Supporting Information

CdS nanospheres decorated hollow polyhedral ZCO derived from metal-organic framework (MOF) for effective photocatalytic water evolution

Wenxia Chen\textsuperscript{a}, Jiasheng Fang\textsuperscript{a}, Yiwei Zhang\textsuperscript{a*}, Guangliang Chen\textsuperscript{b}, Shuo Zhao\textsuperscript{a}, Chao Zhang\textsuperscript{a}, Ran Xu\textsuperscript{a}, Jiehua Bao\textsuperscript{a}, Yuming Zhou\textsuperscript{a*}, Xin Xiang\textsuperscript{a}

\textsuperscript{a}School of Chemistry and Chemical Engineering, Southeast University, Jiangsu Optoelectronic Functional Materials and Engineering Laboratory, Nanjing 211189, P. R. China.

\textsuperscript{b}Key Laboratory of Advanced Textile Materials and Manufacturing Technology, and Engineering Research Center for Eco-Dyeing & Finishing of Textiles, Ministry of Education, Zhejiang Sci-Tech University, Hangzhou 310018, P. R. China

* Corresponding authors. E-mail: zhangchem@seu.edu.cn; ymzhou@seu.edu.cn. Tel: +86 25 52090617; Fax: +86 25 52090617.
Fig. S1 Thermogravimetric analysis (TGA) curve of as-prepared bimetallic ZnCo-ZIF and ZIF-67 under N$_2$ with a ramp of 10 °C · min$^{-1}$. 
Fig. S2 (a) XRD patterns of ZCO, (b) SEM images of ZCO, (c) SEM images of Co$_3$O$_4$, The SEM images of Co$_3$O$_4$ sample fabricated with different temperature: (d) 350 °C, (e) 450 °C, (f) 550 °C.
Fig. S3 (a) XRD patterns of ZnCo-ZIF, (b) low-magnification and (c) high-magnification FESEM images of ZnCo-ZIF, (d) XRD patterns of ZIF-67, (e) low-magnification and (f) high-magnification FESEM images of ZIF-67.
Fig. S4 EDS spectra of the 30wt% CdS/ZCO sample.
Fig. S5 TEM images of ZCO.
Fig. S6 TEM images of 30 wt% CdS/ZCO and the corresponding TEM elemental mapping of O, Zn, S, Cd and Co.
Fig. S7 (a) TEM image of CdS, (b) XRD patterns of CdS.
Fig. S8 (a) UV-Vis absorption spectra of ZCO and Co$_3$O$_4$, (b) Band gap value of ZCO and Co$_3$O$_4$. 
Fig. S9 The H$_2$ evolution rates of CdS/ZCO loaded with different CdS percentages when the sacrifice agent is methanol.
Fig. S10 The H$_2$ evolution rates of CdS/ZCO and ZCO without amino group when sacrifice agent is lactic acid.
Table S1 The summary of the atomic compositions of the composites calculated with the EDX data.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Atomic concentration (%)</th>
<th>Atomic ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>C</td>
</tr>
<tr>
<td>10 wt% CdS/ZCO</td>
<td>4.6</td>
<td>26.7</td>
</tr>
<tr>
<td>20 wt% CdS/ZCO</td>
<td>10.7</td>
<td>34.2</td>
</tr>
<tr>
<td>30 wt% CdS/ZCO</td>
<td>14.9</td>
<td>37.4</td>
</tr>
<tr>
<td>50 wt% CdS/ZCO</td>
<td>6.6.</td>
<td>36.5</td>
</tr>
</tbody>
</table>