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Supporting information

Synergetic effects by Co²⁺ and PO₄³⁻ on Mo-doped BiVO₄ for an improved photoanodic H₂O₂ evolution

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Figure S1. The SEM of (a) BVO, (b) CMB and (c) PMB.



Figure S2. SEM cross section images of (a) BVO, (b) MB, (c) CMB and (d) PMB.



Figure S3. The XRD images of BVO, MB, CMB, PMB and CPMB.



Figure S4. The high-resolution XPS spectra of (a) survey, (b) V 2p, (c) O 1s, (d) Mo 3d for the MB, CMB, PMB and CPMB.



Figure S5. Photocurrent densities of the photoanodes with CO₂ gas bubbling in cooling bath (below 5 °C) in phosphate buffer solution under AM 1.5G illumination.



Figure S6. (a) Absorbance curve of standard concentration, (b) the standard curve.



Figure S7. UV-Vis DRS spectra of photoanodes.



Figure S8. The Kubelka-Munk plots of (a) each photoanode material (b) BVO, (c) MB, (d) CMB (e) PMB and (f) CPMB, respectively.



Figure S9. The corresponding Mott-Schottky plots to measure the flat-band potentials of (a) each photoanode material (b) BVO, (c) MB, (d) CMB (e) PMB and (f) CPMB, respectively.



Figure S10. The band structure of photoanodes.



Figure S11. The time-resolved photoluminescence spectra of the BVO, MB, CMB, PMB and CPMB photoanodes.



Figure S12. The Nyquist plots of EIS measurements of (a) each photoanode material to light, (b) BVO, (c) MB, (d) CMB, (e) PMB and (f) CPMB under AM 1.5G illumination (solid curves) and off (point curves), respectively.



Figure S13. (a) CA curve of photoanodes for H₂O₂ER with the applied voltage of 1.7 V *vs.* RHE. (b) The H₂O₂ER of the photoanodes.