Supporting Information

Doped TiO₂-Supported IrO₂ Electrocatalyst with High Activity and Durability toward the Acidic Oxygen Evolution Reaction

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Characterization data

Figure S1. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of TiO₂@IrO₂.
Figure S2. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of V-TiO₂@IrO₂.
Figure S3. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Mn-TiO₂@IrO₂.
Figure S4. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Fe-TiO₂@IrO₂.
Figure S5. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Ni-TiO₂@IrO₂.
Figure S6. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Cu-TiO₂@IrO₂.
Figure S7. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Nb-TiO₂@IrO₂.
Figure S8. Electrocatalysis OER stability test of unsupported IrO₂, TiO₂@IrO₂, Fe-TiO₂@IrO₂, and W-TiO₂@IrO₂ (lasting for 3.1 h).

Table S1. Performance table of Ir-based electrocatalysts.
Figure S1. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of TiO$_2$@IrO$_2$. 
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Figure S3. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Mn-TiO$_2$@IrO$_2$. 
Figure S4. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Fe-TiO$_2$@IrO$_2$. 
Figure S5. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Ni-TiO$_2$@IrO$_2$. 
Figure S6. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Cu-TiO$_2$@IrO$_2$. 
Figure 57. TEM images, SAED patterns, HAADF-STEM images and EDS elemental mappings of Nb-TiO$_2$@IrO$_2$. 
Figure S8. Electrocatalysis OER stability test of unsupported IrO$_2$, TiO$_2$@IrO$_2$, Fe-TiO$_2$@IrO$_2$, and W-TiO$_2$@IrO$_2$ (test lasting for 3.1h). (a) Chronopotentiometry test at 10mA/cm$^2_{geo}$. (b) OER activity before and after the chronopotentiometry test. (c) The attenuation degree of mass activity ($i_m$) before and after the chronopotentiometry test at 1.56 V (vs Ag/AgCl). (d) Nyquist plots before and after chronopotentiometry test at the potential of 10 mA/cm$^2_{geo}$. (e) The increased degree of $R_{ct}$ before and after the chronopotentiometry test corresponding to the Nyquist plots.
Table S1. Performance table of Ir-based electrocatalysts.

<table>
<thead>
<tr>
<th>Catalyst</th>
<th>Electrolyte</th>
<th>Overpotential @10mA/cm² (mV)</th>
<th>Tafel slope (mV/dec)</th>
<th>Mass activity (A/mgIr) @Overpotential (V)</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-TiO₂/IrO₂</td>
<td>0.1M HClO₄</td>
<td>308</td>
<td>42.36</td>
<td>0.72@330</td>
<td>This work</td>
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<tr>
<td>IrO₂</td>
<td>0.1M HClO₄</td>
<td>373</td>
<td>112</td>
<td>0.0126@300</td>
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<tr>
<td>IrO₂ ns</td>
<td>0.5M H₂SO₄</td>
<td>350</td>
<td>57</td>
<td>0.437@xx</td>
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<tr>
<td>Ni&amp;Co-IrO₂</td>
<td>0.1M HClO₄</td>
<td>~280</td>
<td>53</td>
<td>0.055@270</td>
<td>[3]</td>
</tr>
<tr>
<td>TiO₂/IrO₂</td>
<td>0.1M HClO₄</td>
<td>255@1mA/cm²</td>
<td>42</td>
<td>0.07@295</td>
<td>[4]</td>
</tr>
<tr>
<td>Nb-TiO₂/IrO₂</td>
<td>0.1M HClO₄</td>
<td>310</td>
<td>/</td>
<td>/</td>
<td>[5]</td>
</tr>
<tr>
<td>Nb₀.₀₅TiO₂₀.₉₅O₂/ IrO₂</td>
<td>0.5M H₂SO₄</td>
<td>270@1mA/cm²</td>
<td>282</td>
<td>0.471@370</td>
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<tr>
<td>W₄Ti₁₁O₂₂Ir</td>
<td>0.1M HClO₄</td>
<td>~300</td>
<td>/</td>
<td>~0.77@570</td>
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</tr>
<tr>
<td>TiN/IrO₂</td>
<td>0.5M H₂SO₄</td>
<td>313</td>
<td>65.5</td>
<td>0.874@370</td>
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<tr>
<td>IrNiCu DNF/C</td>
<td>0.1M HClO₄</td>
<td>307</td>
<td>48</td>
<td>0.053@300</td>
<td>[9]</td>
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<tr>
<td>IrCoNi PHNCs</td>
<td>0.1M HClO₄</td>
<td>303</td>
<td>53.8</td>
<td>0.7@300</td>
<td>[10]</td>
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<tr>
<td>P-IrCu₁.₄NCS</td>
<td>0.05M H₂SO₄</td>
<td>311</td>
<td>53.9</td>
<td>0.213@320</td>
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<tr>
<td>SrOₓIr₉r₂O₂ₓNₓ</td>
<td>0.1M HClO₄</td>
<td>310</td>
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<td>/</td>
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<tr>
<td>RuIr</td>
<td>0.1M HClO₄</td>
<td>344</td>
<td>111.5</td>
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<td>[13]</td>
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<tr>
<td>IrOOH NSs</td>
<td>0.1M HClO₄</td>
<td>344</td>
<td>58</td>
<td>/</td>
<td>[14]</td>
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<tr>
<td>Sputtered IrO₂ films</td>
<td>0.1M HClO₄</td>
<td>490</td>
<td>100</td>
<td>/</td>
<td>[15]</td>
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</tbody>
</table>


