

Copper-catalysed amidation of 2-chloro-pyridines

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Supplementary Information

Table of contents

General experimental methods	Page S2
Experimental section	Pages S2-S8
NMR spectra	Pages S9-S24

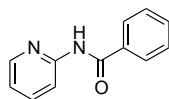
1. General experimental methods

Infrared (IR) spectra were recorded on a Bruker TENSOR TM 27 (IRFT), wave numbers are indicated in cm^{-1} . NMR spectra were recorded on a Bruker AVANCE 400. ^1H NMR were recorded at 400 MHz and data are reported as follows: chemical shift in ppm from tetramethylsilane as an internal standard with the residual solvent peak as an internal indicator (DMSO- d_6 δ : 2.50, CDCl_3 δ : 7.26, C_6D_6 δ : 7.16), multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet or overlap of non-equivalent resonances, br = broad, app = apparent), integration. ^{13}C NMR spectra were recorded at 100 MHz and the data are reported as follows: chemical shift in ppm from tetramethylsilane as an internal standard with the residual solvent peak as an internal indicator (DMSO- d_6 δ : 39.5 ppm, CDCl_3 δ : 77.2 ppm, C_6D_6 δ : 128.1 ppm), multiplicity with respect to proton (deduced from DEPT experiments, s = quaternary C, d = CH, t = CH_2 , q = CH_3). 1,4-Dioxane was distilled over CaH_2 prior to distillation, and stored over 4 Å molecular sieves. TLC was performed on silica gel plates visualized either with a UV lamp (254 nm), or using solution of *p*-anisaldehyde-sulfuric acid-acetic acid in EtOH followed by heating. Purification was performed on silica gel (Merck-Kieselgel 60, 230-400 mesh). Mw spectra with electronic impact (MS-EI) were recorded on a GC/MS (70 eV). HRMS were performed at the Laboratoire de Spectrométrie de Masse SM³E de l'Université Pierre et Marie Curie de Paris).

2. General procedure for the copper-catalyzed amidation

In a sealed tube, to a solution of amide (1.5 equiv), CuI (5 mol %) and K_2CO_3 (2 equiv) in 1,4-dioxane (1 M), was added the chloro-heterocycle (1.0 equiv) and *trans*-*N,N*-dimethylcyclohexane-1,2-diamine (5 mol %). The tube was degassed by three vacuum/argon cycles and sealed. The reaction mixture was heated at 170 °C for 24 h, and directly purified by silica-gel chromatography.

N-(3-Bromopyridin-2-yl)benzamide



Formula : $\text{C}_{12}\text{H}_{10}\text{N}_2\text{O}$

Mw : 198.22 g/mol

m.p. = 83-84 °C

IR (neat) : 3241, 3061, 1673, 1576, 1492, 1431, 1303, 1237, 776, 706 cm^{-1} .

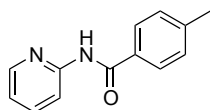
RMN ^1H (400 MHz, DMSO at 395 K) δ : 9.67 (brs, 1H, NH), 7.98 (brs, 1H), 7.76 (d, J = 8.3 Hz, 1H), 8.64 (d, J = 8.0 Hz, 2H), 7.41 (tapp, J = 7.5 Hz, 1H), 7.19 (tapp, J = 7.5 Hz, 1H), 7.10 (tapp, J = 7.5 Hz, 2H), 6.74 (tapp, J = 6.1 Hz, 1H).

RMN ^{13}C (100 MHz, DMSO at 395 K) δ : 165.3 (s), 151.6 (s), 147.2 (d), 137.1 (d), 133.9 (s), 131.0 (d), 127.6 (2C, d), 127.1 (2C, d), 119.0 (d), 114.2 (d).

MS (IE) m/z : 198 (M^+ , 8), 197 (5), 170 (12), 169 (37), 106 (7), 105 (100), 78 (12), 77 (96), 51 (29), 50 (6).

HRMS (ESI): Calculated for $\text{C}_{12}\text{H}_{11}\text{N}_2\text{O}[\text{M}+\text{H}]^+$: 199.0866. Found : 199.0869.

4-Methyl-*N*-(pyridin-2-yl)benzamide



Formula : C₁₃H₁₂N₂O

Mw : 212.25 g/mol

m.p. = 110-111 °C

IR (neat) : 3324, 2956, 2928, 2859, 1641, 1576, 1526, 1504, 1430, 1302, 776, 711, 694 cm⁻¹.

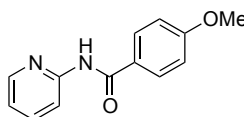
RMN ¹H (400 MHz, CDCl₃) δ : 9.20 (brs, 1H, *NH*), 8.39 (d, *J* = 8.7 Hz, 1H), 8.12 (brd, *J* = 4.0 Hz, 1H), 7.81 (d, *J* = 8.1 Hz, 2H), 7.71 (ddd, *J* = 8.7, 7.4, 1.5 Hz, 1H), 7.23 (d, *J* = 8.1 Hz, 2H), 8.02 (ddd, *J* = 7.4, 4.0, 1.0 Hz, 1H), 2.38 (s, 3H).

RMN ¹³C (100 MHz, CDCl₃) δ : 166.0 (s), 151.9 (s), 147.8 (d), 142.8 (s), 138.5 (d), 131.6 (s), 129.4 (2C, d), 127.4 (2C, d), 119.8 (d), 114.4 (d), 21.6 (q).

MS (IE) *m/z*: 212 (M⁺, 8), 211 (6), 184 (10), 183 (29), 120 (9), 119 (100), 91 (67), 89 (6), 65 (30), 51 (6).

HRMS (ESI): Calculated for C₁₃H₁₃N₂O[M+H]⁺: 213.1027. Found : 213.1022.

4-Methoxy-*N*-(pyridin-2-yl)benzamide



Formula : C₁₃H₁₂N₂O₂

Mw : 228.25 g/mol

m.p. = 107-108 °C

IR (neat) : 3285, 2933, 2839, 1669, 1605, 1576, 1504, 1430, 1301, 1253, 1236, 1175, 776 cm⁻¹.

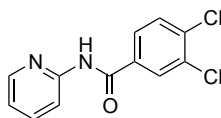
RMN ¹H (400 MHz, DMSO) δ : 10.62 (brs, 1H, *NH*), 8.37 (ddd, *J* = 4.8, 1.8, 0.8 Hz, 1H), 8.18 (brd, *J* = 8.3 Hz, 1H), 8.05 (d, *J* = 9.0 Hz, 2H), 7.82 (ddd, *J* = 8.3, 7.2, 1.8 Hz, 1H), 7.12 (ddd, *J* = 7.2, 4.8, 1.0 Hz, 1H), 7.03 (d, *J* = 9.0 Hz, 2H), 3.83 (s, 3H).

RMN ¹³C (100 MHz, DMSO) δ : 165.3 (s), 162.2 (s), 152.4 (s), 147.8 (d), 138.0 (d), 130.1 (2C, d), 126.1 (s), 119.6 (d), 114.7 (d), 113.6 (2C, d), 55.4 (q).

MS (IE) *m/z*: 228 (M⁺, 10), 227 (5), 200 (10), 199 (12), 136 (9), 135 (100), 107 (15), 92 (16), 78 (5), 77 (25), 64 (8), 63 (5).

HRMS (ESI): Calculated for C₁₃H₁₃N₂O₂[M+H]⁺: 229.0977. Found : 229.0972.

3,4-Dichloro-*N*-(pyridin-2-yl)benzamide



Formula : C₁₂H₈Cl₂N₂O

Mw : 267.11 g/mol

m.p. = 105-106 °C

IR (neat) : 3293, 2976, 2868, 1678, 1577, 1525, 1471, 1431, 1305, 1232, 1150, 1116, 1094, 1031, 775, 746, 672 cm⁻¹.

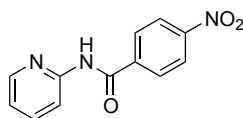
RMN ¹H (400 MHz, CDCl₃) δ : 9.58 (brs, 1H, *NH*), 8.34 (d, *J* = 8.3 Hz, 1H), 8.09 (brd, *J* = 4.5 Hz, 1H), 8.01 (d, *J* = 2.1 Hz, 1H), 7.75 (m, 1H), 7.73 (dd, *J* = 8.1, 2.2 Hz, 1H), 7.49 (d, *J* = 8.3 Hz, 1H), 7.04 (ddd, *J* = 8.3, 5.0, 1.0 Hz, 1H).

RMN ^{13}C (100 MHz, CDCl_3) δ : 164.0 (s), 151.6 (s), 147.8 (d), 138.8 (d), 136.7 (s), 134.2 (s), 133.4 (s), 130.8 (d), 129.9 (d), 126.6 (d), 120.4 (d), 114.8 (d).

MS (IE) m/z : 268 (12), 267 (10), 266 (18), 265 (12), 241 (12), 240 (19), 239 (65), 238 (29), 237 (96), 177 (10), 175 (64), 173 (100), 147 (51), 145 (81), 111 (19), 110 (17), 109 (52), 78 (23), 75 (29), 74 (24), 66 (10), 51 (17).

HRMS (ESI): Calculated for $\text{C}_{13}\text{H}_9\text{Cl}_2\text{N}_2\text{O}$ $[\text{M}+\text{H}]^+$: 267.0093. Found : 267.0086.

4-Nitro-*N*-(pyridin-2-yl)benzamide



Formula : $\text{C}_{12}\text{H}_9\text{N}_3\text{O}_3$

Mw : 243.29 g/mol

m.p. = 239-240 °C

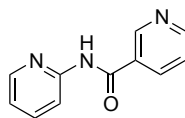
IR (neat) : 3173, 3117, 2984, 1677, 1580, 1538, 1509, 143, 1345, 1309, 1268, 1238, 1148, 1091, 997, 853, 841, 786, 723, 715 cm^{-1} .

RMN ^1H (400 MHz, DMSO) δ : 11.19 (brs, 1H, NH), 8.37 (ddd, J = 4.8, 2.0, 1.0 Hz, 1H), 7.03 (d, J = 9.0 Hz, 2H), 8.33 (d, J = 8.8 Hz, 2H), 8.22 (ddd, J = 8.3, 1.0, 1.0 Hz, 1H), 7.87 (ddd, J = 8.3, 7.4, 2.0 Hz, 1H), 8.02 (ddd, J = 7.4, 4.8, 1.0 Hz, 1H).

RMN ^{13}C (100 MHz, DMSO) δ : 164.6 (s), 151.8 (s), 149.3 (s), 148.1 (d), 139.9 (d), 138.3 (d), 129.6 (2C, d), 123.4 (2C, d), 120.3 (d), 114.8 (d).

HRMS (ESI): Calculated for $\text{C}_{12}\text{H}_{10}\text{N}_3\text{O}_3$ $[\text{M}+\text{H}]^+$: 244.0717. Found : 244.0717.

N-(Pyridin-2-yl)nicotinamide



Formula : $\text{C}_{11}\text{H}_9\text{N}_3\text{O}$

Mw : 199.21 g/mol

m.p. = 136-137 °C

IR (neat) : 3219, 3179, 3111, 3026, 2956, 2925, 2854, 1671, 1578, 1533, 1433, 1309, 1270, 1240, 1028, 896, 773, 706.

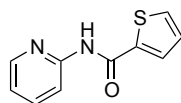
RMN ^1H (400 MHz, DMSO at 395 K) δ : 10.44 (brs, 1H, NH), 9.17 (brs, 1H), 8.74 (d, J = 3.7 Hz, 1H), 8.39 (brd, J = 3.9 Hz, 1H), 8.34 (dt, J = 8.0, 2.0 Hz, 1H), 8.14 (d, J = 8.3 Hz, 1H), 7.81 (ddd, J = 8.5, 7.1, 1.6 Hz, 1H), 7.49 (dd, J = 7.9, 4.8 Hz, 1H), 7.15 (dd, J = 6.9, 5.1 Hz, 1H).

RMN ^{13}C (100 MHz, DMSO at 395 K) δ : 164.0, 151.42 (2C), 148.2, 147.2, 137.1, 134.6, 129.6, 122.4, 119.2, 114.3.

MS (IE) m/z : 199 (M^+ , 14), 198 (50), 171 (4), 170 (19), 121 (4), 107 (4), 106 (58), 79 (8), 78 (100), 52 (8), 51 (45), 50 (8).

HRMS (ESI): Calculated for $\text{C}_{11}\text{H}_{10}\text{N}_3\text{O}$ $[\text{M}+\text{H}]^+$: 200.0818. Found : 200.0820.

N-(Pyridin-2-yl)thiophene-2-carboxamide



Formula : $\text{C}_{10}\text{H}_8\text{N}_2\text{OS}$

Mw : 204.25 g/mol

m.p. = 127-128 °C

IR (neat) : 3231, 3074, 1655, 1574, 1526, 1509, 1429, 1416, 1302, 1264, 1242, 1088, 773, 715 cm^{-1} .

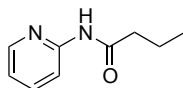
RMN ^1H (400 MHz, CDCl_3) δ : 9.36 (brs, 1H, *NH*), 8.32 (d, $J = 8.5$ Hz, 1H), 8.18 (brs, 1H), 7.71 (brd, $J = 8.3$ Hz, 1H), 7.68 (dd, $J = 3.7, 1.1$ Hz, 1H), 7.50 (d, $J = 5.0$ Hz, 1H), 7.06 (m, 1H), 7.00 (m, 1H).

RMN ^{13}C (100 MHz, CDCl_3) δ : 160.3 (s), 151.7 (s), 147.8 (d), 139.1 (s), 138.6 (d), 131.7 (d), 129.1 (d), 127.9 (d), 119.9 (d), 114.7 (d).

MS (IE) m/z : 204 (M^+ , 12), 203 (3), 176 (12), 171 (14), 113 (4), 112 (6), 111 (100), 83 (14), 78 (7), 57 (2), 52 (2), 51 (6).

HRMS (ESI): Calculated for $\text{C}_{10}\text{H}_9\text{N}_2\text{OS}$ $[\text{M}+\text{H}]^+$: 205.0430. Found : 205.0434.

***N*-(Pyridin-2-yl)butyramide**



Formula : $\text{C}_9\text{H}_{12}\text{N}_2\text{O}$

Mw : 164.20 g/mol

m.p. = 56-57 $^{\circ}\text{C}$

IR (neat) : 3252, 3110, 2963, 2873, 1679, 1577, 1522, 1430, 1295, 1186, 776 cm^{-1}

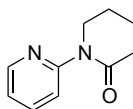
RMN ^1H (400 MHz, CDCl_3) δ : 9.29 (brs, 1H, *NH*), 8.25-7.23 (m, 2H), 7.68 (ddd, $J = 8.4, 7.3, 1.5$ Hz, 1H), 7.00 (ddd, $J = 7.3, 5.0, 1.0$ Hz, 1H), 2.34 (t, $J = 7.3$ Hz, 2H), 1.71 (sext, $J = 7.3$ Hz, 2H), 0.94 (t, $J = 7.3$ Hz, 3H).

RMN ^{13}C (100 MHz, CDCl_3) δ : 172.1 (s), 152.0 (s), 147.5 (d), 138.6 (d), 119.6 (d), 114.6 (d), 39.5 (t), 18.9 (t), 13.8 (q).

MS (IE) m/z : 164 (M^+ , 7), 149 (5), 136 (9), 121 (3), 95 (9), 94 (100), 78 (13), 71 (6), 67 (28), 51 (6).

HRMS (ESI): Calculated for $\text{C}_9\text{H}_{13}\text{N}_2\text{O}$ $[\text{M}+\text{H}]^+$: 165.1022. Found : 165.1025.

1-(Pyridin-2-yl)piperidin-2-one



Formula : $\text{C}_{10}\text{H}_{12}\text{N}_2\text{O}$

Mw : 176.22 g/mol

IR (neat) : 3481, 3057, 2947, 2874, 1658, 1585, 1465, 1432, 1396, 1290, 1271, 1164, 1152, 782 cm^{-1} .

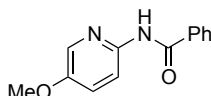
RMN ^1H (400 MHz, CDCl_3) δ : 8.41 (ddd, $J = 4.9, 1.9, 0.9$ Hz, 1H), 7.74 (ddd, $J = 8.3, 1.9, 0.9$ Hz, 1H), 7.66 (ddd, $J = 8.3, 7.2, 1.9$ Hz, 1H), 7.07 (ddd, $J = 7.2, 4.9, 1.9$ Hz, 1H), 3.92 (t, $J = 5.9$ Hz, 2H), 2.58 (t, $J = 6.5$ Hz, 2H), 1.97-1.87 (m, 4H).

RMN ^{13}C (100 MHz, CDCl_3) δ : 171.1 (s), 154.7 (s), 148.0 (d), 137.1 (d), 121.0 (2d), 47.9 (t), 33.7 (t), 23.3 (t), 21.2 (t).

MS (IE) m/z : 176 (M^+ , 20), 148 (19), 121 (21), 120 (59), 119 (100), 107 (26), 106 (7), 94 (7), 93 (11), 79 (25), 78 (36), 70 (7), 55 (11), 52 (15), 51 (18).

HRMS (ESI): Calculated for $\text{C}_{10}\text{H}_{12}\text{N}_2\text{ONa}$ $[\text{M}+\text{Na}]^+$: 199.0841. Found: 199.0843.

N-(5-Methoxypyridin-2-yl)benzamide



Formula : C₁₃H₁₂N₂O₂

Mw : 228.27 g/mol

m.p. = 107-108 °C

IR (neat) : 3066, 3011, 2970, 2931, 2841, 1667, 1531, 1400, 1314, 1285, 1254, 1225, 1033, 833, 710, 693, 668 cm⁻¹.

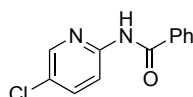
RMN ¹H (400 MHz, CDCl₃) δ : 9.38 (brs, 1H, NH), 8.33 (d, J = 9.3 Hz, 1H), 7.89 (d, J = 7.3 Hz, 2H), 7.69 (brs, 1H), 7.62 (t, J = 7.3 Hz, 1H), 7.42 (t, J = 7.3 Hz, 2H), 7.26 (brd, J = 9.3 Hz, 1H), 3.74 (s, 3H).

RMN ¹³C (100 MHz, CDCl₃) δ : 165.8 (s), 152.8 (s), 145.5 (s), 134.7 (s), 134.1 (d), 132.0 (d), 128.7 (d), 127.4 (d), 123.7 (d), 115.0 (d), 55.90 (t).

MS (IE) m/z : 228 (12), 200 (12), 199 (24), 106 (8), 105 (100), 78 (5), 77 (74), 53 (5), 52 (4), 51 (15).

HRMS (ESI): Calculated for C₁₃H₁₃N₂O₂[M+H]⁺: 229.0971. Found: 229.0975.

N-(5-Chloropyridin-2-yl)benzamide



Formula : C₁₂H₉ClN₂O

Mw : 232.66 g/mol

m.p. = 124-125 °C

IR (neat) : 2989, 1676, 1578, 1530, 1382, 1307, 1010, 841, 714, 695 cm⁻¹.

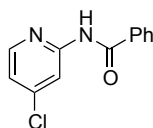
RMN ¹H (400 MHz, CDCl₃) δ : 8.79 (brs, 1H, NH), 8.40 (d, J = 8.8 Hz, 1H), 8.16 (brs, 1H), 7.90 (d, J = 7.1 Hz, 2H), 7.71 (dd, J = 8.8, 2.5 Hz, 1H), 7.58 (t, J = 7.1 Hz, 1H), 7.49 (d, J = 7.1 Hz, 2H).

RMN ¹³C (100 MHz, CDCl₃) δ : 165.8 (s), 150.0 (s), 146.6 (d), 138.2 (d), 134.1 (s), 132.6 (d), 129.0 (d), 127.4 (d), 127.0 (s), 115.0 (d).

MS (IE) m/z : 232 (M⁺, 5), 204 (6), 203 (11), 106 (7), 105 (100), 78 (5), 77 (70), 51 (19).

HRMS (ESI): Calculated for C₁₂H₁₀ClN₂O[M+H]⁺: 233.0476. Found: 233.0477.

N-(4-Chloropyridin-2-yl)benzamide



Formula : C₁₂H₉ClN₂O

Mw : 232.66 g/mol

m.p. = 121-122 °C

IR (neat) : 2963, 2870, 1260, 1091, 1023, 799 cm⁻¹.

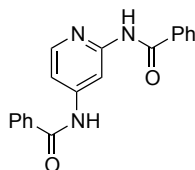
RMN ¹H (400 MHz, DMSO) δ : 11.09 (brs, 1H, NH), 8.40 (brd, J = 4.1 Hz, 1H), 8.32 (d, J = 1.7 Hz, 1H), 8.03 (dd, J = 7.1, 1.3 Hz, 2H), 7.62 (brt, J = 7.5 Hz, 1H), 8.03 (dd, J = 7.5, 7.1 Hz, 2H), 7.33 (dd, J = 4.1, 1.7 Hz, 1H).

RMN ¹³C (100 MHz, DMSO) δ : 166.5 (s), 153.4 (s), 149.4 (d), 143.9 (s), 133.8 (s), 132.2 (d), 128.4 (2C, d), 128.1 (2C, d), 119.9 (d), 114.1 (d).

MS (IE) m/z : 232 (M⁺, 5), 204 (6), 203 (11), 106 (7), 105 (100), 78 (5), 77 (70), 51 (19).

HRMS (ESI): Calculated for C₁₂H₁₀ClN₂O[M+H]⁺: 233.0476. Found: 233.0477.

N,N'-(Pyridine-2,4-diyl)dibenzamide



Formula : C₁₉H₁₅N₃O₂

Mw : 317.34 g/mol

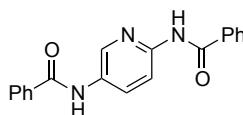
IR (neat) : 3406, 1672, 1596, 1514, 1406, 1284, 1266, 1049, 1024, 1003, 708 cm⁻¹.

RMN ¹H (400 MHz, DMSO) δ : 10.73 (brs, 2H, *NH*), 8.67 (brs, 1H), 8.29 (brd, *J* = 5.3 Hz, 1H), 8.03 (m, 4H), 7.75 (d, *J* = 5.3 Hz, 1H), 7.64-7.49 (m, 6H).

RMN ¹³C (100 MHz, DMSO) δ : 166.4 (s), 165.9 (s), 152.9 (s), 148.4 (d), 147.7 (s), 134.3 (s), 134.2 (s), 132.1 (d), 131.9 (d), 128.5 (2C, d), 128.4 (2C, d), 128.0 (4C, d), 110.7 (d), 104.8 (d).

HRMS (ESI): Calculated for C₁₉H₁₆N₃O[M+H]⁺: 318.1237. Found: 318.1239.

N,N'-(pyridine-2,5-diyl)dibenzamide



Formula : C₁₉H₁₅N₃O₂

Mw : 317.34 g/mol

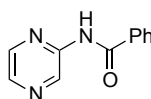
IR (neat) : 3327, 2979, 2869, 1652, 1536, 1510, 1492, 1384, 1302, 1261, 1140, 1025, 1003, 691 cm⁻¹.

RMN ¹H (400 MHz, DMSO) δ : 10.81 (brs, 1H, *NH*), 10.63 (brs, 1H, *NH*), 8.82 (tapp, *J* = 1.7 Hz, 1H), 8.20 (brd, *J* = 1.7 Hz, 2H), 8.04 (d, *J* = 7.3 Hz, 2H), 8.00 (d, *J* = 7.3 Hz, 2H), 7.64-7.49 (m, 6H).

RMN ¹³C (100 MHz, DMSO) δ : 165.7 (s), 165.6 (s), 147.9 (s), 139.9 (d), 134.3 (s), 134.1 (s), 132.2 (s), 131.9 (d), 131.8 (d), 129.9 (d), 128.5 (2C, d), 128.4 (2C, d), 128.0 (2C, d), 127.7 (2C, d), 114.6 (d).

HRMS (ESI): Calculated for C₁₉H₁₆N₃O[M+H]⁺: 318.1237. Found: 318.1239.

N-(pyrazin-2-yl)benzamide



Formula : C₁₁H₉N₃O

Mw : 199.21 g/mol

IR (neat) : 3104, 3060, 2988, 2870, 1671, 1527, 1407, 1291, 1259, 1146, 1053, 1025, 1009, 692 cm⁻¹.

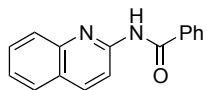
RMN ¹H (400 MHz, DMSO) δ : 11.15 (brs, 1H, *NH*), 9.44 (s, 1H), 8.47 (brd, *J* = 1.4 Hz, 1H), 8.41 (d, *J* = 1.4 Hz, 1H), 8.05 (d, *J* = 8.2 Hz, 2H), 7.61 (t, *J* = 8.2 Hz, 1H), 7.52 (t, *J* = 8.2 Hz, 2H).

RMN ¹³C (100 MHz, DMSO) δ : 166.2 (s), 149.1 (s), 142.6 (d), 140.0 (d), 137.5 (d), 133.4 (s), 132.3 (d), 128.4 (2C, d), 128.2 (2C, d).

MS (IE) *m/z*: 199 (9), 171 (7), 170 (6), 106 (7), 105 (100), 77 (72), 51 (19).

HRMS (ESI): Calculated for C₁₁H₁₀N₃O[M+H]⁺: 200.0818. Found: 200.0818.

***N*-(quinolin-2-yl)benzamide**



Formula : C₁₆H₁₂N₂O

Mw : 248.28 g/mol

m.p. = 124-125 °C

IR (neat) : 3059, 1681, 1599, 1497, 1423, 1319, 1283, 1263, 1247, 1123, 921, 829, 705 cm⁻¹.

RMN ¹H (400 MHz, CDCl₃) δ : 9.14 (brs, 1H, *NH*), 8.59 (d, *J* = 8.9 Hz, 1H), 8.19 (d, *J* = 8.9 Hz, 1H), 7.97 (d, *J* = 7.0 Hz, 2H), 7.78 (m, 2H), 7.59 (m, 1H), 7.53 (t, *J* = 7.0 Hz, 1H), 7.45 (t, *J* = 7.0 Hz, 2H), 7.44 (m, 1H).

RMN ¹³C (100 MHz, CDCl₃) δ : 166.2 (s), 151.3 (s), 146.6 (s), 138.8 (d), 134.2 (d), 132.4 (s), 130.1 (d), 128.8 (2C, d), 127.7 (d), 127.4 (2C, d), 127.3 (d), 126, 4 (s), 125.3 (d), 114.6 (d).

MS (IE) *m/z*: 248 (13), 220 (21), 219 (64), 128 (7), 106 (7), 105 (90), 78 (7), 77 (100), 51 (19).

HRMS (ESI): Calculated for C₁₆H₁₃N₂O [M+H]⁺: 249.1025. Found : 249.1022.

