Supporting Information

Facile Synthesis and Characterization of Pd@Ir_{nL} (n=1–4) Core-Shell Nanocubes for Highly Efficient Oxygen Evolution in Acidic Media

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Figure S1. (a) TEM image and (b) size distribution of the Pd nanocubes. Average edge length of 17.6±1.6 nm was derived for the Pd nanocubes (scale bar: 50 nm).
Figure S2. (a) Ir 4f and (b) Pd 3d XPS spectra recorded from the Pd@Ir_{nL} nanocubes, indicating that the nanocubes were composed of metallic Pd and Ir.\textsuperscript{1,2}
Figure S3. (a) Schematic illustration and (b) TEM image of Pd@Ir<sub>4L</sub> core-shell nanocubes synthesized using the standard procedure, except for the absence of KBr (scale bar: 50 nm).
Figure S4. TEM images of the as-prepared (a) Pd@Ir_{1L}/C, (b) Pd@Ir_{2L}/C, (c) Pd@Ir_{3L}/C, and (d) Pd@Ir_{4L}/C (scale bar: 100 nm).
Figure S5. (a) CV curves recorded from the commercial Ir/C and Pd@Ir\textsubscript{3L}/C, and (b) their corresponding ECSAs at an Ir loading of 10.2 μg\textsubscript{Ir}·cm\textsuperscript{-2} on RDE. Although a small amount of Cl\textsuperscript{4−} can be reduced by Ir surface to form Cl\textsuperscript{−} during test at low potential, the generated Cl\textsuperscript{−} has no obvious effect on the measurements.\textsuperscript{3}
Figure S6. OER activity activation for (a) commercial Ir/C, (b) Pd@Ir$_{1L}$/C, (c) Pd@Ir$_{2L}$/C, (d) Pd@Ir$_{3L}$/C, and (e) Pd@Ir$_{4L}$/C during initial 50 rounds of scanning in the potential region of 1.2–1.6 V.
Figure S7. Enhancement factor for the OER mass activity of Pd@Ir_{nL}/C relative to commercial Ir/C.
Figure S8. (a) CV curves, (b) Specific ECSAs, (c) LSV curves, (d) η at the current density of 10 mA·cm$^{-2}_{\text{geo}}$, (e) Tafel plots, and (f) mass and specific activities of Pd@Ir_{3L}/C with the Ir loadings of 10.2 and 25.5 μg·cm$^{-2}$ on RDEs.
**Figure S9.** Effect of the number of Ir atomic layers on the changes in Tafel slopes of Pd@Ir$_n$/C before and after durability test.
Figure S10. TEM images of (a) Pd@Ir_{1L}/C, (b) Pd@Ir_{2L}/C, (c) Pd@Ir_{3L}/C, and (d) Pd@Ir_{4L}/C after 2,000 testing cycles (scale bar: 50 nm). The red circles indicate the core-shell nanocubes involving dissolution.
Figure S11. Pd 3d XPS spectra recorded from Pd@Ir$_{1d}$/C after 2,000 testing cycles.
Table S1. The wt.% of Ir and average number of Ir atomic layers calculated from the ICP-MS data for the Pd and Ir contents in the Pd@Ir$_{nL}$ samples.

<table>
<thead>
<tr>
<th>Samples</th>
<th>Wt.% of Ir in Pd@Ir$_{nL}$ nanocubes</th>
<th>Average number of Ir atomic layers</th>
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<tbody>
<tr>
<td>Pd@Ir$_{1L}$</td>
<td>9.3</td>
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<td>Pd@Ir$_{2L}$</td>
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<tr>
<td>Pd@Ir$_{4L}$</td>
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<td>3.8</td>
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REFERENCES

