Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.
This journal is © the Owner Societies 2015

Electronic Supplementary Information

Reinforced photocatalytic reduction of CO₂ to CO by ternary metal oxide NiCo₂O₄

Zhaoyu Wang, Min Jiang, Jiani Qin, Han Zhou, and Zhengxin Ding

State Key Laboratory of Photocatalysis on Energy and Environment, College of Chemistry, Fuzhou University, Fuzhou 350002, People's Republic of China.

E-mail: zxding@fzu.edu.cn
Fig. S1 SEM imagines of NiCo$_2$O$_4$ spheres.

Fig. S2 TGA curve of the NiCo$_2$O$_4$ precursor.
Fig. S3 (a) EDX spectrum and (b) the corresponding EDX-mapping images of the NiCo$_2$O$_4$ material.
**Fig. S4** The photoluminescence (PL) spectra of the photocatalytic CO$_2$ reduction system with and without NiCo$_2$O$_4$ as a cocatalyst.

**Fig. S5** The UV-vis absorption spectroscopy of NiCo$_2$O$_4$ solid.
**Fig. S6** Mott-Schottky plot of the prepared NiCo$_2$O$_4$ material.

**Fig. S7** Energy diagram illustration for the photocatalytic CO$_2$ reduction reaction.
Fig. S8 Reusability test of the NiCo$_2$O$_4$ cocatalyst.

Table S1 Photocatalytic performance of different catalysts.

<table>
<thead>
<tr>
<th>Catalyst</th>
<th>CO (μmol)</th>
<th>H$_2$ (μmol)</th>
<th>$^a$Sel.$_{\text{CO}}$/ %</th>
<th>ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CdS</td>
<td>8</td>
<td>1</td>
<td>88</td>
<td>[1]</td>
</tr>
<tr>
<td>NiCo$_2$O$_4$</td>
<td>21</td>
<td>4</td>
<td>84</td>
<td>This work</td>
</tr>
<tr>
<td>ZnCo$_2$O$_4$</td>
<td>25</td>
<td>9</td>
<td>74</td>
<td>[2]</td>
</tr>
<tr>
<td>MnCo$_2$O$_4$</td>
<td>28</td>
<td>7</td>
<td>80</td>
<td>[3]</td>
</tr>
</tbody>
</table>

