Supporting Information for

Room-Temperature Cu-Catalyzed $N$-Arylation of Aliphatic Amines in Neat Water

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1. General Methods
Unless otherwise stated, all commercial reagents were used as purchased without further purification; all reactions were carried out in 10 mL sealed tubes, under a pure and dry Argon atmosphere. Analytical thin layer chromatography (TLC) was performed on precoated silica gel 60 F254 plates. Column chromatography was performed with QDHY 60 A C.C silica gel (35-70 mm). All products were characterized by their NMR, LC/MS. NMR spectra were recorded at 25°C on a 400 MHz or 500 MHz spectrometer working at 400 MHz or 500 MHz for \(^1\)H, at 100 MHz or 125 MHz for \(^13\)C, respectively. The first order peak patterns are indicated as s (singlet), d (doublet), t (triplet), q (quadruplet). Complex nonfirst-order signals are indicated as m (multiplet).

2. Preparation of L1

\[
\begin{array}{c}
\text{L1} \\
\text{N-OH}
\end{array}
\]

L1 was assembled according to the reported procedure (J. Het. Chem. 1978, 15, 249). 6,7-Dihydro-5H-quinolin-8-one (2.94 g, 20 mmol) was reacted with hydroxylamine hydrochloride (1.47 g, 21 mmol) to afford the title compound (L1) (3.07 g, 95%).

\(^1\)H NMR (CDCl₃): \(\delta\) 10.03 (br, 1H), 8.46 (d, \(J = 3.6\) Hz, 1H), 7.47 (d, \(J = 7.6\) Hz, 1H), 7.18 (d, \(J = 8.0\), 4.8 Hz, 1H), 2.93 (t, \(J = 6.8\) Hz, 2H), 2.81 (t, \(J = 6.0\) Hz, 2H), 1.87-1.93 (m, 2H). \(^13\)C NMR (CDCl₃): \(\delta\) 152.9, 148.8, 148.1, 136.8, 134.6, 123.5, 28.9, 23.8, 20.7.

3. General Procedure for the Coupling of Ar-I with Aliphatic Amines

A 10 mL sealed tube equipped with a Teflon valve was charged with a magnetic stir bar, CuI (9 mg, 5 mol%), L1 (10 mg, 6 mol%), KOH (168 mg, 3.0 mmol) and solid aryl iodides (1.0 mmol). The tube was evacuated and backfilled with argon (this procedure was repeated three times). Under a counter flow of Argon, H₂O (1.5 mL), 1.0 mmol aryl iodides (if liquid), 1.5 mmol amines were added by syringe. The tube was sealed quickly. The reaction mixture was allowed to stir under argon at room temperature (25 °C) until completion. Then the mixture was extracted by diethyl ether (3×6 mL). The combined extracts were dried by anhydrous sodium sulfate, filtered and the solvent was removed under vacuum. The residue was purified by column chromatography on silica gel with an eluent of petroleum ether and ethyl acetate.

4. General Procedure for the Coupling of Ar-Br with Aliphatic Amines

A 10 mL sealed tube equipped with a Teflon valve was charged with a magnetic stir bar, CuI (9 mg, 5 mol%), L1 (10 mg, 6 mol%), KOH (168 mg, 3.0 mmol) and solid aryl bromides (1.0 mmol). The tube was evacuated and backfilled with argon (this procedure was repeated three times). Under a counter flow of Argon, H₂O (1.5 mL), 1.0 mmol aryl bromides (if liquid), 1.5 mmol amines were added by syringe. The tube was sealed quickly. The reaction mixture was allowed to stir under argon at 65 °C until completion. The reaction mixture was cooled to room temperature, then the mixture was extracted by diethyl ether (3×6 mL). The combined extracts were dried by anhydrous sodium sulfate, filtered and the solvent was removed under vacuum. The residue was purified by column chromatography on silica gel with an eluent of petroleum ether and ethyl acetate.
5. General Procedure for the Reuse of the CuI/L1 Catalyst System for the Coupling Reaction:
A 10 mL sealed tube equipped with a Teflon valve was charged with a magnetic stir bar, CuI (9 mg, 5 mol%), L1 (10 mg, 6 mol%), KOH (168 mg, 3.0 mmol). The tube was evacuated and backfilled with argon (this procedure was repeated three times). Under a counter flow of Argon, H2O (1.5 mL), 1.0 mmol aryl iodides, 1.5 mmol amines were added by syringe. The tube was sealed quickly. The reaction mixture was allowed to stir under argon at room temperature (25 °C) until completion. Then the mixture was extracted by diethyl ether (3×6 mL). The combined extracts were dried by anhydrous sodium sulfate, filtered and the solvent was removed under vacuum. The residue was purified by column chromatography on silica gel with an eluent of petroleum ether and ethyl acetate.

The residue mixture of CuBr/L1 catalyst system was was evaporated under vacuo and subjected to a second run of the C-N coupling reaction by charging with the same substrates (aryl-I 1.0 mmol, amine 1.5 mmol, and KOH 2.0 mmol). The results were listed as follows:

Table 1. Reuse of the CuI/L1 Catalyst System for the coupling of 1-iodo-3,5-dimethylbenzene with \textit{n}-hexylamine.

<table>
<thead>
<tr>
<th>runs</th>
<th>yield (%)</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>91</td>
</tr>
<tr>
<td>2</td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>43</td>
</tr>
</tbody>
</table>

6. Spectral and Analytic Data of 3a-4j: All compounds were identified by spectral comparison with literature data.

\textbf{N-\textit{n}-hexyl-3,5-dimethylbenzenamine (3a).}\[^{[1]}\] Pale yellow oil. \(^{1}H\) NMR (CDCl\(_3\)): \(\delta\) 6.5 (s, 1H), 6.38 (s, 2H), 3.56 (s, 1H), 3.19 (t, \(J = 7.2\) Hz, 2H), 2.39 (s, 6H), 1.77-1.69 (m, 2H), 1.57-1.43 (m, 6H), 1.04 (t, \(J = 6.8\) Hz, 3H); \(^{13}C\) NMR (CDCl\(_3\)): \(\delta\) 148.8, 138.9, 119.3, 110.9, 44.2, 31.8, 29.8, 27.0, 22.8, 21.6, 14.2.

\textbf{N-\textit{n}-hexyl-4-acety-benzenamine (3b).}\[^{[2]}\] White solid. \(^{1}H\) NMR (CDCl\(_3\)): \(\delta\) 7.81 (d, \(J = 8.8\) Hz, 2H), 6.55 (d, \(J = 8.8\) Hz, 2H), 4.47 (br s, 1H), 3.15 (t, \(J = 7.6\) Hz, 2 H), 2.49 (s, 3H), 1.67-1.59 (m, 2H), 1.42-1.27 (m, 6H), 0.91 (m, 3 H); \(^{13}C\) NMR (CDCl\(_3\)): \(\delta\) 196.3, 152.4, 130.8, 126.4, 111.3, 43.4, 31.6, 29.2, 26.7, 25.9, 22.6, 14.0.

\textbf{N-\textit{n}-hexyl-4-benzonitrile (3c).}\[^{[3]}\] Pale yellow oil. \(^{1}H\) NMR (CDCl\(_3\)): \(\delta\) 7.39 (d, \(J = 8.8\) Hz, 2H), 6.55 (d, \(J = 8.8\) Hz, 2H), 4.51 (s, 1H), 3.11 (t, \(J = 8.8\) Hz, 2H), 1.66-1.59 (m, 2H), 1.43-1.25 (m, 6H), 0.88 (t, \(J = 6.8\) Hz, 3H); \(^{13}C\) NMR (CDCl\(_3\)): \(\delta\) 151.3, 133.7, 120.5, 112.3, 98.5, 43.5, 31.5, 29.1, 26.7, 22.6, 14.0.

\textbf{N-hexyl-4-nitroaniline (3d).}\[^{[4]}\] Pale yellow solid. \(^{1}H\) NMR (CDCl\(_3\)): \(\delta\) 8.09 (d, \(J = 9.2\) Hz, 2H), 6.54 (d, \(J = 9.2\) Hz, 2H), 3.22 (t, \(J = 7.2\) Hz, 2H), 1.68 (t, \(J = 7.2\) Hz, 2H), 1.43 (m, 7H), 0.92 (t, \(J = 6.8\) Hz, 3H); \(^{13}C\)NMR (75 MHz, CDCl\(_3\)): \(\delta\) 153.3, 138.0, 126.4,
N-n-hexyl-4-chloroaniline (3e). [3] Pale purple oil. $^1$H NMR (CDCl$_3$): $\delta$ 7.11 (dd, $J = 6.8, 2.4$ Hz, 2H), 6.51 (dd, $J = 6.8, 2.0$ Hz, 2H), 3.59 (s, 1H), 3.06 (t, $J = 7.2$ Hz, 2H), 1.65-1.58 (m, 2H), 1.45-1.30 (m, 6H), 0.92 (t, $J = 6.8$ Hz, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 147.1, 129.0, 121.6, 113.8, 44.2, 31.7, 29.4, 26.8, 22.7, 14.1.

4-Bromo-N-hexylaniline (3f). [5] Pale yellow solid. $^1$H NMR (CDCl$_3$): $\delta$ 7.25 (t, $J = 8.4$ Hz, 2H), 6.48 (d, $J = 8.4$ Hz, 2H), 3.74 (br, 1H), 3.07 (t, $J = 7.2$ Hz, 2H), 1.63 (m, 2H), 1.42 (m, 7H), 0.91 (t, $J = 6.8$, Hz, 3H). $^{13}$C-NMR (75 MHz, CDCl$_3$): $\delta$ 147.4, 131.9, 114.3, 108.7, 44.1, 31.6, 29.4, 26.8, 22.6, 14.0.

N-n-hexylbenzenamine (3g). [3] Pale yellow oil. $^1$H NMR (CDCl$_3$): $\delta$ 7.21-7.17 (m, 2H), 6.69 (t, $J = 7.6$ Hz, 1H), 6.63 (d, $J = 7.6$ Hz, 2H), 3.73 (s, 1H), 3.10 (t, $J = 7.2$ Hz, 2H), 1.67-1.60 (m, 2H), 1.46-1.29 (m, 6H), 0.91 (t, $J = 6.8$ Hz, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 148.3, 129.2, 117.3, 112.9, 44.2, 31.7, 29.5, 26.9, 22.7, 14.1.

N-n-hexyl-4-methoxybenzenamine (3h). [3] Pale-yellow oil. $^1$H NMR (CDCl$_3$): $\delta$ 6.82 (d, $J = 8.8$ Hz, 2H), 6.62 (d, $J = 8.8$ Hz, 2H), 3.79 (s, 3H), 3.34 (s, 1H), 3.08 (t, $J = 7.2$ Hz, 2H), 1.63 (m, 2H), 1.47-1.35 (m, 6H), 0.94 (t, $J = 6.8$ Hz, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 152.1, 142.8, 114.9, 114.1, 55.8, 45.1, 31.7, 29.7, 26.9, 22.7, 14.1.

(S)-N-Phenyl-\(\alpha\)-methylbenzylamine (3i). [1] Pale yellow oil. $^1$H NMR (CDCl$_3$): $\delta$ 7.49-7.41 (m, 4H), 7.32 (t, $J = 7.2$ Hz, 1H), 7.19 (t, $J = 8.0$ Hz, 2H) 6.76 (t, $J = 7.6$ Hz, 1H), 6.63 (d, $J = 8.0$ Hz, 2H), 4.58 (m, 1H), 4.19 (s, 1H), 1.62 (d, $J = 6.8$ Hz, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 147.3, 145.3, 129.2, 128.8, 126.9, 126.9, 117.4, 113.5, 53.6, 25.1.

N-benzyl-4-methoxybenzenamine (3j). [6] White solid. $^1$H NMR (CDCl$_3$): $\delta$ 7.43-7.33 (m, 5H), 6.84 (d, $J = 8.8$ Hz, 2H), 6.65 (d, $J = 8.8$ Hz, 2H), 4.33 (s, 2H), 3.79 (s, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 152.3, 142.5, 139.8, 128.7, 127.7, 127.3, 115.0, 114.3, 55.7, 49.3.

N-cyclohexyl-4-chloro-benzenamine (3k). [7] White solid. $^1$H NMR (CDCl$_3$): $\delta$ 7.28-7.10 (m, 2H), 6.53 (m, 2H), 3.61 (br s, 1H), 3.27-3.19 (m, 1H), 2.08-2.05 (m, 2H), 1.82-1.77 (m, 2H), 1.71-1.66 (m, 1H), 1.45-1.24 (m, 5H); $^{13}$C NMR (CDCl$_3$): $\delta$ 145.9, 129.1, 121.4, 114.3, 51.9, 33.3, 25.9, 24.9.

N-Alllyl-\(p\)-phenylenediamine (3l). [8] Brown oil. $^1$H NMR (CDCl$_3$): $\delta$ 6.66-6.55 (m, 4H), 6.01-5.92 (m, 1H), 5.24 (m, 1H), 5.13 (m, 1H), 3.72 (br s, 2H), 4.58 (br s, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 140.9, 137.9, 135.8, 116.9, 116.3, 115.1, 47.9.

N-[2-(1-piperidinyl)phenyl]-acetamide (3m). [8] Pale yellow oil. $^1$H NMR (CDCl$_3$): $\delta$ 8.54 (br s, 1H),
8.33 (d, J = 7.6 Hz, 1H), 7.14-7.02 (m, 3H), 2.79 (br s, 4H), 2.21 (s, 3H), 1.74 (br s, 4H), 1.62 (br s, 2H); $^{13}$C NMR (CDCl$_3$): $\delta$ 168.0, 142.4, 133.5, 124.9, 123.5, 120.3, 119.3, 53.7, 26.9, 24.9, 24.0.

2-(4-methoxybenzylamino)benzoic acid (3n).[9] White solid. $^1$H NMR (CDCl$_3$): $\delta$ 7.79 (d, $J$ = 7.6 Hz, 1H), 7.33-7.27 (m, 3H), 6.90 (d, $J$ = 8.4 Hz, 2H), 6.69 (d, $J$ = 8.4 Hz, 1H), 6.54 (t, $J$ = 7.2 Hz, 1H), 4.36 (s, 2H), 3.73 (s, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 158.8, 151.1, 134.8, 132.1, 131.5, 128.9, 114.9, 114.4, 112.1, 111.5, 55.5, 45.9.

(4-(Benzylamino)phenyl)methanol (3o).[10] Colorless oil. $^1$H NMR (CDCl$_3$): $\delta$ 7.37 (m, 4H), 7.29 (m, 1H), 7.18 (d, $J$ = 8.4 Hz, 2H), 4.53 (s, 2H), 4.33 (s, 2H); $^{13}$C-NMR (CDCl$_3$): $\delta$ 147.7, 139.2, 130.1, 128.9, 128.7, 127.5, 127.3, 113.0, 65.4, 48.4.

4-pyrrolidinonitrobenzene (3p).[11] Yellow solid. $^1$H NMR (d-DMSO): $\delta$ 8.02 (d, $J$ = 9.6 Hz, 2H), 6.56 (d, $J$ = 9.2 Hz, 2H), 3.34 (t, $J$ = 5.6 Hz, 4H), 1.96 (t, $J$ = 6.8 Hz, 4H); $^{13}$C NMR (d-DMSO): $\delta$ 152.3, 135.7, 126.4, 111.3, 48.2, 25.4.

N-(Pyridin-2-ylmethyl)aniline (3q).[12] White solid. $^1$H NMR (CDCl$_3$): $\delta$ 8.59 (d, $J$ = 4.4 Hz, 1H), 7.67 (t, $J$ = 7.6 Hz, 1H), 7.35 (d, $J$ = 8.0 Hz, 1H), 6.74 (t, $J$ = 7.6 Hz, 1H), 6.68 (d, $J$ = 8.0 Hz, 2H), 4.47 (s, 2H); $^{13}$C-NMR (CDCl$_3$): $\delta$ 158.5, 149.1, 147.9, 136.7, 129.3, 122.1, 121.6, 117.6, 113.1, 49.3.

2-p-Tolylaminoethanol (3r).[10] Pale yellow oil. $^1$H NMR (CDCl$_3$): $\delta$ 7.03 (d, $J$ = 8.0 Hz, 2H), 6.60 (d, $J$ = 8.4 Hz, 2H), 3.78 (t, $J$ = 5.2 Hz, 2H), 3.43 (br s, 2H), 2.30 (s, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 145.8, 129.8, 127.3, 113.7, 61.1, 46.7, 20.4.

N-Benzyl-4-(trifluoromethyl)aniline (3s).[10] White solid. $^1$H NMR (CDCl$_3$): $\delta$ 7.40 (d, $J$ = 8.4 Hz, 2H), 7.36 (m, 4H), 7.31 (m, 1H), 6.65 (d, $J$ = 8.4 Hz, 2H), 4.37 (s, 2H); $^{13}$C-NMR (CDCl$_3$): $\delta$ 150.3, 138.3, 128.8, 127.6, 127.4, 126.6, 126.3, 123.6, 112.2, 47.9.

N-Benzylpyridin-2-amine (3t).[13] Pale yellow solid. $^1$H NMR (CDCl$_3$): $\delta$ 8.11 (d, $J$ = 4.4 Hz, 1H), 7.43 (m, 5H), 7.29 (m, 1H), 6.61 (dd, $J$ = 6.8, 5.6 Hz, 1H), 6.39 (d, $J$ = 8.4 Hz, 1H), 4.99 (br, 1H), 4.52 (d, $J$ = 6.0 Hz, 2H); $^{13}$C-NMR (CDCl$_3$): $\delta$ 158.5, 147.9, 139.1, 137.6, 128.7, 127.4, 127.3, 113.2, 106.9, 46.3.

3-(Cyclohexylamino)pyridine (3u).[1] White solid. $^1$H NMR (CDCl$_3$): $\delta$ 8.01 (br s, 1H), 7.91 (br s, 1H), 7.05 (br s, 1H), 6.84 (d, $J$ = 7.6 Hz, 1H), 3.70 (br s, 1H), 3.28-3.21 (m, 1H), 2.05-2.02 (m, 2H), 1.68-1.63 (m, 1H), 1.43-1.26 (m, 5H); $^{13}$C NMR (CDCl$_3$): $\delta$ 143.5, 137.9, 136.1, 123.8, 118.8, 51.4, 33.2, 25.8, 24.9.
2-[N-(2-thiophenmethyl)-pyridinamine (3v). \[^8\] White solid. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 8.13 (m, 1H), 7.46-7.41 (m, 1H), 7.21 (dd, \(J = 5.2\) 1.2 Hz, 1H), 7.02 (m, 1H), 6.96 (m, 1H), 6.61 (dd, \(J = 6.0\) 0.4 Hz, 1H), 6.44 (d, \(J = 8.0\) Hz, 1H), 5.08 (br s, 1H), 4.71 (d, \(J = 6.0\) Hz, 2H); \(^13\)C NMR (CDCl\(_3\)): \(\delta\) 158.1, 147.9, 142.6, 137.5, 126.8, 125.2, 124.6, 113.5, 107.4, 41.3.

N-Isopropylpyridin-2-amine (3w). \[^{[14]}\] Pale yellow oil. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 8.07 (d, \(J = 4.4\) Hz, 1H), 7.43 (m, 1H), 6.55 (dd, \(J = 6.8\) 5.6 Hz, 1H), 6.37 (d, \(J = 8.4\) Hz, 1H), 4.45 (br, 1H), 3.93 (m, 1H), 1.24 (d, \(J = 6.4\) Hz, 6H). \(^13\)C-NMR (CDCl\(_3\)): \(\delta\) 158.1, 148.0, 137.5, 112.4, 106.8, 43.1, 23.0.

3-[N-(3-morpholinopropyl)thiophenamine (3x). \[^8\] Brown oil. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 7.15 (dd, \(J = 4.8\) 2.8 Hz, 1H), 6.62 (dd, \(J = 5.2\) 1.6 Hz, 1H), 5.95 (m, 1H), 3.73 (m, 4H), 3.16 (t, \(J = 6.4\) Hz, 2H), 2.51 (m, 6H), 1.87-1.81 (m, 2H); \(^13\)C NMR (CDCl\(_3\) ): \(\delta\) 148.9, 125.1, 119.9, 95.2, 66.9, 57.6, 53.7, 45.5, 25.5.

4-(N-benzyl)-1-methyl-1H- pyrazolamine (3y). \[^8\] Brown oil. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 7.39-7.28 (m, 5H), 7.14 (s, 1H), 6.86 (s, 1H), 4.16 (s, 2H), 3.78 (s, 3H); \(^13\)C NMR (CDCl\(_3\) ): \(\delta\) 139.6, 134.1, 128.7, 128.5, 127.7, 127.2, 116.7, 52.2, 39.1.

N-(2-(1H-indol-3-yl)ethyl)-4-methoxyaniline (3z). \[^{[15]}\] Brown solid. \(^1\)H NMR (500 MHz, CDCl\(_3\)): \(\delta\) 8.13 (br., 1H), 7.69 (d, \(J = 8.0\) Hz, 1H), 7.39 (d, \(J = 8.0\) Hz, 1H), 7.29 (t, \(J = 7.5\) Hz, 1H), 7.21 (t, \(J = 7.5\) Hz, 1H), 7.05 (s, 1H), 6.86 (d, \(J = 8.5\) Hz, 2H), 6.66 (d, \(J = 8.5\) Hz, 2H), 3.81 (s, 3H), 3.53 (t, \(J = 5.6\) Hz, 2H), 3.14 (t, \(J = 6.5\) Hz, 2H); \(^13\)C NMR (125 MHz, CDCl\(_3\) ): \(\delta\) 152.2, 142.6, 136.5, 127.5, 122.2, 119.4, 118.9, 115.0, 114.5, 113.4, 111.3, 55.9, 45.1, 25.2.

N-(4-methoxybenzyl)- 4-methoxy-benzenamine (4b). \[^{[16]}\] White solid. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 7.31 (d, \(J = 8.4\) Hz, 2H), 6.89 (d, \(J = 8.4\) Hz, 2H), 6.79 (d, \(J = 9.2\) Hz, 2H), 6.65 (d, \(J = 9.2\) Hz, 2H), 4.24 (s, 2H), 3.83 (s, 3H), 3.77 (s, 3H); \(^13\)C NMR (CDCl\(_3\) ): \(\delta\) 158.9, 152.5, 142.0, 131.4, 128.9, 114.9, 114.5, 114.0, 55.8, 55.3, 48.9.

5-[(4-methylphenyl)amino]-1-Pentanol (4c). \[^{[14]}\] Yellow oil. \(^1\)H NMR (CDCl\(_3\)): \(\delta\) 7.01 (d, \(J = 8.0\) Hz, 2H), 6.56 (d, \(J = 8.0\) Hz, 2H), 3.61 (t, \(J = 6.8\) Hz, 2H), 3.09 (t, \(J = 6.8\) Hz, 2H), 2.92 (br s, 2H), 2.27 (s, 3H), 1.68-1.57 (m, 4H), 1.51-1.45 (m, 2H); \(^13\)C NMR (CDCl\(_3\) ): \(\delta\) 146.2, 129.8, 126.6, 113.2, 62.6, 44.4, 32.5, 29.4, 23.4, 20.4.

1-(N-cyclohexyl)-naphthalenamine (4d). \[^{[17]}\] Colorless oil. \(^1\)H NMR (CDCl\(_3\) ): \(\delta\) 7.87-7.83 (m, 2H), 7.52-7.45 (m, 2H), 7.38 (t, \(J = 8.0\) Hz, 1H), 7.25 (d, \(J = 8.0\) Hz, 1H), 6.71 (d, \(J = 7.6\) Hz, 1H), 4.38 (br s, 1H), 3.57-3.49 (m, 1H), 2.22 (m, 2H), 2.19-1.85 (m, 2H), 1.78-1.73 (m, 1H), 1.56-1.41 (m, 5H); \(^13\)C NMR (CDCl\(_3\) ): \(\delta\) 142.3, 134.6,
128.7, 126.7, 125.6, 124.5, 123.5, 119.9, 116.8, 104.9, 51.9, 33.3, 26.1, 25.1.

N-Isopropyl-[1,1'-biphenyl]-4-amine (4e).\[^{[18]}\] Pale yellow solid. $^1$H NMR (CDCl$_3$): $\delta$ 7.54 (d, $J$= 7.6 Hz, 2H), 7.44 (d, $J$= 8.8 Hz, 2H), 7.40 (t, $J$= 8.0 Hz, 2H), 7.26 (t, $J$= 8.0 Hz, 1H), 6.67 (d, $J$= 8.4 Hz, 2H), 3.72 (m, 1H), 1.25 (d, $J$= 6.4 Hz, 6H); $^{13}$C-NMR (CDCl$_3$): $\delta$ 146.8, 141.3, 130.0, 128.6, 128.0, 126.3, 126.0, 113.6, 44.4, 23.0.

4-(3-morpholinopropylamino)-benzynol (4f). \[^{[8]}\] White solid. $^1$H NMR ($d$-DMSO): $\delta$ 7.00 (d, $J$= 8.0 Hz, 2H), 6.49 (d, $J$= 8.4 Hz, 2H), 5.5 (br s, 1H), 4.77 (t, $J$= 5.2 Hz, 1H), 4.29 (d, $J$= 5.2 Hz, 2H), 3.58 (s, 4H), 3.03 (br s, 2H), 2.36 (s, 6H), 1.66 ( t, $J$= 6.8 Hz, 2H); $^{13}$C NMR ($d$-DMSO): $\delta$ 148.5, 129.8, 128.4, 112.1, 66.7, 63.6, 56.7, 53.9, 41.8, 26.1.

1-(4-Nitrophenyl)piperidine (4g). \[^{[11]}\] Yellow solid. $^1$H NMR (CDCl$_3$): $\delta$ 8.12 (d, $J$= 9.6 Hz, 2H), 6.83 (d, $J$= 9.6 Hz, 2H), 3.44 (s, 4H), 1.70 (s, 7H); $^{13}$C-NMR (CDCl$_3$): $\delta$ 154.7, 137.8, 126.1, 112.7, 48.7, 25.2, 24.2.

3-[N-(2-methylthiophen)]-6-methoxy-pyridinamine (4h). \[^{[8]}\] White solid. $^1$H NMR (CDCl$_3$): $\delta$ 7.66 (s, 1H), 7.22 (d, $J$= 5.2 Hz, 1H), 7.06-6.96 (m, 3H), 6.63 (d, $J$= 8.8 Hz, 1H), 4.48 (s, 2H), 3.88 (s, 3H), 3.74 (br s, 1H); $^{13}$C-NMR (CDCl$_3$): $\delta$ 157.8, 142.5, 138.4, 130.9, 126.9, 126.3, 125.2, 124.8, 110.8, 53.4, 44.4.

3-[N-(2-(methylthio)ethyl)]-pyridineamine (4i). \[^{[8]}\] Yellow oil. $^1$H NMR (CDCl$_3$): $\delta$ 8.04 (s, 1H), 7.94 (d, $J$= 3.6 Hz, 1H), 7.08-7.05 (m, 1H), 6.87 (d, $J$= 8.0 Hz, 1H), 4.28 (br s, 1H), 3.29 (t, $J$= 6.4 Hz, 2H), 2.73 (t, $J$= 6.4 Hz, 2H), 2.09 (s, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 143.9, 138.8, 135.9, 123.8, 118.9, 41.5, 33.4, 15.0.

2-(N-Methylpiperazino)-5-nitropyridine (4j). \[^{[19]}\] Yellow solid. $^1$H NMR (CDCl$_3$): $\delta$ 9.03 (t, $J$= 2.4 Hz, 1H), 8.19 (m, 1H), 6.57 (dd, $J$= 9.6 0.8 Hz, 1H), 3.83 (d, $J$= 4.4 Hz, 4H), 2.57 (d, $J$= 4.0 Hz, 4H), 2.39 (s, 3H); $^{13}$C NMR (CDCl$_3$): $\delta$ 160.3, 146.4, 135.1, 133.0, 104.6, 54.5, 45.9, 44.7.

7. References


