Supporting Information

A unique Z-scheme 2D/2D nanosheet heterojunction design to harness charge transfer for photocatalysis

Huijie Cheng,a Jungang Hou,ab* Osamu Takeda,b Xing-Min Guo,a Hongmin Zhuab

aSchool of Metallurgical and Ecological Engineering, University of Science and Technology
Beijing, Beijing 100083, China

bTohoku University, 6-6-02 Aramaki-Aza-Aoba, Aoba-ku, Sendai, 980-8579 Japan

Corresponding author: jhou@ustb.edu.cn
Figure S1. The pore size distribution of mesoporous structure of hybrids.

Figure S2. FT-IR spectra of as-prepared (i) 5wt%CN/BTO, (ii) 10wt%CN/BTO, (iii) 15wt%CN/BTO, (iv) 20wt%CN/BTO nanosheet heterojunctions.
Figure S3. Raman spectra of different samples. (i) Bismuth titanate, (ii) 15wt% carbon nitride/bismuth titanate and (iii) carbon nitride.

Figure S4. Raman spectra of as-prepared (i) 5wt%CN/BTO, (ii) 10wt%CN/BTO, (iii) 15wt%CN/BTO, (iv) 20wt%CN/BTO nanosheet heterojunctions.
Figure S5. Recycled photodegradation performance of RhB and 4-CP solutions for as-prepared 15wt%CN/BTO heterojunctions.

Figure S6. XRD patterns of the 15wt%CN/BTO heterojunctions before and after the photocatalysis.
Figure S7. Absorption activities of RhB solution for as-prepared various hybrids. (i) BTO; (ii) 5wt%CN/BTO; (iii) 10wt%CN/BTO; (iv) 15wt%CN/BTO; and (v) 20wt%CN/BTO heterojunctions in dark.

Figure S8. Absorption activities of 4-CP solution for as-prepared various hybrids. (i) BTO; (ii) 5wt%CN/BTO; (iii) 10wt%CN/BTO; (iv) 15wt%CN/BTO; and (v) 20wt%CN/BTO heterojunctions in dark.
Figure S9. Photocatalytic activities of RhB solution for as-prepared various samples. (i) blank experiment in the absence of catalyst, (ii) bulk BTO; (iii) O-vacancy confined in BTO nanosheets; (iv) C$_3$N$_4$ nanosheets; (v) simple mixture of C$_3$N$_4$ and O-vacancy confined in BTO nanosheet and (vi) 15wt% CN/O-vacancy confined in BTO nanosheet heterojunctions.
Figure S10. Electron spin resonance (ESR) signals of the DMPO-•OH with irradiation for 20 s in methoal dispersion.