Supporting Information

Urchin-like Pd@CuO-Pd Yolk-shell Nanostructures: Synthesis, Characterization and Electrocatalysis

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Figure S1. The EDS data of (a) the Pd@Cu₂O truncated octahedrons and (b) the urchin-like Pd@CuO-Pd yolk-shell nanostructures.

Figure S2. TEM image and HRTEM image of the urchin-like Pd@CuO-Pd yolk-shell nanostructures. Inset: The selected-area electron diffraction (SAED) pattern.
Figure S3. The survey XPS spectra of (a) the Pd@Cu₂O truncated octahedrons and (b) the urchin-like Pd@CuO-Pd yolk-shell nanostructures.
Figure S4. (a) SEM image and (b) XRD patterns of pure Cu$_2$O nanoparticles.
Figure S5. (a) SEM image and (b) XRD patterns of the CuO nanoparticles.
Figure S6. (a) TEM image and (b) XRD patterns of the hollow Pd nanoparticles. (c) CV curves of the hollow Pd nanoparticles in N$_2$-saturated 0.1 M KOH solution with 3 mM glucose at a scan rate of 100 mV s$^{-1}$. (d) Amperometric response of the hollow Pd nanoparticles after successive addition of glucose in N$_2$-saturated 0.1 M KOH at 0.5 V (vs Ag/AgCl).
**Figure S7.** TEM image of the Pd mixtures obtained by etching CuO in the urchin-like Pd@CuO-Pd yolk-shell nanostructures.
<table>
<thead>
<tr>
<th>Materials</th>
<th>Sensitivity (µA cm⁻² mM⁻¹)</th>
<th>Response time (s)</th>
<th>Linear Range</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pd@CuO-Pd</td>
<td>695</td>
<td>&lt; 3 s</td>
<td>10 µM-6 mM</td>
<td>This work</td>
</tr>
<tr>
<td>CuO fibers</td>
<td>431.3</td>
<td>1</td>
<td>6 µM-2.5 mM</td>
<td>1</td>
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<tr>
<td>CuO nanoparticles</td>
<td>629</td>
<td>--</td>
<td>5 µM-6 mM</td>
<td>2</td>
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<tr>
<td>CuO nanospheres</td>
<td>404.53</td>
<td>--</td>
<td>1 µM-2.55 mM</td>
<td>3</td>
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<tr>
<td>Cu nanocluster/CNTs</td>
<td>250</td>
<td>5</td>
<td>0.7µM-3.5 mM</td>
<td>4</td>
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<tr>
<td>Pd@Cys-C₆₀</td>
<td>35.46</td>
<td>--</td>
<td>2.5µM-1.0mM</td>
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<tr>
<td>Cu/Cu₂O HMs</td>
<td>476</td>
<td>&lt; 2</td>
<td>0.22 mM-10.89 mM</td>
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<tr>
<td>Cu₂O/GNs</td>
<td>285</td>
<td>&lt;9</td>
<td>0.3 mM-3.3 mM</td>
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<td>Cu₂O nanocubes</td>
<td>200</td>
<td>&lt;9</td>
<td>--</td>
<td>7</td>
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<tr>
<td>Pt-Pb nanowire</td>
<td>11.25</td>
<td>~10</td>
<td>up to 11 mM</td>
<td>8</td>
</tr>
<tr>
<td>Pd/graphene hybrid</td>
<td>--</td>
<td>9</td>
<td>10µM-5 mM</td>
<td>9</td>
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</table>
Notes and references