Electronic Supplementary Information

Inlay of Bi$_2$O$_2$CO$_3$ nanoparticles onto Bi$_2$WO$_6$ nanosheets to build heterostructured photocatalysts

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Fig. S1 SEM images of g-C$_3$N$_4$ (A) and Bi$_2$O$_2$CO$_3$ (B).

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Fig. S2 SEM images of the ZnO samples obtained with g-C₃N₄ as a source of NH₄⁺ via hydrothermal process.

Fig. S3 XRD patterns of the Bi₂O₂CO₃/Bi₂WO₆ nanocomposites prepared using g-C₃N₄ or Na₂CO₃ as a source of CO₃²⁻.

Fig. S4 XRD patterns of the samples prepared with different volume of NaOH, (a) 5.0 mL, (b) 6.0 mL, (c) 7.0 mL, and (d) 8.0 mL.
Fig. S5 SEM images of the samples prepared with different volume of NaOH, (A) 5.0 mL, (B) 6.0 mL, (C) 7.0 mL, (D) 8.0 mL, (E) 6.4 mL, (F) 6.5 mL, (G) 6.6 mL, (H) 6.7 mL, and (I) 6.8 mL.

Fig. S6 XRD patterns of the Bi$_2$O$_2$CO$_3$/Bi$_2$WO$_6$ composites prepared using different amounts of g-C$_3$N$_4$. 

Fig. S7 SEM images of the Bi$_2$O$_2$CO$_3$/Bi$_2$WO$_6$ composites prepared using different amounts of g-C$_3$N$_4$.

Fig. S8 (A) Plots of degradation rate of RhB over Bi$_2$O$_2$CO$_3$, Bi$_2$WO$_6$ and Bi$_2$O$_2$CO$_3$/Bi$_2$WO$_6$ under visible light irradiation ($k$ is the apparent rate constant, h$^{-1}$). (B) Absorption spectra change of the RhB solution during the photocatalytic reaction.
Fig. S9 Plots of degradation of RhB over Bi$_2$O$_2$CO$_3$/Bi$_2$WO$_6$ obtained using Na$_2$CO$_3$ or g-C$_3$N$_4$ as the source of CO$_3^{2-}$ under visible light irradiation. In the direct hydrothermal process, the molar ratio of the starting materials is 1:0.5:0.04 (Bi(NO$_3$)$_3$:5H$_2$O: Na$_2$WO$_4$:2H$_2$O: Na$_2$CO$_3$).

Fig. S10 SEM images of the Bi$_2$O$_2$CO$_3$/Bi$_2$WO$_6$ composites attained after reaction for (A) 8 h, (B) 12 h, (C) 16 h, and (D) 20 h.
Fig. S11 Comparison of photocatalytic activity of the Bi₂O₂CO₃/Bi₂WO₆ composites attained after reaction for (A) 8 h, (B) 12 h, (C) 16 h, and (D) 20 h towards the degradation of RhB under visible light irradiation.

Fig. S12 Schematic diagram for the energy band structure of the Bi₂O₂CO₃/Bi₂WO₆ and the possible charge transfer process under visible light irradiation.
Fig. S13 Plots of Photogenerated carries trapping in the system of photocatalytic degradation of RhB over Bi$_2$O$_2$CO$_3$/Bi$_2$WO$_6$ under visible light irradiation.