Supporting Information

Hierarchical Heterostructures based on Prickly Ni Nanowires/Cu$_2$O Nanoparticles with Enhanced Photocatalytic Activity

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Fig. S1 The size distribution of Cu$_2$O nanoparticles in HNWs.
Fig. S2 EDX spectrum of as-synthesized Ni-Cu$_2$O HNWs.

Table S1. Cu element and Cu$_2$O content (wt%) in heteronanowires

<table>
<thead>
<tr>
<th>Sample Weight</th>
<th>Cu content</th>
<th>Cu$_2$O content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1: 12.5 mg</td>
<td>10</td>
<td>11.52</td>
</tr>
<tr>
<td>Sample 2: 32.0 mg</td>
<td>10.5</td>
<td>11.81</td>
</tr>
<tr>
<td>Sample 3: 23.1 mg</td>
<td>12.3</td>
<td>13.84</td>
</tr>
</tbody>
</table>

a) Sample tested was prepared with different batches of Ni NWs. b) The Ni-Cu$_2$O HNWs was dissolved in aqua regia, and the content of Cu element was analysed by ICP.
Fig. S3 The size distribution of pure Cu$_2$O NPs.

Mean (pure Cu$_2$O NPs): 74 nm

Fig. S4 EDX spectrum of pure Cu$_2$O NPs.
Fig. S5 Variation in the absorption of the MO solution in the presence of the as-prepared photocatalysts for different irradiation times: (a) Ni-CuO HNWs, (b) CuO NPs, (c) Ni NWs, and (d) blank.

Fig. S6 The adsorption curves of MO in the presence of the as-prepared photocatalysts under dark for different times: (a) Ni-CuO HNWs and (b) CuO NPs.
Fig. S7 The (a) low and (b) high magnification SEM image of Ni-Cu$_2$O HNWs after photocatalytic test.

Fig. S8 XRD patterns of the Ni-Cu$_2$O HNWs before and after photocatalytic test.
Fig. S9 (a) Plots of $-\ln(A_t/A_0)$ versus time for rate constant calculation of OG and RhB photodegraded by Ni-Cu$_2$O HNWs. Time-dependent UV-Vis spectra of (b) OG, and (c) RhB solution photodegraded by Ni-Cu$_2$O HNWs.
Fig. S10 N$_2$ adsorption–desorption BET isotherms of Ni-Cu$_2$O HNWs.