Supporting Information

Efficient tandem aqueous room temperature oxidative amidations catalysed by supported Pd nanoparticles on graphene oxide

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**Experimental**

**Chemical and apparatus**

All reagents were obtained from Merck (Germany) and Fluka (Switzerland) and were used without further purification. The crystalline phase of the nanoparticles were recognized by X-ray diffraction (XRD) measurements (Philips-PW1800 diffractometer). Scanning electron microscopy (SEM) images of the samples were taken with a Zeiss-DSM 960A microscope. Transmission electron microscopy (TEM) images were obtained through a Zeiss EM 900 electron microscope operating. $^1$H NMR spectra were
measured on a Bruker AV-300 instrument (400 MHz) with CDCl₃ as solvent. A multiwave ultrasonic
generator (Sonicator-3000; Misonix Inc., Farmingdale, NY, USA) was used for exfoliation of graphite
oxide to graphene oxide. Melting points were measured on an Electrothermal 9100 apparatus.

*Spectral data*

*N-(3-Chlorophenyl)-4-nitrobenzamide.* (6b)

\[
\begin{array}{c}
\text{O} \\
\text{N} \\
\text{Cl}
\end{array}
\]

\( ^1\text{H} \text{NMR (CDCl}_3, 400 \text{ MHz}) \delta: 7.19-8.30 (m, 9 \text{ H}). \) \( ^{13}\text{C} \text{NMR (CDCl}_3, 100 \text{ MHz}) \delta: 161.08, 142.96, 136.803, 129.309, 128.259, 125.369, 124.100, 120.362, 116.894, 116.804, 116.520. \)

*N-Phenylbenzamide.* (6c)

\[
\begin{array}{c}
\text{O} \\
\text{N}
\end{array}
\]

White solid, mp: 162-163 °C. \( ^1\text{H} \text{NMR (CDCl}_3, 400 \text{ MHz}) \delta: 7.98 (s, 1 \text{ H}), 7.06-7.80 (m, 10 \text{ H}). \) \( ^{13}\text{C} \text{NMR (CDCl}_3, 100 \text{ MHz}) \delta: 165.71, 137.96, 135.09, 131.80, 129.09, 128.78, 127.00, 124.57, 120.21. \)

*N,N-Diphenylbenzamide.* (6d)

\[
\begin{array}{c}
\text{O} \\
\text{N}
\end{array}
\]

\( ^1\text{H} \text{NMR (CDCl}_3, 400 \text{ MHz}) \delta: 7.172-7.494 (m, 15 \text{ H}). \) \( ^{13}\text{C} \text{NMR (CDCl}_3, 100 \text{ MHz}) \delta: 170.572, 143.985, 136.227, 130.090, 129.148, 129.059, 127.820, 127.497, 126.291. \)

*4-Nitro-N-phenylbenzamide.* (6e)
White solid, mp: 214-216 °C. $^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 7.109-8.30 (m, 10 H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 163.66, 154.68, 140.04, 138.31, 130.24, 128.27, 125.42, 124.12, 120.54.

$N$-(3-Chlorophenyl)benzamide.

$^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 8.138 (s, 1 H), 7.13-7.75 (m, 9 H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 166.11, 139.11, 134.66, 134.48, 132.07, 130.11, 128.78, 127.11, 124.61, 120.51, 118.40.

Phenyl(pyrrolidin-1-yl)methanone. (6g)

Colorless liquid. $^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 7.301-7.44 (m, 5 H), 3.57 (t, $j=6.6$ Hz, 2 H), 3.33 (t, $j=6.2$ Hz, 2 H), 1.87 (t, $j=6.5$ Hz, 2 H), 1.79 (t, $j=6.2$ Hz, 2 H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 168.71, 136.30, 128.72, 127.21, 126.07, 45.13, 25.37.

Ethyl 2-(benzamido)benzoate. (6h)

$^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 12.10 (s,1 H), 7.14-8.97 (m, 9 H), 4.45 (q, $j=1.8$ Hz, 2 H), 1.45 (t, $j=1.8$ Hz, 3 H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 168.62, 165.70, 141.93, 135.02, 134.64, 131.84, 130.90, 128.76, 127.39, 122.51, 120.50, 115.54, 61.47, 14.18.

$N$-(4-Bromophenyl)benzamide. (6j)
White solid, mp: 198-200 °C. $^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 7.97 (s, 1 H), 7.189-7.797 (m, 9 H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 168.14, 137.01, 134.86, 132.08, 128.88, 126.99, 121.69, 114.51.

$N$-(4-Hydroxyphenyl)benzamide . (6k)

$^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 8.06 (s, 1 H), 7.18-8.04 (m, 9 H), 5.08 (s, 1 H)

$^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 171.59, 158.62, 133.77, 130.21, 129.26, 129.04, 128.86, 128.59, 128.493.

$N$-Benzylbenzamide . (6l)

White solid, mp: 102-103 °C. $^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 8.11 (s, 1 H), 7.28-7.82 (m, 10 H), 4.64(d, j= 5.63 Hz, 2 H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 167.485, 138.28, 134.39, 131.533, 128.758, 128.572, 127.883, 127.565, 127.039, 44.097.

$N$-(Pyridin-2-yl)benzamide . (6n)

White solid, mp: 80-82 °C. $^1$H NMR (CDCl$_3$, 400 MHz) $\delta$: 9.23 (br, 1 H), 7.09-8.47 (m, 9 H). $^{13}$C NMR (CDCl$_3$, 100 MHz) $\delta$: 173.04, 151.75, 149.30, 147.36, 138.79, 132.47, 129.31, 127.44, 119.87, 114.60. FT-IR $\delta$: 1458, 1528, 1579, 1598, 3173.