A novel efficient g-C$_3$N$_4$@BiOI p-n heterojunction photocatalyst constructed through the assembly of g-C$_3$N$_4$ nanoparticles

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Supporting Information
Fig. S1 High resolution XPS spectra of (a) C 1s and (b) N 1s in CNNP; (c) Bi 4f, (d) I 3d and (e) O 1s in FB.

Fig. S2 High magnification SEM images of CNNP
**Fig. S3** (a) SEM image of 1CNNP@FB and corresponding EDS elemental mapping images of (b) C, (c) N, (d) Bi, (e) O and (f) I

**Fig. S4** Zeta potential of (a) CNNP and (b) FB dispersed in aqueous solution at room temperature
**Fig. S5** Zeta potential of CNNP@FB composites dispersed in aqueous solution at room temperature

**Fig. S6** (a) TEM image of FB and (b) HRTEM image of CNNP

**Fig. S7** Time-resolved fluorescence decay spectra of FB and 1CNNP@FB
Table S1 The radiative fluorescence lifetimes and their relative percentages of photo-generated charge carriers in the FB and 1CNNP@FB

<table>
<thead>
<tr>
<th>Sample</th>
<th>$\tau_1$ [ns] Rel%</th>
<th>$\tau_2$ [ns] Rel%</th>
<th>$\tau_3$ [ns] Rel%</th>
<th>Average [ns]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB</td>
<td>0.8-19.6</td>
<td>3.11-37.8</td>
<td>23.34-42.6</td>
<td>11.26</td>
</tr>
<tr>
<td>1CNNP@FB</td>
<td>1.12-32.6</td>
<td>4.94-41.0</td>
<td>28.99-26.4</td>
<td>12.58</td>
</tr>
</tbody>
</table>

Fig. S8 Cycling runs for the photocatalytic degradation of MO over 1CNNP@FB

Fig. S9 XRD patterns of the 1CNNP@FB after 4 cycles

Fig. S10 (a) SEM image and (b) high magnification SEM image of the 1CNNP@FB after 4 cycles
Fig. S11 Mott–Schottky plots of (a) CNNP and (b) FB