Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Supporting Information

Influence of Mo doping on interfacial charge carrier dynamics in photoelectrochemical water oxidation on $BiVO_4$

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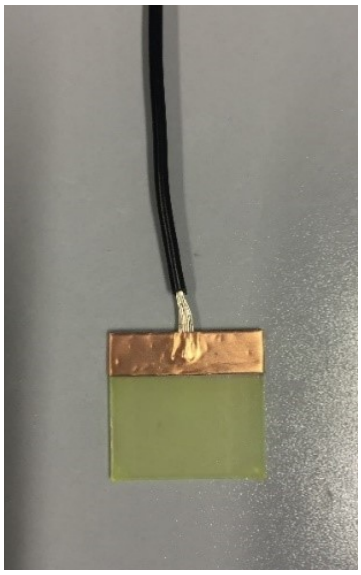

Figure S1 Contacting of BVO photoelectrode.

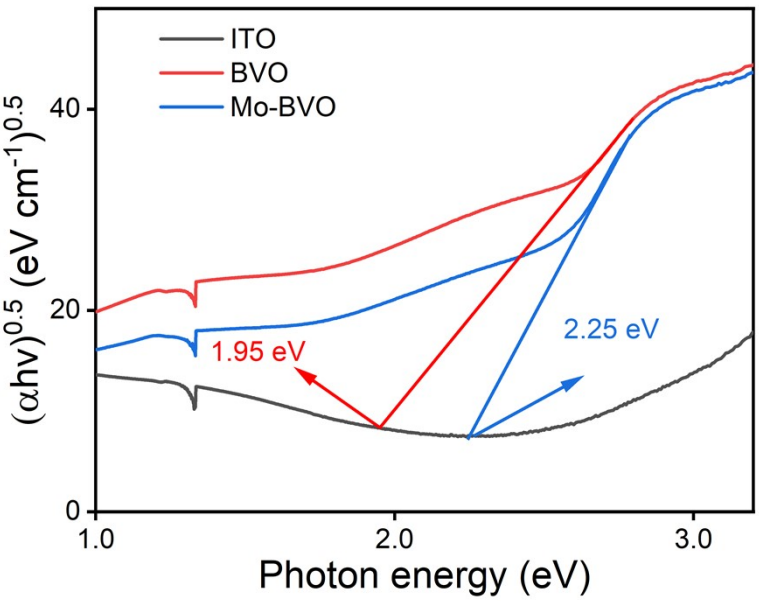

Figure S2 Tauc plots of as-prepared $BiVO_4$ film samples, assuming indirect optical absorption.

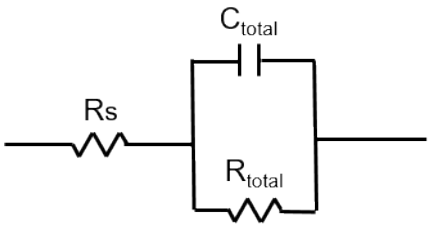

Figure S3 Randles model for fitting electrochemical impedance spectra of as-prepared samples.

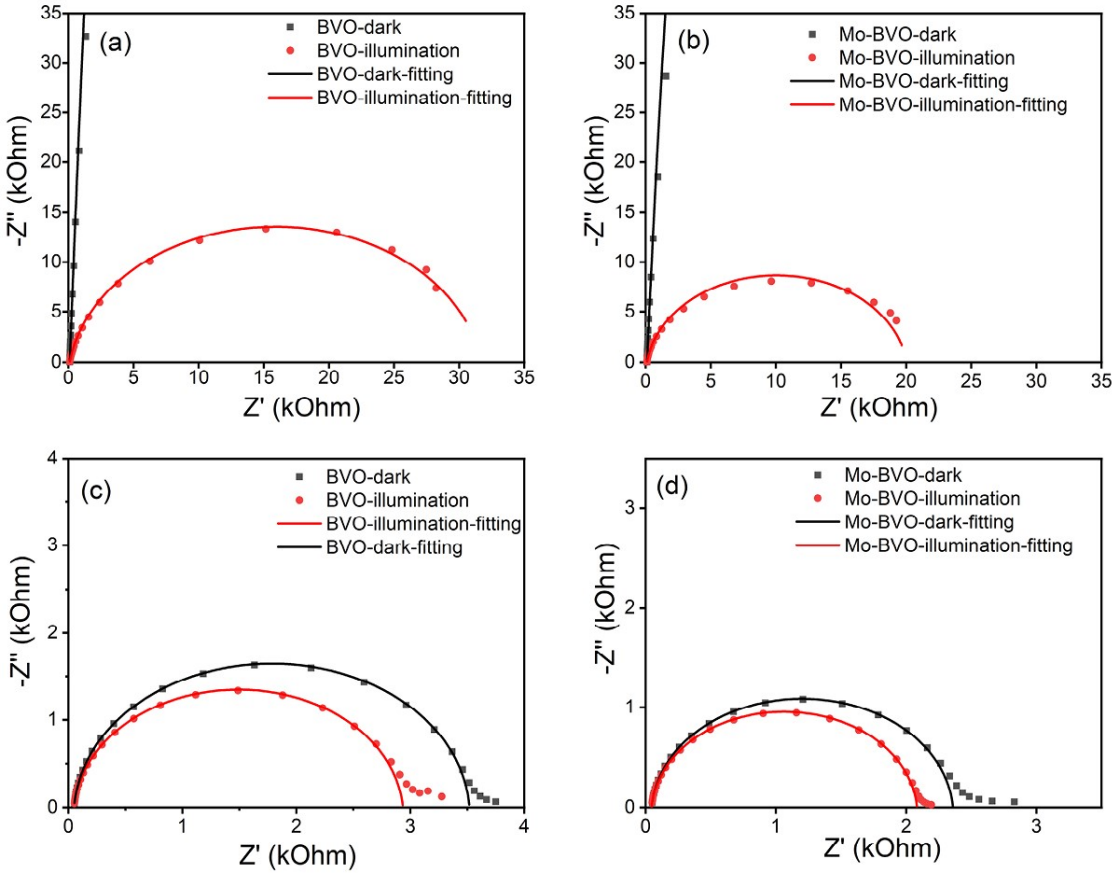

Figure S4 EIS fitting results of as-prepared samples, measured at 1.2 V vs. RHE in 0.1 M phosphate buffer solution ((a) and (b)) and 0.5 M Na_2SO_3 solution ((c) and (d)).

Table S1 Element parameters of Randles equivalent circuit, obtained from EIS data fitting, measured in 0.1 M phosphate buffer solution

Sample	Condition	Rs (Ω)	CPE		$R_{total}=R_{bulk}+R_{ct}$	Error(%)
			C_{total} (μF)	α	(MΩ)	
BVO	Dark	101	3.03	0.982	12.6	1.3
	Illumination	92.9	2.85	0.904	31.6×10^{-3}	6.9
Mo-BVO	Dark	99.7	3.40	0.979	5.51	2.7
	Illumination	91.9	3.06	0.911	19.9×10^{-3}	14.1

Table S2 Element parameters of Randlse equivalent circuit, obtained from EIS data fitting, measured in 0.5 M Na_2SO_3 solution

Sample	Condition	Rs (Ω)	CPE		$R_{total}=R_{bulk}+R_{ct}$ (KΩ)	Error(%)
			C_{total} (μF)	α		
BVO	Dark	49.6	3.17	0.967	3.47	1.0
	Illumination	47.2	2.30	0.956	2.89	2.0
Mo-BVO	Dark	45.4	3.14	0.960	2.31	1.2
	Illumination	44.7	3.21	0.958	2.06	2.0

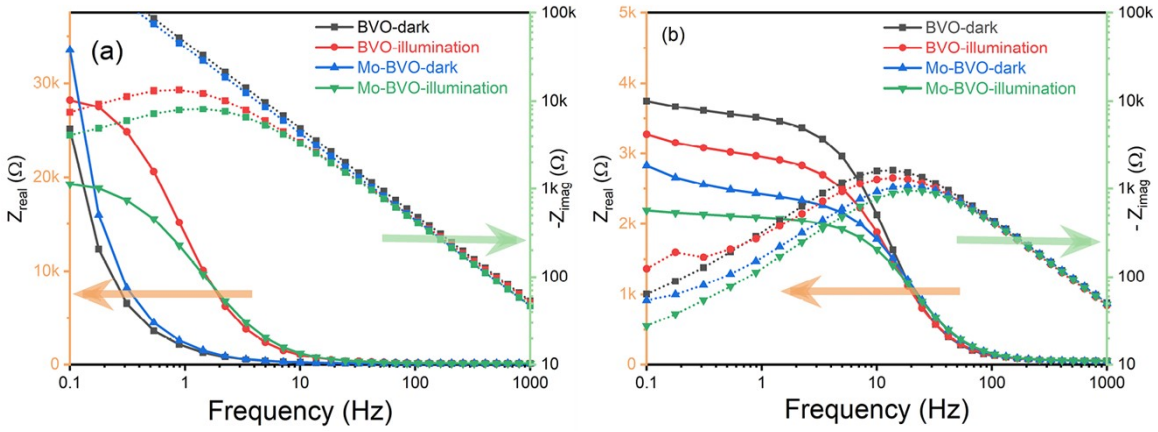

Figure S5 Resistance vs. frequency plots of as-prepared BVO samples, measured at 1.2 V vs. RHE in 0.1 M phosphate buffer solution (a) and 0.5 M Na_2SO_3 solution (b). The real resistance at 1 kHz is independent of frequency and the slope of imaginary resistance at 1 kHz is close to 1, which indicates 1 kHz of frequency is suitable for Mott-Schottky measurement.

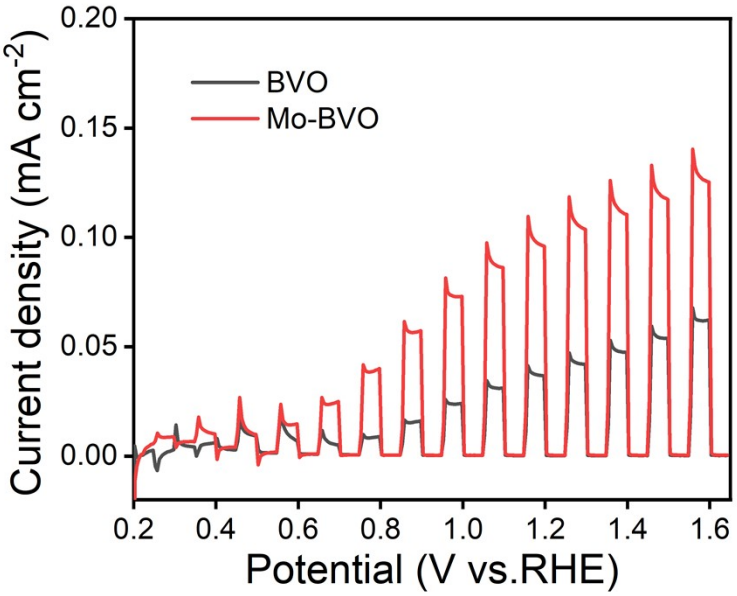

Figure S6 Chopped light voltammetry (CLV) curves of BVO and Mo-BVO samples, measured in 0.1 M phosphate buffer solution. The scan rate is 50 mV s^{-1}.

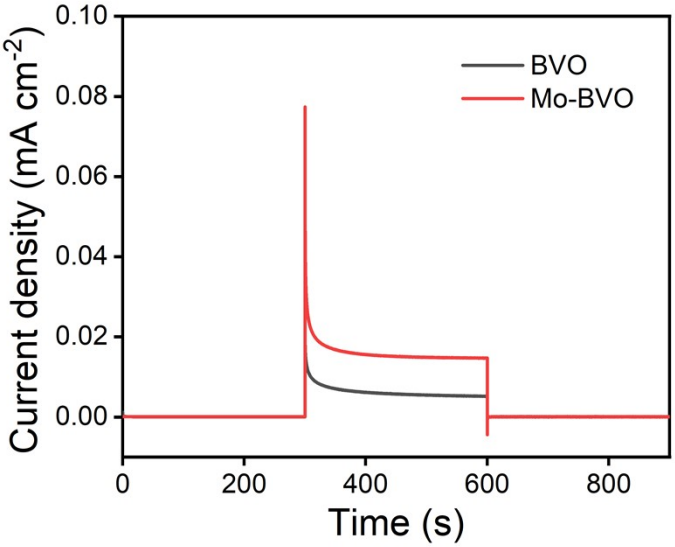

Figure S7 Chopped photocurrent curves of BVO and Mo-BVO samples, measured at 1.2 V_{RHE} in 0.1 M phosphate buffer solution.