Supporting Information

Crystal plane dependent dopant migration that boosts catalytic oxidation

Ruixue Wang, Jingjing Wei,* Huiying Wei* and Yanzhao Yang*

School of Chemistry and Chemical Engineering, Shandong University, Jinan City, Shandong 250100,
P.R. China
Figure S1. HRTEM images of Fe₅CeₓO₂₋ₓ samples: (a, b) Rod-N (nanorods under N₂ pretreatment); (c, d) Rod-O (nanorods under O₂ pretreatment); (e, f) Cube-N (nanocubes under N₂ pretreatment); (g, h) Cube-O (nanocubes under O₂ pretreatment).
Figure S2. XRD patterns of Fe$_x$Ce$_{1-x}$O$_{2-\delta}$ samples: (a) Rod-N (nanorods under N$_2$ pretreatment); (b) Rod-O (nanorods under O$_2$ pretreatment); (c) Cube-N (nanocubes under N$_2$ pretreatment); (d) Cube-O (nanocubes under O$_2$ pretreatment).
Table S1. Analysis of XRD results of samples: Rod-N (nanorods under N\textsubscript{2} pretreatment); Rod-O (nanorods under O\textsubscript{2} pretreatment); Cube-N (nanocubes under N\textsubscript{2} pretreatment); Cube-O (nanocubes under O\textsubscript{2} pretreatment).

<table>
<thead>
<tr>
<th>Catalysts</th>
<th>Rod-N</th>
<th>Rod-O</th>
<th>Cube-N</th>
<th>Cube-O</th>
</tr>
</thead>
<tbody>
<tr>
<td>I\textsubscript{(220)}/I\textsubscript{(111)}</td>
<td>0.545</td>
<td>0.552</td>
<td>0.503</td>
<td>0.511</td>
</tr>
<tr>
<td>I\textsubscript{(200)}/I\textsubscript{(111)}</td>
<td>0.421</td>
<td>0.415</td>
<td>0.443</td>
<td>0.457</td>
</tr>
</tbody>
</table>
Figure S3. Catalytic stability of the CO oxidation over Cube-O (nanocubes under O$_2$ pretreatment).
Figure S4. Catalytic activities of the CO + O\textsubscript{2} reaction over CeO\textsubscript{2} nanorods activated in N\textsubscript{2} atmosphere; CeO\textsubscript{2} nanorods activated in O\textsubscript{2} atmosphere; CeO\textsubscript{2} nanocubes activated in N\textsubscript{2} atmosphere; CeO\textsubscript{2} nanocubes activated in O\textsubscript{2} atmosphere.
Figure S5. TEM images of used Fe$_x$Ce$_{1-x}$O$_{2.8}$ samples: (a) Rod-N (nanorods under N$_2$ pretreatment); (b) Rod-O (nanorods under O$_2$ pretreatment); (c) Cube-N (nanocubes under N$_2$ pretreatment); (d) Cube-O (nanocubes under O$_2$ pretreatment).
Figure S6. XRD patterns of used Fe$_2$Ce$_{1-x}$O$_{2.8}$ samples: (a) Rod-N (nanorods under N$_2$ pretreatment); (b) Rod-O (nanorods under O$_2$ pretreatment); (c) Cube-N (nanocubes under N$_2$ pretreatment); (d) Cube-O (nanocubes under O$_2$ pretreatment).
Figure S7. XPS survey spectrum of FeₓCe₁₋ₓO₂₋δ samples: (a) Rod-N (nanorods under N₂ pretreatment); (b) Rod-O (nanorods under O₂ pretreatment); (c) Cube-N (nanocubes under N₂ pretreatment); (d) Cube-O (nanocubes under O₂ pretreatment).