Supporting Information

**TiO$_2$/NiO Hybrid Shells: p-n Junction Photocatalysts with Enhanced Activity under Visible Light**

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Figure S1. TEM images of (a) SiO$_2$ particles, (b) SiO$_2$/TiO$_2$ core/shell hybrids, (c) SiO$_2$/TiO$_2$/NiO hybrids, and (d) TiO$_2$/NiO hollow hybrids.
Figure S2. TEM image of TiO$_2$/NiO hollow hybrids. Synthetic conditions: 0.1 mL TBOT, 0.015 mol L$^{-1}$ NiCl$_2$·6H$_2$O.
Figure S3. XPS spectrum of N2.
Figure S4. (a) Evolution of RhB concentration and (b) apparent reaction rate constant versus reaction time under visible light irradiation using TiO$_2$/NiO hollow hybrids as photocatalysts with different shell thickness.
Figure S5. The reusability of TiO$_2$/NiO hollow hybrids as photocatalysts in the degradation of RhB under visible light irradiation.
**Figure S6.** PL spectral changes with different irradiation times on sample N3 in a $5 \times 10^{-4}$ mol L$^{-1}$ basic solution of terephthalic acid.

**Table S1** TOC result for the degradation of RhB using TiO$_2$/NiO hollow hybrids as catalyst under visible light irradiation.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>0</th>
<th>20</th>
<th>60</th>
<th>100</th>
<th>120</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOC (ppm)</td>
<td>10.34</td>
<td>7.382</td>
<td>6.592</td>
<td>3.463</td>
<td>2.311</td>
<td>1.992</td>
</tr>
</tbody>
</table>

**Figure S7** Evolution of RhB concentration and TOC versus reaction time under visible light irradiation.