Supporting Information for

Bridged-multi-octahedral Cobalt Oxide Nanocrystals with Co-terminated Surface as Oxygen Evolution and Reduction Electrocatalyst

Yiliguma,1 Zhijie Wang,1 Wenhao Xu,1 Yuhang Wang,1 Xiaoqi Cui,1 Abdullah M. Al-Enizi,2 Yun Tang,1,* Gengfeng Zheng1,*

1Laboratory of Advanced Materials, Department of Chemistry, Collaborative Innovation Center of Chemistry for Energy Materials, Fudan University, Shanghai 200433, China
2Department of Chemistry, College of Science, King Saud University, Riyadh 11451, Saudi Arabia
Figure S1. TEM images of cobalt oxide NCs obtained from (a) 1 min, (b) 5 min, (c) 15 min, (d) 60 min, (e) 90 min, and (f) 5 h reaction time.
Figure S2. Structural models of (a) the {100} crystal facets of intermediate NCs (cubic spinel $\text{Co}_3\text{O}_4$), and (b) the {111} crystal facet of final NCs (cubic spinel $\text{Co}_3\text{O}_4$).

Figure S3. (a) TEM image of as-made hydrothermally synthesized $\text{CoO}_x$ (CoO$_x$-HT) and inset SAED pattern indicates the cubic crystalline structure (JCPDS No. 43-1004) of the hydrothermally synthesized $\text{CoO}_x$. (b) HRTEM image of CoO$_x$-HT.
**Figure S4.** CV curves for the CoO$_x$ NC and CoO$_x$-HT.

**Figure S5.** OER durability test of the CoO$_x$ NC and CoO$_x$-HT.
Figure S6. (a, b) TEM images of the CoO_x NC catalyst after the stability tests, indicating the degradation of CoO_x NC catalyst during the catalytic process.

Figure S7. The electrical equivalent circuit for the EIS test.

Figure S8. CVs scanned with different rates from 20 to 100 mV s^{-1} in the potential range of near 0.87 – 0.97 V vs RHE for CoO_x-HT catalyst.
Figure S9. LSVs of CoO$_x$ NC in oxygen and nitrogen saturated 0.1M KOH.

Supporting Table

Table S1. Comparison of the values of the fitted Nyquist plots for each sample.

<table>
<thead>
<tr>
<th>Sample</th>
<th>$R_s$</th>
<th>$R_{CT}$</th>
<th>$R$</th>
<th>$CPE_1$</th>
<th>$CPE_2$</th>
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<tr>
<td></td>
<td>($\Omega$)</td>
<td>($\Omega$)</td>
<td>($\Omega$)</td>
<td>(mF cm$^{-2}$)</td>
<td>(mF cm$^{-2}$)</td>
</tr>
<tr>
<td>CoO$_x$ NC</td>
<td>5.43</td>
<td><strong>0.60</strong></td>
<td>47.3</td>
<td>4.01</td>
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<tr>
<td>CoO$_x$-HT</td>
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<td><strong>4.37</strong></td>
<td>534</td>
<td>2.42</td>
<td>0.32</td>
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