Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Preparation of $BiVO_4$ nanoporous photoanode based on peroxovanadate reduction and conversion for efficient photoelectrochemical performance

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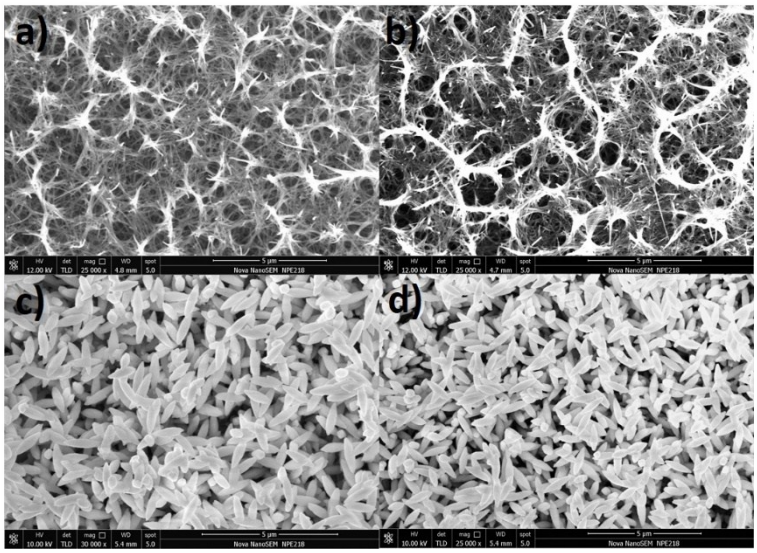

Fig. S1 SEM images of V_2O_5•xH_2O films deposited for 2h (a) and 4h (b), and the corresponding converted $BiVO_4$ films prepared from V_2O_5•xH_2O film after annealing treatment: (c) 2h-$BiVO_4$, (d) 4h-$BiVO_4$.

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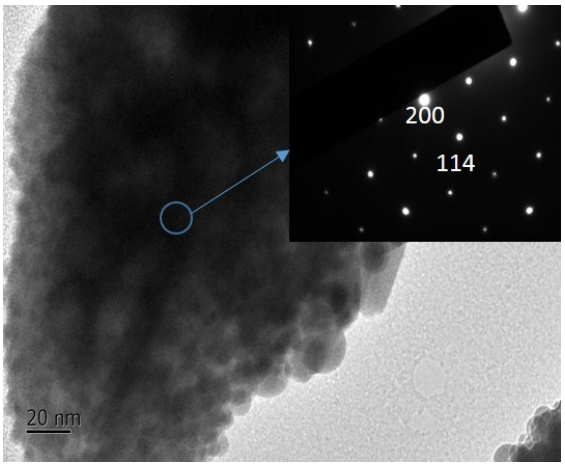

Fig. S2 TEM image of the shuttle like $BiVO_4$ rod and the SAED pattern.

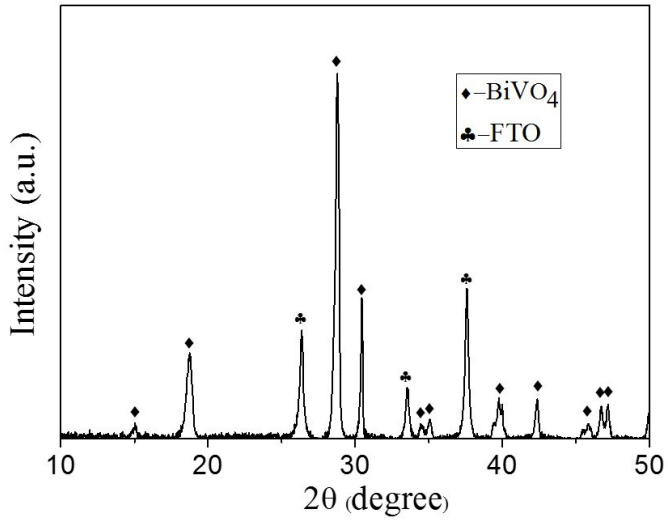

Fig.S3 XRD pattern of $BiVO_4$ film prepared from V_2O_5 film deposited for 2 h.

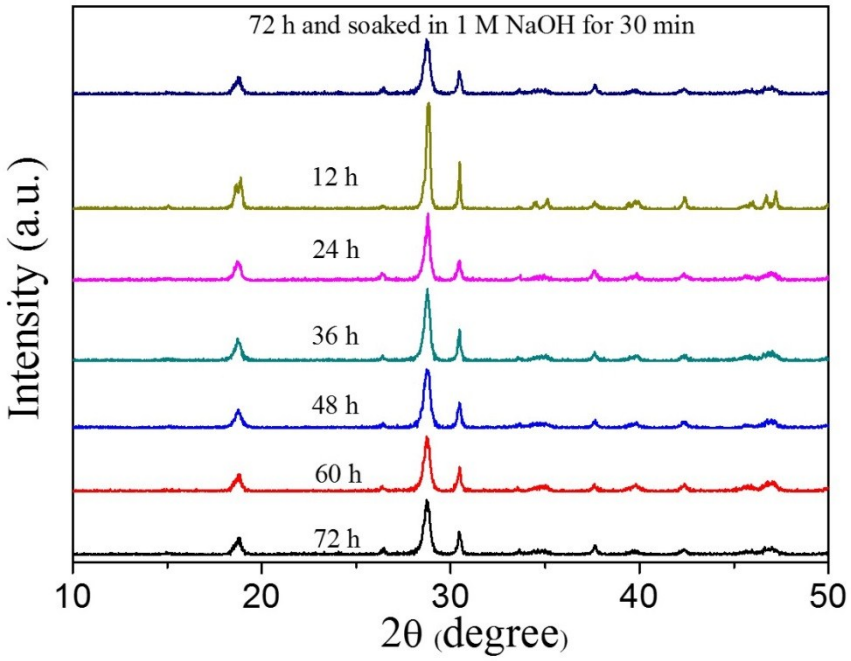

Fig. S4 XRD patterns of samples formed by the annealed V_2O_5 •xH_2O film with varied impregnation time by Bi^{3+}.

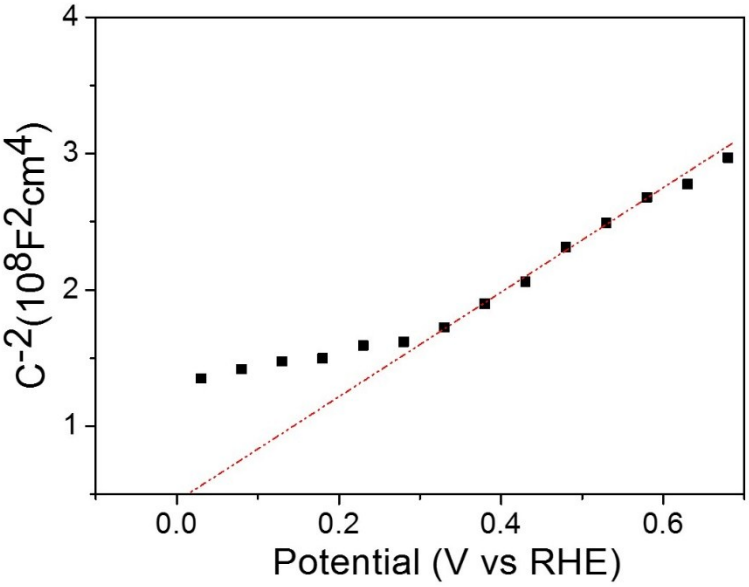

Fig. S5 Mott–Schottky plot for $BiVO_4$ photoanode prepared in this work.

Table S1 Comparison of PEC properties with $BiVO_4$ photoanodes reported in the literatures

Bare $BiVO_4$	Electrolyte	Photocurrent densiy($mAcm^{-2}$)@1.23V *vs* RHE	IPCE@400nm and 1.23V *vs* RHE	Reference
	Na_2SO_4(pH 6.6)	~1.5	~20%	[1]
	natural seawater	<0.5	~10%	[2]
	$NaHCO_3$(pH 8.5)	0.5-1.0	<20%	[3]
	Na_2SO_4(pH 7)	~0.4	<20%(Mo doped)	[4]
	Na_2SO_4(pH 7)	<1(@1.41 V)	-	[5]
	Na_2SO_4(pH 7)	<1	-	[6]
	KH_2PO_4 (pH 7)	<0.5	<10%	[7]
	Na_2SO_4 and PBS (pH 6.6)	0.5-1.0	20-25%(@1.59 V)	[8]
	Na_2SO_4(pH 6.8)	0.2(@1.0 V)	<10%	[9]
	PBS (pH=7)	<0.5	<20%	[10]
	PBS (pH=7)	0.5-1.0	<20%	[11]
	PBS (pH=7)	<1	-	[12]
	PBS (pH=7)	~1.5	-	[13]
	PBS (pH=7)	1.10	22.4%	This paper

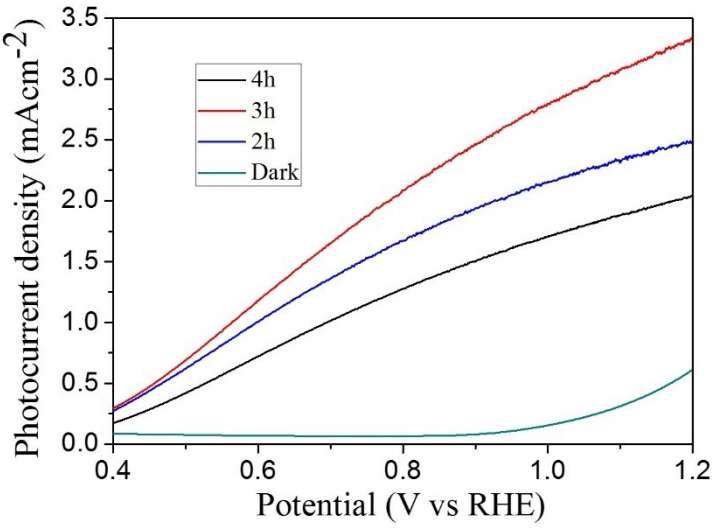

Fig. S6 I-V curves of $BiVO_4$ electrodes measured in a 0.1 M phosphate buffer (pH 7) containing 0.1 M Na_2SO_3 as hole scavenger under AM 1.5G, 100 mW/cm^2 illumination (scan rate, 10 mV/s).

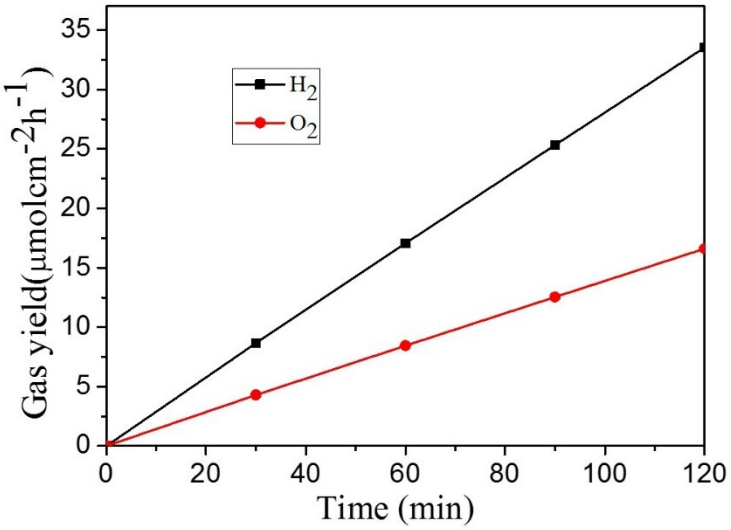

Fig. S7 Gas yield during water oxidation under AM 1.5G illumination at 1.23 V vs RHE.

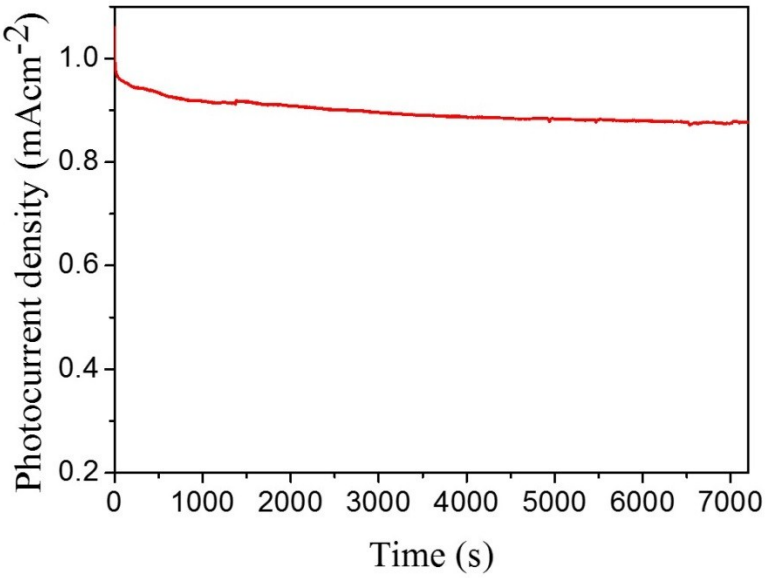

Fig. S8 I-t curves of $BiVO_4$ photoanode at 1.23 V vs RHE under AM 1.5G illumination.

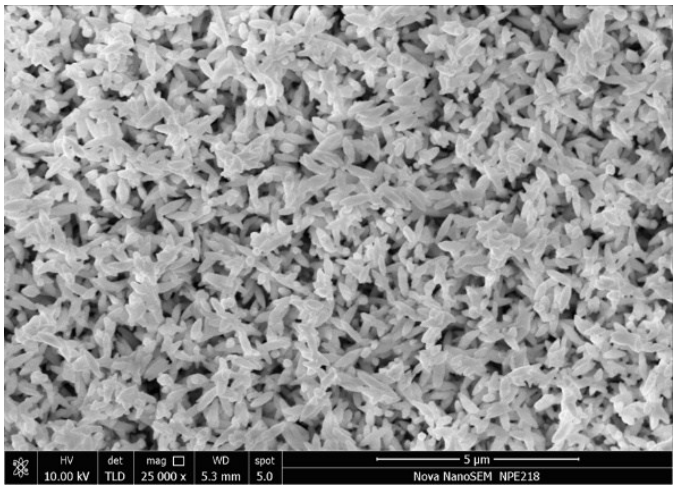

Fig. S9 SEM image of $BiVO_4$ film after 2 h stability test.

Supplementary references

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