Photoelectrochemical Cell for Unassisted Overall Solar Water Splitting

Using BiVO₄ Photoanode and Si Nanoarray Photocathode

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Figure S1 XRD patterns of Mo-doped $BiVO_4$ films on FTO substrates. (*) monoclinic $BiVO_4$.



Figure S2 (a) Pictures of the two-electrode $BiVO_4/Si$ nanoarray tandem cell. The working electrode lead of the potentiostat is connected to the $BiVO_4$ photoanode and the reference and counter electrode leads are connected to the Si nanoarray photocathode. (b)(c) Illuminated under AM 1.5G sunlight (100 mW cm⁻²).



Figure S3 J-V curves for the (a) the $BiVO_4$ photoanode and (b) Si nanoarrays photocathode before and after the stability testing in aqueous 0.1 M potassium phosphate solution buffered to pH 5.5.



Figure S4 (a) I-T curve (0 V_{RHE}) and (b) J-V curves of a bare planar p-Si electrode in an aqueous 0.1 M potassium phosphate solution buffered to pH 5.5, using graphite electrodes as a counter electrode.



Figure S5 (a) I-T curve (OV versus RHE) and (b) J-V curves of a bare p-Si nanoarrays electrode in an aqueous 0.1 M potassium phosphate solution buffered to pH 5.5, using graphite electrodes as a counter electrode.



Figure S6 Binding energy of $Si2p_{3/2}$ on the surface of bare planar Si electrode before and after the stability test.



Figure S7 Binding energy of $Si2p_{3/2}$ on the surface of bare Si nanoarrays electrode before and after the stability test.



Figure S8 Current density– voltage (J-V) curves for Pt-decorated Si nanoarrays electrode in pH 5.5 and pH 7 potassium phosphate buffered electrolyte.



Figure S9. SEM images of BiVO₄

	Bi ³⁺ (mg/L)	Co ²⁺ (mg/L)	V ⁵⁺ (mg/L)
reference solution	<0.05	0.009	0.05
the electrolyte	<0.05	0.27	0.07

Table 1 The amount of Bi^{3+} , Co^{2+} and V^{5+} in the electrolyte after stability testing.