Litchi-peel-like hierarchical hollow copper-ceria microspheres: aerosol-assisted synthesis and high activity and stability for catalytic CO oxidation

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Figure S1 Schematic setup for aerosol spray pyrolysis.

Figure S2 Enlarged SEM image of 20CuCe-H sample.
Figure S3 (a) BF-HAADF TEM image, (b) TEM image and (c) HRTEM image of 20CuCe-H, and (d) selected SAED image of the single microsphere in (a).

Figure S4 EXD elemental mapping of 20CuCe-H sample.
Figure S5 BE-STEM image of 20CuCe-L sample.

Figure S6 HRTEM image of 20CuCe-L sample.

Figure S7 Selected area EDX elementary mapping of 20CuCe-L sample.
Figure S8 TEM images of (a, b) 10CuCe-H, (c, d) 10CuCe-L, (e, f) 30CuCe-H, (g, h) 30CuCe-L.

Figure S9 HRTEM images of (a) 10CuCe-H and (b) 10CuCe-L.
Figure S10 EDX elementary mapping of 10CuCe-H sample.

Figure S11 EDX elementary mapping of 10CuCe-L sample.
Figure S12 Magnifying TEM images of (a) 30CuCe-H and (b) 30CuCe-L.

Figure S13 HRTEM images of (a) 30CuCe-H and (b) 30CuCe-L.

Figure S14 Enlarged XRD profiles of the as-prepared copper-ceria samples.
Figure S15 Cu-LMM spectra of the as-prepared copper-ceria samples.

Figure S16 Area-normalized specific reaction rates of 20CuCe-H and 20CuCe-L.

Figure S17 CO conversion as a function of temperature over 20CuCe-H in continuous three cycles.
Table S1 Catalytic activity of copper-ceria samples in references and our work.

<table>
<thead>
<tr>
<th>Samples</th>
<th>( T_{50} ) (°C)</th>
<th>( T_{100} ) (°C)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>20CuCe-L</td>
<td>83</td>
<td>120</td>
<td>This work</td>
</tr>
<tr>
<td>CuO(20)/CeO(_2)-500</td>
<td>101</td>
<td>151</td>
<td>Ref(^1)</td>
</tr>
<tr>
<td>CuO/Ce(<em>x)Cu(</em>{1-x})O(_2)-δ</td>
<td>95</td>
<td>135</td>
<td>Ref(^2)</td>
</tr>
<tr>
<td>Cu(^{2+}) doped CeO(_2) (P4)</td>
<td>172</td>
<td>223</td>
<td>Ref(^3)</td>
</tr>
<tr>
<td>Cu(<em>{0.1})Ce(</em>{0.9})O(_2)</td>
<td>234</td>
<td>275</td>
<td>Ref(^4)</td>
</tr>
<tr>
<td>Cu(<em>{0.1})Ce(</em>{0.9})O(_2)</td>
<td>149</td>
<td>196</td>
<td>Ref(^5)</td>
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<tr>
<td>Cu(<em>{0.26})Ce(</em>{0.74})O(_2-δ)</td>
<td>144</td>
<td>203</td>
<td>Ref(^6)</td>
</tr>
<tr>
<td>Cu(<em>{0.05})Ce(</em>{0.95})O(_2-δ)</td>
<td>94</td>
<td>200</td>
<td>Ref(^7)</td>
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</tbody>
</table>


