Supporting Information

Ce-Mn Coordination Polymer Derived Hierarchical/Porous Structured CeO$_2$-MnO$_x$ for Enhanced Catalytic Properties

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**Fig. S1** HAADF-STEM image of CeO$_2$-MnO$_x$ (5:5) catalyst.

**Fig. S2** SEM images of (a and b) Ce CPs, (c and d) Ce-Mn (7:3) CPs, (e and f) Ce-Mn (5:5) CPs, (g and h) Ce-Mn (3:7) CPs, and (i and j) Mn CPs.
Fig. S3 SEM images of (a and c) CeO$_2$ and (b and d) MnO$_x$.

Fig. S4 SEM image of CeO$_2$-MnO$_x$ (3:7) catalyst.
Fig. S5 XRD patterns of Ce CPs, Mn CPs, and Ce-Mn CPs with different ratios.

Fig. S6 The enlarged XRD patterns of CeO$_2$ (111) diffraction peak for CeO$_2$ and CeO$_2$-MnO$_x$ catalysts with different ratios.
Fig. S7 CO conversion curve (a) and NO conversion curve (b) of CeO$_2$-MnO$_x$ (5:5) prepared from impregnation method$^*$ under the same space velocity (60 000 and 120 000 mL·h$^{-1}$·g$^{-1}$ of catalyst for CO oxidation and SCR of NH$_3$, respectively)

$^*$ The CeO$_2$-MnO$_x$ (5:5) catalyst was prepared by a traditional impregnation method. Typically, 200 mg of commercial CeO$_2$ was impregnated with an aqueous solution containing the desired amount of Mn(NO$_3$)$_2$·4H$_2$O for 2 h. Then, the resulting solid was heated at 100°C to evaporate residual water. Finally, the product was dried in an oven at 110°C for 12 h and calcined at 500°C for 5 h in air.
Fig. S8 The original XPS spectra of (a) Ce 3d; (b) Mn 2p and (c) O 1s of CeO$_2$, MnO$_x$ and CeO$_2$-MnO$_x$ catalysts with different ratios.

Fig. S9 NH$_3$-TPD profiles of CeO$_2$, MnO$_x$ and CeO$_2$-MnO$_x$ catalysts with different ratios.
Table S1. Crystallite size of CeO$_2$, porous structure parameters and molar ratios (by ICP-OES) of the CeO$_2$, MnO$_x$ and CeO$_2$-MnO$_x$ catalysts with different ratios.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Ce:Mn (mol/mol)</th>
<th>Crystallite size$^a$ (nm)</th>
<th>$S_{BET}$ (m$^2$/g)</th>
<th>Pore size (nm)</th>
<th>Pore volume (cm$^3$/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CeO$_2$</td>
<td>1:0</td>
<td>10.0</td>
<td>53.08</td>
<td>8.80</td>
<td>0.15</td>
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<tr>
<td>CeO$_2$-MnO$_x$ (7:3)</td>
<td>7:2.99</td>
<td>4.1</td>
<td>83.46</td>
<td>8.28</td>
<td>0.21</td>
</tr>
<tr>
<td>CeO$_2$-MnO$_x$ (5:5)</td>
<td>5:4.99</td>
<td>3.8</td>
<td>77.76</td>
<td>8.37</td>
<td>0.21</td>
</tr>
<tr>
<td>CeO$_2$-MnO$_x$ (3:7)</td>
<td>3:7.92</td>
<td>5.0</td>
<td>70.81</td>
<td>9.68</td>
<td>0.22</td>
</tr>
<tr>
<td>MnO$_x$</td>
<td>0:1</td>
<td>-</td>
<td>27.47</td>
<td>13.80</td>
<td>0.14</td>
</tr>
</tbody>
</table>

$^a$ Calculated from the characteristic peak of CeO$_2$ (111) crystal face in the XRD patterns.