Structural features and catalytic performance in CO preferential oxidation of CuO-CeO$_2$ supported on multi-walled carbon nanotubes

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**Table S1** Structure characteristics for CuO-CeO$_2$ catalysts supported on different materials

<table>
<thead>
<tr>
<th>Catalyst</th>
<th>Cu/Ce$^a$</th>
<th>Cu/Ce$^b$</th>
<th>Cu/Ce$^c$</th>
<th>$d_{\text{CeO}2}$ (nm)</th>
<th>Ce$^{3+}$/Ce$_{\text{total}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>CuO-CeO$_2$(5/5)/AC</td>
<td>1.00</td>
<td>1.03</td>
<td>2.62</td>
<td>3.1</td>
<td>0.29</td>
</tr>
<tr>
<td>CuO-CeO$_2$(5/5)/Al$_2$O$_3$</td>
<td>1.00</td>
<td>0.97</td>
<td>0.91</td>
<td>3.5</td>
<td>0.40</td>
</tr>
<tr>
<td>CuO-CeO$_2$(5/5)/SiO$_2$</td>
<td>1.00</td>
<td>0.95</td>
<td>0.86</td>
<td>4.1</td>
<td>0.24</td>
</tr>
</tbody>
</table>

$^a$ Cu/Ce ratio according to the nominal composition.
$^b$ Cu/Ce ratio determined by ICP-AES.
$^c$ Cu/Ce ratio determined by XPS.
Fig. S1. XRD patterns of CuO-CeO$_2$ catalysts supported on different materials: (a) CuO-CeO$_2$(5/5)/AC, (b) CuO-CeO$_2$(5/5)/Al$_2$O$_3$, (c) CuO-CeO$_2$(5/5)/SiO$_2$. 

- **CeO$_2$**
- **CuO**
- **Al$_2$O$_3$**

**Intensity (a.u.)**

- (a) CuO-CeO$_2$(5/5)/AC
- (b) CuO-CeO$_2$(5/5)/Al$_2$O$_3$
- (c) CuO-CeO$_2$(5/5)/SiO$_2$
Fig. S2. TEM (left) and HRTEM (right) images of CuO-CeO$_2$ catalysts supported on different materials: (a) CuO-CeO$_2$(5/5)/AC, (b) CuO-CeO$_2$(5/5)/Al$_2$O$_3$, (c) CuO-CeO$_2$(5/5)/SiO$_2$. 

**Fig. S3.** Cu 2p core level spectra of CuO-CeO$_2$ catalysts supported on different materials: (a) CuO-CeO$_2$(5/5)/AC, (b) CuO-CeO$_2$(5/5)/SiO$_2$, (c) CuO-CeO$_2$(5/5)/Al$_2$O$_3$. 
Fig. S4. H2-TPR profiles of CuO-CeO2 catalysts supported on different materials:
(a) CuO-CeO2(5/5)/CNT, (b) CuO-CeO2(5/5)/AC, (c) CuO-CeO2(5/5)/SiO2 and (d) CuO-CeO2(5/5)/Al2O3.