Supporting information

Engineering of nanoscale defect patterns in CeO$_2$ nanorods via ex-situ and in-situ annealing

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Figure S1: XPS Spectrum of Ce (3d) for CeO$_2$ nanorods annealed under oxidizing environment

Table S1: XPS binding energies of individual peak of the Ce (3d) spectrum for as-synthesized and post annealed CeO$_2$ nanorods

<table>
<thead>
<tr>
<th>Materials</th>
<th>Ce (3d$_{5/2}$)</th>
<th>Ce (3d$_{3/2}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C$_0$</td>
<td>C$_1$</td>
</tr>
<tr>
<td>CNR – As</td>
<td>880.8</td>
<td>882.8</td>
</tr>
<tr>
<td>CNR – 325 ºC</td>
<td>880.5</td>
<td>882.6</td>
</tr>
<tr>
<td>CNR – 800 ºC</td>
<td>880.8</td>
<td>882.4</td>
</tr>
</tbody>
</table>
**Figure S2:** HRTEM images of as-synthesized CeO$_2$ nanorods from a minority of rods showing high crystallinity with occasional defects: (a) possible grain rotation, (b) some planar defect lines, (c) local $\{111\}$ faceting leading to roundish tip avoiding flat $\{110\}$ type face; (d) local lattice distortions / strain patches ($<211>$ viewing direction). All rods are $\{110\}$ directed.
Figure S3: In situ TEM images in various places after heating at 600 °C.
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