 mL). The filtrate was concentrated under reduced pressure. The crude product was purified by silica gel column chromatography to afford the dimerized product.

**Spectral Data**

\begin{center}
\includegraphics[width=0.3\textwidth]{n-quinolin-8-ylbenzamide.png}
\end{center}

\textbf{N-(quinolin-8-yl)benzamide}: White solid (yield, 89 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/2). $^1$H NMR (300MHz, CDCl$_3$) $\delta$ 10.74 (s, 1H), 8.97–8.92 (dd, 1H), 8.87–8.83 (dd, 1H), 8.23–8.18 (dd, 1H), 8.12–8.07 (m, 2H), 7.60–7.47 (m, 6H). HRMS (ESI) Calculated for C$_{16}$H$_{12}$N$_2$O ([M+H]$^+$) 249.1022, Found 249.1072.
4-Methyl-N-(quinolin-8-yl)-benzamide: Brown solid (yield, 62 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/3). $^1$H NMR (300 MHz, CDCl₃) δ 10.72 (s, 1H), 8.92 (d, 1H), 8.85 (d, 1H), 8.21 (d, 1H), 8.0 (d, 2H) 7.62–7.47 (m, 3H), 7.34 (d, 3H), 2.45 (s, 3H). $^{13}$C NMR (75 MHz, CDCl₃) δ 165.18, 148.48, 142.14, 140.33, 139.10, 138.16, 135.50, 131.95, 131.01, 129.30, 127.12, 122.96, 117.67, 89.01, 21.50. HRMS (ESI) Calculated for C₁₇H₁₄N₂O ([M+H]$^+$) 263.1179, Found 263.1227.

2-Methyl-N-(quinolin-8-yl)-benzamide: White solid (yield, 75 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/3). $^1$H NMR (400 MHz, CDCl₃) δ 10.21 (s, 1H), 8.97–8.92 (d, 1H), 8.79–8.76 (dd, 1H), 8.2–8.16 (dd, 1H), 7.71–7.67 (d, 1H) 7.63–7.53 (m, 2H), 7.475–7.63 (m, 1H), 7.43–7.38 (m, 1H), 7.35–7.25 (t, 2H), 2.61 (s, 3H). HRMS (ESI) Calculated for C₁₇H₁₄N₂O ([M+H]$^+$) 263.1179, Found 263.1085.

3-Methyl-N-(quinolin-8-yl)-benzamide: White solid (yield, 78%), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/3). $^1$H NMR (400 MHz, CDCl₃) δ
10.71 (s, 1 H), 8.96–8.93 (m, 1 H), 8.87–8.84 (m, 1 H), 8.21–8.16 (m, 1 H), 7.91–7.85 (m, 2 H), 7.63–7.57 (t, 1 H), 7.56–7.52 (m, 1 H), 7.50–7.46 (m, 1 H), 7.45–7.37 (m, 3 H), 2.48 (s, 3 H);

HRMS (ESI) Calculated for C_{17}H_{14}N_{2}O ([M+H]^+) 263.1179, Found 263.1081.

![Chemical structure of 4-Bromo-N-(quinolin-8-yl)benzamide]

4-Bromo-N-(quinolin-8-yl)benzamide: Yellow solid (yield, 51 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/3). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.73 (s, 1H), 8.91–8.83 (m, 2H), 8.25 (d, 1H), 8.00–7.91 (d, 2H), 7.72–7.47 (m, 6H). HRMS (ESI) Calculated for C$_{16}$H$_{11}$BrN$_2$O ([M+H]$^+$) 327.0128, Found 327.0191.

![Chemical structure of 4-Nitro-N-(quinolin-8-yl)benzamide]

4-Nitro-N-(quinolin-8-yl)benzamide: Yellow solid (yield, 58 %), after purification by silica gel column chromatography (hexane/EtOAc : 4/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.83 (s, 1H), 8.93–8.86 (m, 1H), 8.40–8.25 (m, 6H), 7.72 (t, 2H), 7.55–7.5 (q, 1H). HRMS (ESI) Calculated for C$_{16}$H$_{11}$N$_3$O$_3$ ([M+H]$^+$) 294.0873, Found 294.0930.

![Chemical structure of 3-Nitro-N-(quinolin-8-yl)benzamide]

3-Nitro-N-(quinolin-8-yl)benzamide: Light yellow solid (yield, 88 %), after purification by silica gel column chromatography (hexane/EtOAc : 4/1). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 10.84 (s,
1H), 8.95–8.87 (m, 3H), 8.47–8.4 (m, 2H), 8.21 (dd, J = 8.3, 1.7 Hz, 1H), 7.75 (t, 1H), 7.65–7.58 (m, 2H), 7.55–7.50 (dd, 1H) HRMS (ESI) Calculated for C_{16}H_{11}N_{3}O_{3} ([M+H]^+) 294.0873, Found 294.0775.

N-(quinolin-8-yl)-1-naphthamide: White solid (yield, 75 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 10/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.43 (s, 1H), 9.10–9.03 (d, 1H), 8.76–8.72 (d, 1H), 8.57–8.50 (t, 1H), 8.21–8.15 (d, 1H), 8.00 (d, 1H), 7.95–7.89 (d, 2H), 7.68–7.55 (m, 5H), 7.48–7.40 (q, 1H). HRMS (ESI) Calculated for C$_{20}$H$_{14}$N$_2$O ([M+H]$^+$) 299.1179, Found 299.1240.

N-(quinolin-8-yl)isonicotinamide: Yellow solid (yield, 66 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 10/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.78 (s, 1H), 8.90–8.82 (m, 4H), 8.18 (d, 1H), 7.88 (d, 2H), 7.57 (t, 2H), 7.48–7.45 (q, 1H). HRMS (ESI) Calculated for C$_{15}$H$_{11}$N$_3$O ([M+H]$^+$) 250.0975, Found 250.1021.

N-(quinolin-8-yl)-thiophene-3-carboxamide: White solid (yield, 66 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 10/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.55 (s, 1H), 8.90–8.82 (m, 2H), 8.20–8.15 (d, 2H), 7.71–7.68 (d, 1H), 7.61–7.42 (m, 5H).
HRMS (ESI) Calculated for C_{12}H_{10}N_{2}OS ([M+H]^+) 255.0587, Found 255.0630.

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\text{N-(2-methylquinolin-8-yl)-benzamide: White solid (yield, 86 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/3).} \ H NMR (400 MHz, CDCl}_3 \ \delta 10.82 (s, 1H), 8.90 (dd, 1H), 8.11–8.04 (m, 3H), 7.60-7.47 (m, 5H), 7.35 (d, 1H), 2.78(s, 3H).
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HRMS (ESI) Calculated for C_{17}H_{14}N_{2}O ([M+H]^+) 263.1190, Found 263.1140.

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\text{N-(6-methoxyquinolin-8-yl)benzamide: White solid (yield, 82 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/3).} \ H NMR (400 MHz, CDCl}_3 \ \delta 10.72 (s, 1H), 8.70-8.67 (m, 2H), 8.11–8.03 (m, 3H), 7.60-7.52 (m, 3H), 7.41 (q, 1H), 6.85 (d, 1H) ,3.97 (s, 3H). \text{HRMS (ESI) Calculated for C}_{17}H_{14}N_{2}O_{2} ([M+H]^+) 279.1145, Found 279.1089.}
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\text{N-(5-iodo-quinolin-8-yl)benzamide: Yellow solid (yield, 92 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/3).} \ H NMR (300 MHz, CDCl}_3 \ \delta 10.75 (s, 1H), 8.82 (s, 1H), 8.80–8.74 (m, 1H), 8.40–8.37 (d, 1H), 8.15–8.09 (t, 3H), 7.63–7.58 (m,}
4H). $^{13}$C NMR (75 MHz, CDCl$_3$) $\delta$ 165.23, 148.80, 140.63, 139.18, 138.22, 135.40, 134.78, 132.03, 129.53, 128.85, 127.29, 123.19, 117.80, 89.96. HRMS (ESI) Calculated for C$_{16}$H$_{11}$IN$_2$O ([M+H]$^+$) 374.9989, Found 375.0071.

4-methyl-N-(5-iodo-quinolin-8-yl)-benzamide: White solid (yield, 93 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 2/5). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.73 (s, 1H), 8.86–8.82 (m, 1H), 8.75–8.69 (d, 2H), 8.44–8.37 (m, 1H), 8.16 (d, 1H), 8.00–7.92 (d, 2H), 7.60–7.54 (m, 1H), 7.39–7.32 (d, 2H), 2.45 (s, 3H). $^{13}$C NMR (75 MHz, CDCl$_3$) $\delta$ 165.16, 148.58, 140.53, 138.16, 131.92, 131.95, 129.30, 129.47, 127.12, 122.95, 117.67, 89.91, 21.35. HRMS (ESI) Calculated for C$_{17}$H$_{13}$IN$_2$O ([M+H]$^+$) 389.0145, Found 389.0160.

2-methyl-N-(5-iodo-quinolin-8-yl)-benzamide: Purple solid (yield, 86%), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 2/5). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 10.22 (s, 1H), 8.76–8.70 (m, 2H), 8.42–8.38 (dd, 1H), 8.15 (d, 1H), 7.70–7.66 (d, 1H), 7.56–7.52 (m, 1H), 7.44–7.39 (t, 1H), 7.36–7.30 (t, 2H), 2.60 (s, 3H). $^{13}$C NMR (100MHz, CDCl$_3$) $\delta$ 168.16, 148.85, 140.78, 139.25, 138.32, 136.82, 136.36, 135.69, 131.48, 130.52, 129.72, 127.26, 126.07, 123.22, 117.89, 89.56, 20.22. HRMS (ESI) Calculated for C$_{17}$H$_{13}$IN$_2$O ([M+H]$^+$) 389.0145, Found 389.0016.
3-methyl-N-(5-iodo-quinolin-8-yl)-benzamide: Yellow solid (yield, 89 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 2/5). \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 10.71 (s, 1H), 8.85–8.82 (m, 1H), 8.74–8.71 (d, 1H), 8.43–8.38 (dd, 1H), 8.15 (d, 1H), 7.89–7.83 (m, 2 H), 7.59–7.55 (m, 1H), 7.45–7.38 (m, 2H), 2.49 (s, 3H). \(^{13}\)C NMR (100MHz, CDCl\(_3\)) \(\delta\) 165.70, 148.87, 140.81, 139.43, 138.77, 138.38, 135.62, 134.93, 132.80, 129.71, 128.71, 128.13, 124.24, 123.22, 117.96, 89.41, 21.49. HRMS (ESI) Calculated for C\(_{17}\)H\(_{13}\)IN\(_2\)O ([M+H]+) 389.0145, Found 389.0011.

4-bromo-N-(5-iodo-quinolin-8-yl)benzamide: Earthy yellow solid (yield, 83 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 2/5). \(^1\)H NMR (300 MHz, CDCl\(_3\)) \(\delta\) 10.72 (s, 1H), 8.75 (d, 2H), 8.41 (s, 1H), 7.93 (s, 1H), 7.64 (dd, 4H), 7.26 (s, 1H). \(^{13}\)C NMR (75 MHz, CDCl\(_3\)) \(\delta\) 166.47, 148.88, 140.80, 139.19, 138.24, 135.15, 133.62, 132.06, 128.82, 123.26, 117.88, 89.98. HRMS (ESI) Calculated for C\(_{16}\)H\(_{10}\)BrN\(_2\)O ([M+H]+) 453.9094, Found 453.9001.

4-nitro-N-(5-iodo-quinolin-8-yl)benzamide: Brownish solid (yield, 85 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 5/1). \(^1\)H NMR (300 MHz, CDCl\(_3\)) \(\delta\)
10.82 (s, 1H), 8.93–8.85 (m, 2H), 8.44 (d, 2H), 8.24–8.21 (m, 3H), 7.62–7.56 (m, 3H). $^{13}$C NMR (75MHz, CDCl$_3$) δ 163.24, 148.55, 141.01, 136.58, 133.96, 128.49, 127.45, 124.13, 124.09, 122.51, 121.95, 116.90. HRMS (ESI) Calculated for C$_{16}$H$_{10}$IN$_3$O$_3$ ([M+H]$^+$) 419.9840, Found 419.9882.

3-nitro-N-(5-iodo-quinolin-8-yl)benzamide: Yellow solid (yield, 87%), after purification by silica gel column chromatography (petroleum ether/EtOAc : 5/1). $^1$H NMR (400 MHz, CDCl$_3$) δ 10.83 (s, 1H), 8.93–8.85 (m, 2H), 8.70 (d, 1H), 8.48–8.37 (m, 3H), 8.18 (d, 1H), 7.80–7.74 (t, 1H), 7.63–7.58 (m, 1H). $^{13}$C NMR (100 MHz, CDCl$_3$) δ 162.89, 149.18, 148.58, 140.96, 139.19, 138.27, 136.59, 134.81, 133.12, 130.12, 129.76, 126.52, 123.48, 122.38, 118.20, 90.52. HRMS (ESI) Calculated for C$_{16}$H$_{10}$IN$_3$O$_3$ ([M+H]$^+$) 419.9840, Found 419.9682.

N-(5-iodo-quinolin-8-yl)-1-naphthamide: Yellow solid (yield, 82%), after purification by silica gel column chromatography (petroleum ether/EtOAc : 11/1). $^1$H NMR (300 MHz, CDCl$_3$) δ 10.43 (s, 1H), 8.84 (d, 1H), 8.74–8.69 (dd, 1H), 8.54–8.48 (t, 1H), 8.42–8.37 (dd, 1H), 8.20 (d, 1H), 8.05 (d, 1H), 7.96–7.90 (m, 2H), 7.62–7.53 (m, 4H). $^{13}$C NMR (75 MHz, CDCl$_3$) δ 167.66, 148.83, 140.70, 139.15, 138.25, 135.66, 134.29, 133.85, 131.31, 129.65, 128.39, 127.37, 126.54, 125.53, 125.43, 124.80, 123.20, 118.01, 89.77. HRMS (ESI) Calculated for C$_{20}$H$_{13}$IN$_2$O ([M+H]+$^+$) 425.0145, Found 425.0097.
N-[(5-iodo-quinolin-8-yl)]isonicotinamide: White solid (yield, 75 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 12/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.82 (s, 1H), 8.87–8.84 (m, 3H), 8.69 (d, 1H), 8.43 (d, 1H), 8.16 (d, 1H), 7.91 (d, 2H), 7.62–7.59 (m, 1H). $^{13}$C NMR (75 MHz, CDCl$_3$) $\delta$ 163.18, 150.66, 149.14, 142.06, 140.98, 139.18, 138.27, 134.70, 129.77, 123.49, 121.20, 118.25, 90.64. HRMS (ESI) Calculated for C$_{15}$H$_{10}$N$_3$O ([M+H]$^+$) 375.9941, Found 375.9970.

3-iodo-N-[(5-iodo-quinolin-8-yl)]isonicotinamide: Brown solid (yield, 17 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 12/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.23 (s, 1H), 9.10(d, 1H), 8.76 (s, 1H), 8.70 (d, 1H), 8.66 (d, 1H), 8.40 (d, 1H), 8.16 (d, 1H), 7.57–7.54 (m, 2H). $^{13}$C NMR (75 MHz, CDCl$_3$) $\delta$ 164.95, 158.74, 149.40, 149.14, 148.31, 140.89, 138.99, 138.18, 134.57, 129.77, 123.47, 122.74, 118.43, 91.50, 90.97. HRMS (ESI) Calculated for C$_{15}$H$_{9}$N$_3$O ([M+H]$^+$) 501.8908, Found 501.8941.

N-[(5-iodo-quinolin-8-yl)]-thiophene-3-carboxamide: White solid (yield, 74 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 12/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.55 (s, 1H), 8.81–8.79 (m, 1H), 8.70–8.67 (d, 1H), 8.42–8.37 (m, 1H), 8.15–8.10 (d, 1H), 7.59–7.53 (m, 3H), 7.40–7.38 (d, 1H). $^{13}$C NMR (75 MHz, CDCl$_3$) $\delta$ 161.17, 148.90, 140.79,
138.31, 135.29, 132.26, 129.73, 127.98, 123.28, 118.19, 89.96. HRMS (ESI) Calculated for C_{14}H_{9}IN_{2}OS ([M+H]^+) 380.9553, Found 380.9580.

2-iodo-N-(5-ido-quinolin-8-yl)-thiophene-3-carboxamide: White solid (yield, 15 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 12/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.56 (s, 1H), 8.85–8.82 (d, 1H), 8.70–8.65 (d, 1H), 8.45–8.39 (m, 2H), 8.20–8.16 (d, 1H), 8.15 (d, 1H), 7.72 (d, 1H), 7.61–7.56 (q, 1H), 7.50–7.43 (t, 1H). $^{13}$C NMR (75 MHz, CDCl$_3$) $\delta$ 160.78, 148.69, 140.62, 138.21, 138.03, 135.32, 129.00, 126.68, 126.20, 123.06, 117.74, 89.87. HRMS (ESI) Calculated for C$_{14}$H$_{8}$I$_{2}$N$_{2}$OS ([M+H]^+) 506.8519, Found 506.8537.

N-(2-(diiodomethyl)-5-idoquinolin-8-yl)benzamide: Yellow solid (yield, 31 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/2). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 10.64 (s, 1H), 10.29 (s, 1H), 8.79 (d, 1H), 8.56 (d, 1H), 8.25 (d, 1H), 8.14 (d, 1H) 8.07 (d, 2H) 7.65-7.54 (m, 3H). $^{13}$C NMR (100MHz, CDCl$_3$) $\delta$ 191.92, 156.40, 150.50, 142.55, 141.19, 138.73, 136.21, 134.55, 132.39, 131.59, 129.07, 127.23, 119.31, 118.80, 89.11. HRMS (ESI) Calculated for C$_{17}$H$_{11}$I$_{3}$N$_{2}$O ([M-I+H]^+) 514.9081, Found 514.9073.
**N-(5-iodo-6-methoxyquinolin-8-yl)benzamide:** Yellow solid (yield, 90 %), after purification by silica gel column chromatography (petroleum ether/dichloromethane : 1/2). $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 10.85 (s, 1H), 8.96 (s, 1H), 8.675 (dd, 1H), 8.46 (dd, 1H), 8.11-8.08 (m, 2H), 7.64-7.55 (m, 3H), 7.53-7.49 (q, 1H), 4.13 (s, 3H). $^{13}$C NMR (100MHz, CDCl$_3$) $\delta$ 165.44, 157.33, 146.37, 139.46, 136.24, 135.28, 134.61, 132.16, 131.68, 130.63, 128.91, 128.56, 128.40, 127.26, 123.59, 103.76, 57.21. HRMS (ESI) Calculated for C$_{17}$H$_{13}$IN$_2$O$_2$ ([M+H]$^+$) 405.0091, Found 405.0055.

**N-(5-cyano-quinolin-8-yl)benzamide:** White solid (yield, 30 %), after purification by silica gel column chromatography (petroleum ether/EtOAc : 3/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.91 (s, 1H), 9.01–8.97 (m, 2H), 8.59–8.54 (d, 1H), 8.13–8.00 (m, 3H), 7.75–7.55 (m, 5H). $^{13}$C NMR (125 MHz, CDCl$_3$) $\delta$ 165.68, 149.71, 139.50, 137.88, 134.87, 134.27, 134.11, 132.53, 129.01, 130.25, 127.83, 127.42, 123.93, 117.84, 115.32, 103.13. HRMS (ESI) Calculated for C$_{17}$H$_{11}$IN$_3$O ([M+H]$^+$) 274.0975, Found 274.0989.

**N,N'-(5,5'-bisquinolin-8-yl)-bisbenzamide:** Brown solid (yield, 49 %), after purification by silica
gel column chromatography (petroleum ether/EtOAc : 3/1). $^1$H NMR (300 MHz, CDCl$_3$) $\delta$ 10.36 (s, 2H), 8.70–8.65 (m, 2H), 8.47–8.44 (m, 2H), 7.96–7.92 (m, 3H), 7.87–7.84 (d, 3H), 7.47–7.39 (m, 11H). $^{13}$C NMR (125MHz, CDCl$_3$) $\delta$ 167.44, 147.08, 139.70, 138.32, 136.40, 135.71, 134.65, 130.86, 130.42, 127.96, 127.86, 127.45, 127.01, 121.33, 121.23, 116.58. HRMS (ESI) Calculated for C$_{32}$H$_{22}$N$_4$O$_2$ ([M+H]$^+$) 495.1816, Found 495.1802.