Supporting Information

Interface Engineering of a 2D/2D $BiVO_4/Bi_4V_2O_{10}$ Heterostructure with Improved Photocatalytic Photo-redox Activity

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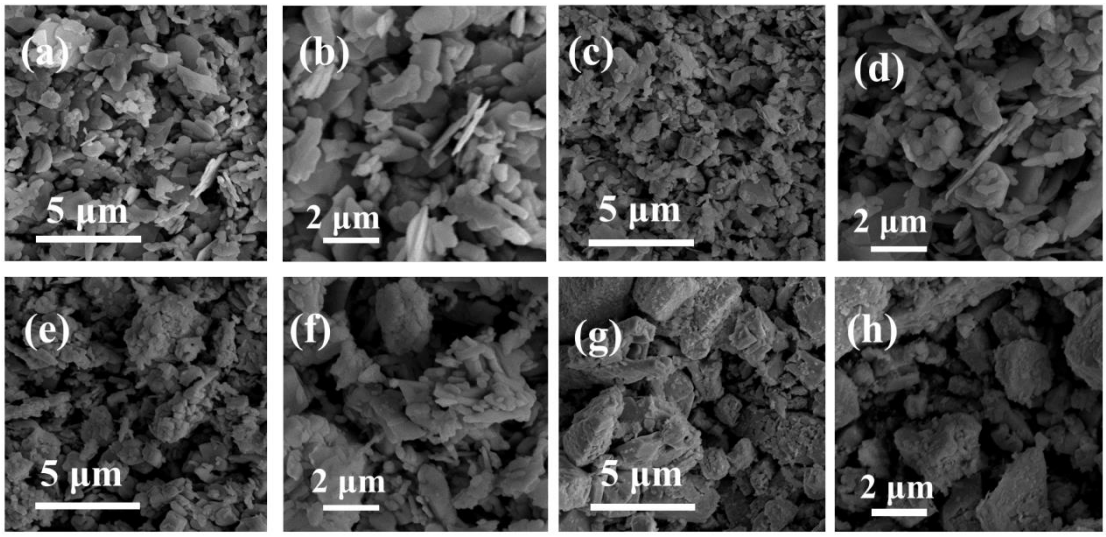

Figure S1. SEM images of (a, b) BVO−5, (c, d) BVO−7, (e, f) BVO−9, and (g, h) BVO_4.

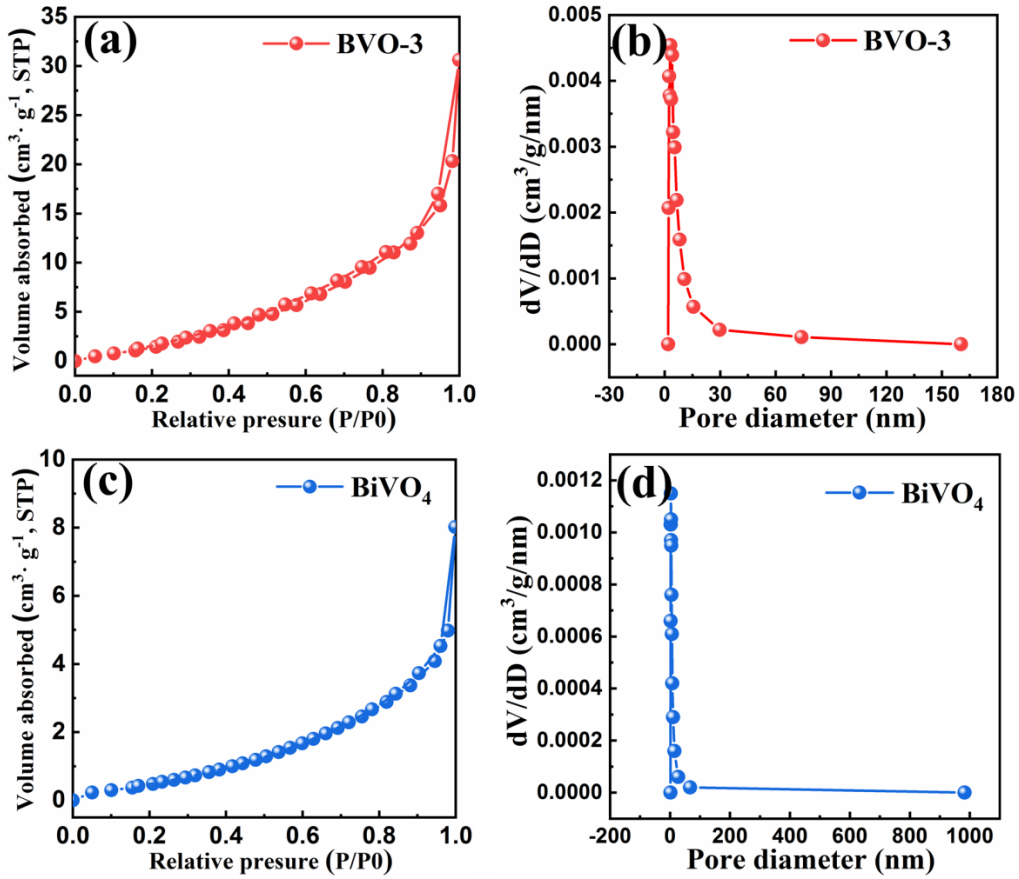

Figure S2. N_2 adsorption-desorption isotherms (a, c) and pore size distribution curves (b, d) of $BiVO_4$ and the BVO-3 heterostructure.

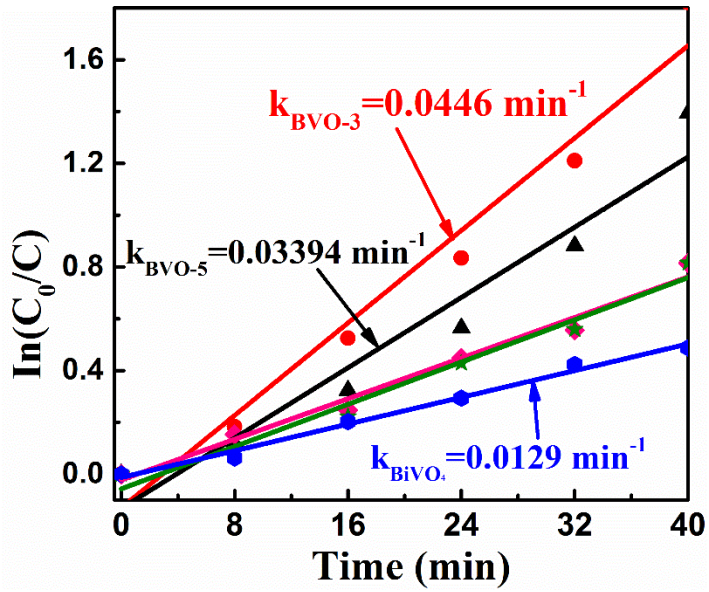

Figure S3. Photoreductive reaction kinetics curves of as-prepared samples under different reaction pH values.

Table S1. List of the photocatalytic performance of $BiVO_4$-based photocatalysts for pollutant degradation

Photocatalysts	Light source	Concentration of photocatalyst (g/L)	Concentration of pollutant (ppm)	Reaction time (min)	Cr(VI) degradation (%)
$BiVO_4$/MXene	300 W Xe lamp λ>400 nm	0.5	10	120	83.6 [1]
Bi_2S_3/$BiVO_4$	300 W Xe lamp UV-vis	1	50	150	100 [2]
Fe_3O_4/$BiVO_4$/CuS	300 W Xe lamp	1	10	90	99 [3]

	λ>420 nm				
$Ag_2CO_3/BiVO_4$	500 W Xe lamp λ>420 nm	0.4	15	150	70[4]
$BiVO_4$/RGO	500 W Xe lamp	1	10	150	90.3[5]

Reference:

(1) Liu, P.; Yi, J.; Bao, R.; Zhao, H., Theory-Oriented Synthesis of 2D/2D $BiVO_4$/MXene Heterojunction for Simultaneous Removal of Hexavalent Chromium and Methylene Blue. *ChemCatChem* **2021,** *13* (13), 3046-3053.

(2) Hu, J.; Zhang, F.; Yang, Y.; Han, Q.; Li, Z.; Shen, Q.; Zhang, Y.; Zhou, Y.; Zou, Z., In Situ Preparation of Bi_2S_3 Nanoribbon-Anchored $BiVO_4$ Nanoscroll Heterostructures for the Catalysis of Cr(VI) Photoreduction. *Catal. Sci. Technol.* **2020,** *10* (12), 3843-3847.

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(5) Zhang, L.; Wang, A.; Zhu, N.; Sun, B.; Liang, Y.; Wu, W., Synthesis of Butterfly-Like $BiVO_4$/RGO Nanocomposites and Their Photocatalytic Activities. *Chin. J. Chem. Eng.* **2018,** *26* (3), 667-674.

Table S2. List of the photocatalytic performance of $BiVO_4$-based photocatalysts for oxygen evolution

Sample	Light source	Sacrificial agent	Concentration of photocatalyst (g/L)	O_2 evolution (μmol/g/h)
Ti doped $BiVO_4$ nanosheets	300 W Xe lamp λ>420 nm	0.05 M $AgNO_3$	0.5	102.8[1]
$BiVO_4$ with different {010} and {110} facets ratio	300 W Xe lamp λ>420 nm	0.02 M $AgNO_3$	0.33	25[2]
g-C_3N_4@Ag/$BiVO_4$ (040)	350 W Xe lamp λ>420 nm	0.2 M $NaIO_3$	1	163.1[3]
FeO_x/{110}$BiVO_4$	LED light λ≥460 nm	0.01 M $NaIO_3$	5	62.0[4]

Reference:

(1) Peng, B.; Shi, Y.; Zhang, X.; Lv, P., Top-Down Fabrication of Ti Doped $BiVO_4$ Nanosheets for Efficient Water Oxidation under Visible Light. *Catal. Sci. Technol.* **2021**, 11 (24), 7898-7904.

(2) Shan, L.; Lu, C.; Dong, L.; Suriyaprakash, J., Efficient Facet Regulation of $BiVO_4$ and its Photocatalytic Motivation. *J. Alloys Compd.* **2019,** *804*, 385-391.

(3) Ou, M.; Wan, S.; Zhong, Q.; Zhang, S.; Song, Y.; Guo, L.; Cai, W.; Xu, Y., Hierarchical Z-Scheme Photocatalyst of g-C_3N_4@Ag/$BiVO_4$ (040) with Enhanced Visible-Light-Induced Photocatalytic Oxidation Performance. *Appl. Catal., B* **2018,** *221*, 97-107.

(4) Zheng, M.; Cao, X.; Ding, Y.; Tian, T.; Lin, J., Boosting Photocatalytic Water Oxidation Achieved by $BiVO_4$ Coupled with Iiron-Containing Polyoxometalate: Analysis the True Catalyst. *J. Catal.* **2018,** *363*, 109-116.