Supporting Information

Improved Photoelectrochemical Performance of $BiVO_4$ for Water Oxidation Enabled by the Integration of the Ni@NiO Core-Shell Structure

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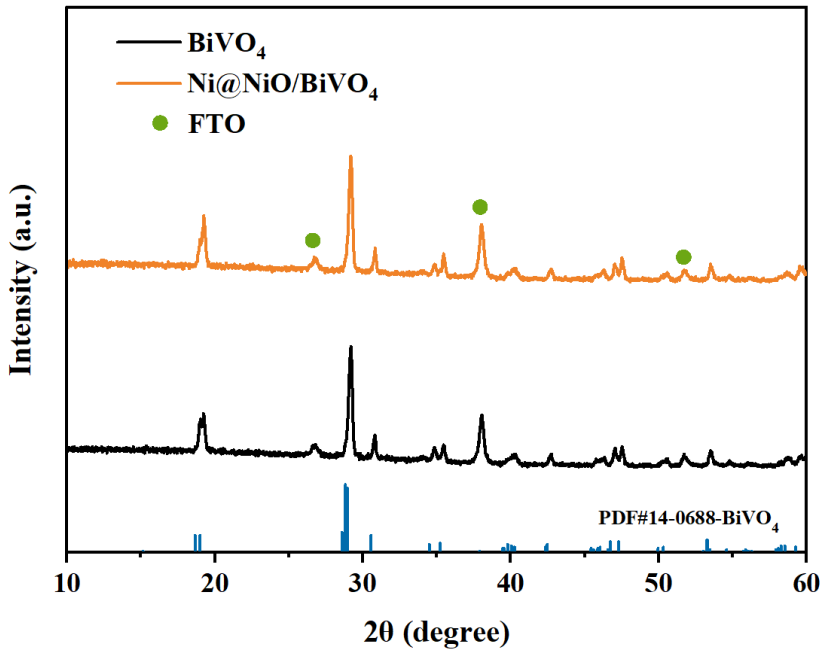


Figure S1. XRD patterns of the $BiVO_4$ and Ni@NiO/$BiVO_4$ photoanodes.

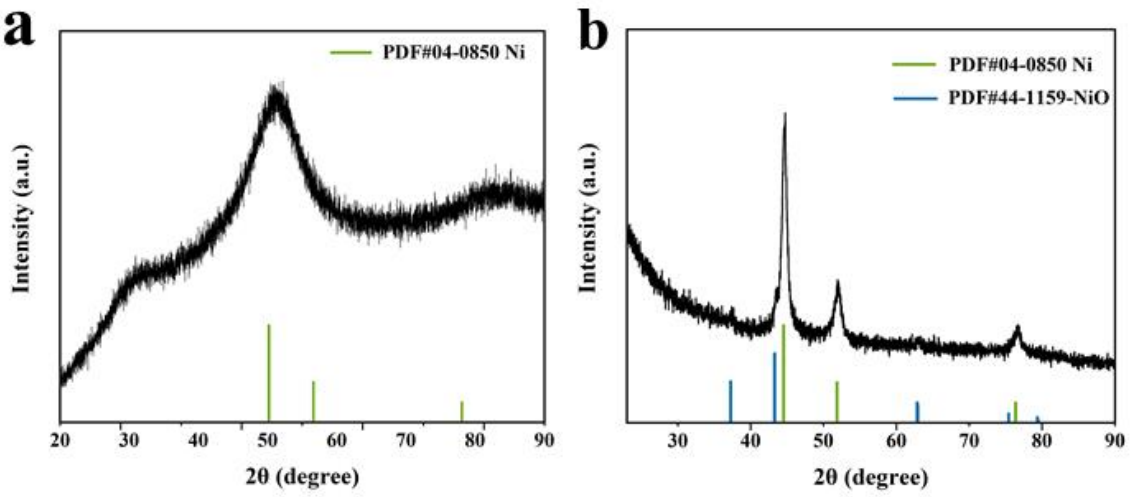


Figure S2. XRD patterns of (**a**) Ni nanoparticles and (**b**) the sample after annealing.

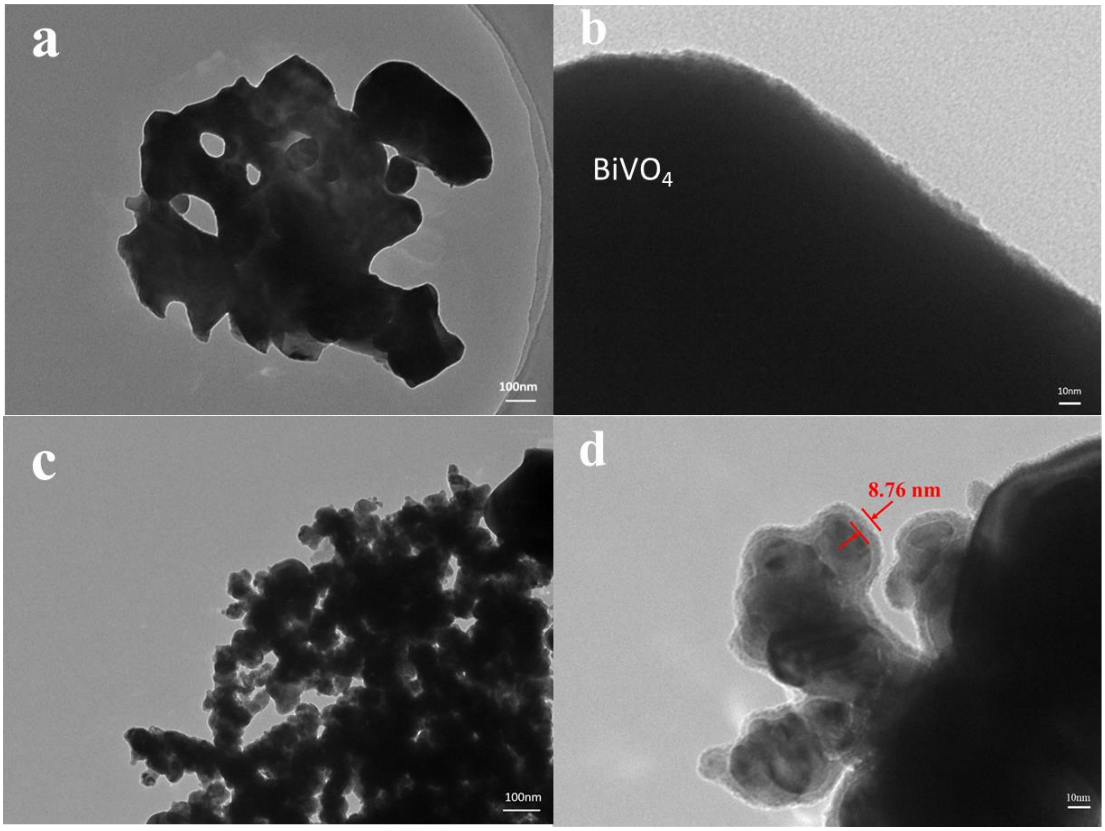


Figure S3. TEM images of (**a**,**b**) $BiVO_4$ and (**c**,**d**) Ni@NiO/$BiVO_4$.

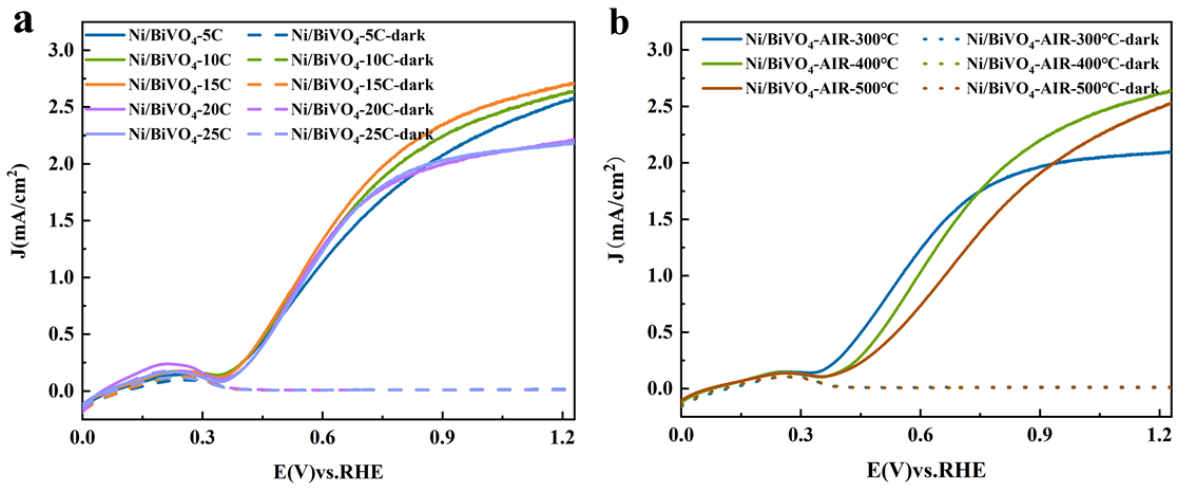


Figure S4. LSV curves of Ni@NiO/$BiVO_4$ films obtained by different (**a**) spin-coating circles and (**b**) at different calcination temperatures.

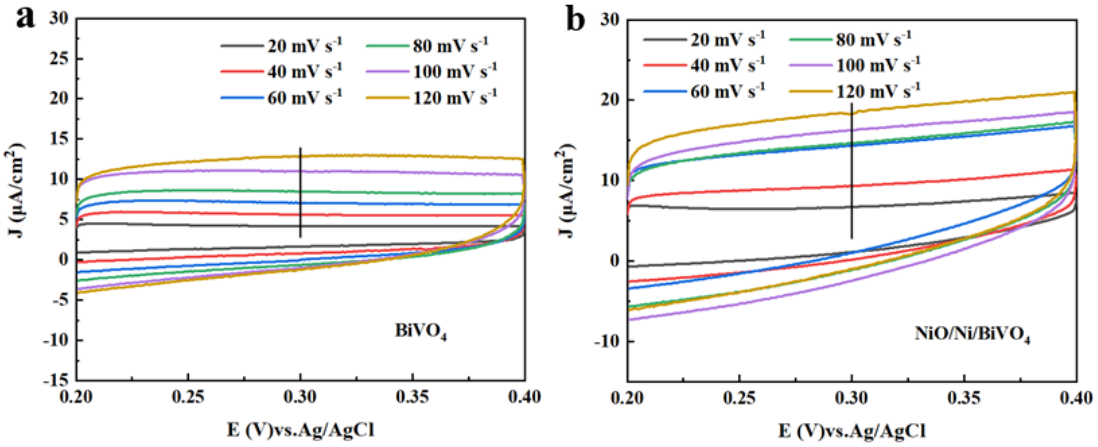


Figure S5. Cyclic voltammograms of the (**a**) $BiVO_4$ and (**b**) Ni@NiO/$BiVO_4$ photoanodes measured at scan rates ranging from 20 mV/s to 120 mV/s. The sweep potential was ranging from 0.2 to 0.4 V vs. Ag/AgCl.

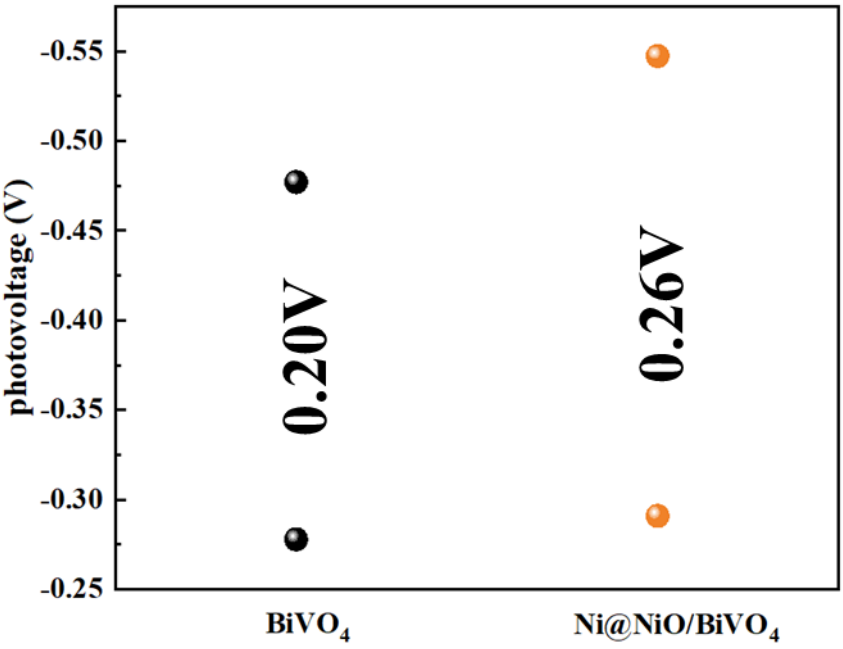


Figure S6. OCP values of the $BiVO_4$ and Ni@NiO/$BiVO_4$ photoanodes.

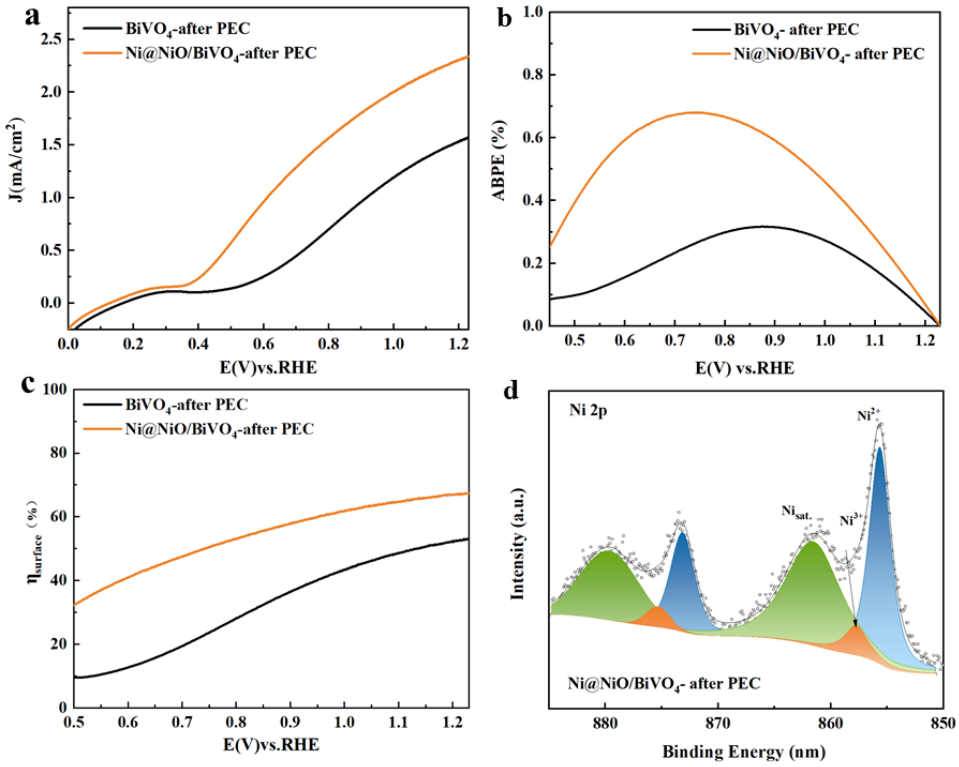


Figure S7. (**a**) LSV, (**b**) ABPE and (**c**) Surface charge separation efficiency of $BiVO_4$ and Ni@NiO/$BiVO_4$ films after PEC tests; (**d**) Ni 2p XPS spectrum of the Ni@NiO/$BiVO_4$ film after PEC test.

Table S1. Comparison of ABPE for the related $BiVO_4$ photoanodes.

Photoelectrode	Electrolyte	ABPE	Current Density (mA/cm^2)	Ref
Ni@NiO/$BiVO_4$	0.50 M phosphate buffer saline (pH = 9)	0.73% at 0.77 V_{RHE}	2.6	This Work
WO_3/$BiVO_4$/NiOOH	sodium borate buffer (pH = 9)	0.49% at 0.92 V_{RHE}	2.33	[50]
NiO/$BiVO_4$	0.5 M Na_2SO_4	0.37% at 0.85 V_{RHE}	1.94	[51]
g-C_3N_4/Mo:$BiVO_4$	0.10 M phosphate buffer solution (pH = 7)	0.74% at 0.78 V_{RHE}	3.11	[52]
CoPi/Mo:$BiVO_4$	0.1 M phosphate buffer (pH = 7)	0.52% at 0.86 V_{RHE}	2.98	[53]
$BiVO_4$/rGO/NiFe-LDH	phosphate buffered solution (pH = 7)	0.19% at 0.87 V_{RHE}	1.13	[54]