Supporting Information

Improved Interfacial Charge Transfer and Visible Light Activity of Reduced Graphene Oxide-Graphitic Carbon Nitride Photocatalysts

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From Fig. S1, the graphene exhibited one sharp G band, while GO displayed two distinct peaks at 1347 and 1590 cm\(^{-1}\), which were attributed to the D and G bands, respectively. As for the gCN and rGO(0.1)-gCN samples, no prominent peaks were observed due to the strong fluorescence background from the gCN.
Fig. S2 The ratio of converted phenol (C/C₀) and the evolution of CO₂ gas during degradation of phenol under visible light irradiation over the rGO(0.1)-gCN photocatalyst.

Table S1 The ratio between the experimentally detected CO₂ and the one calculated from converted phenol

<table>
<thead>
<tr>
<th>Time (h)</th>
<th>Detected CO₂ (µmol)ᵃ</th>
<th>Calculated CO₂ (µmol)ᵇ</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>13.29</td>
<td>28.75</td>
<td>0.46</td>
</tr>
<tr>
<td>15</td>
<td>28.28</td>
<td>49.41</td>
<td>0.57</td>
</tr>
<tr>
<td>24</td>
<td>54.73</td>
<td>66.08</td>
<td>0.83</td>
</tr>
<tr>
<td>72</td>
<td>157.87</td>
<td>159.39</td>
<td>0.99</td>
</tr>
</tbody>
</table>

ᵃThe CO₂ was obtained from experimental results. ᵇThe CO₂ was calculated by assumption that total degradation of phenol occurred. If total degradation of phenol occurs, 1 mol of phenol will produce 6 mol of CO₂.

Fig. S2 shows that CO₂ was produced continuously under visible light irradiation in the presence of rGO(0.1)-gCN as the photocatalyst. Table S1 shows the calculated ratio between the experimentally evolved CO₂ and expected one from the converted phenol. When most of phenol was degraded, the ratio was very close to one. This result strongly indicated that the total degradation of phenol to CO₂ and H₂O occurred on the rGO(0.1)-gCN photocatalyst.
**Fig. S3** Reusability of the rGO(0.1)-gCN for degradation of phenol under 3 h visible light irradiation.

**Fig. S4** XRD patterns of the rGO(0.1)-gCN (a) before, and (b) after three successive cycles of photocatalytic reaction.
Fig. S5 DR UV-Vis spectrum of the rGO(0.1)-gCN (line) and the degradation of phenol (closed circle) under different light wavelengths using cut-off filters at 320, 380, 400 and 420 nm.

**Calculation of quantum efficiency**

Quantum efficiency was calculated from the percentage ratio between the number of converted phenol and number of absorbed photon as shown in Eq. (1).

\[
\text{Quantum efficiency} = \frac{N_{\text{converted}}}{N_{\text{photon}}} \times 100\%
\]

\[(1)\]

The number of converted phenol was calculated from Eq. (2), while the number of adsorbed photon was determined from Eq. (3) and (4).

\[
N_{\text{converted}} = \frac{\text{No. of mol of converted phenol}}{\text{time}} \text{ (mol s}^{-1})
\]

\[(2)\]

\[
N_{\text{photon}} = \frac{I \times A}{U_\lambda} \text{ (mol s}^{-1})
\]

\[(3)\]

where \(I\) is the light intensity absorbed by the photocatalyst (97.6 µW cm\(^{-2}\)), \(A\) is the area of the reactor with the photocatalyst exposed to the light (16.7 cm\(^{2}\)), \(U_\lambda\) is the mole photon energy of the representative wavelength.
\[ U_\lambda = \frac{hc \times N_A}{\lambda} \ (J \ mol^{-1}) \]

(4),

where \( h \) is the Plank constant, \( c \) is the speed of light in vacuum, \( N_A \) is the Avogadro number, \( \lambda \) is the representative wavelength of the light source used (365 nm).