

## Supplementary Data

### Significantly enhanced photocatalytic degradation towards tetracycline hydrochloride in BiVO<sub>4</sub> via surface defect engineering

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#### Text S1 Computational methodology

Internal electron fields calculation

The IEF of the catalyst is calculated using the formula established by Kanata et al.<sup>1</sup>

$$E = \left( \frac{-2V_s \rho}{\epsilon \epsilon_0} \right)^{\frac{1}{2}} \quad (1)$$

Where E, V<sub>s</sub>, ρ, ε, and ε<sub>0</sub>, represent the range of IEF, surface voltage, surface charge density, low-frequency dielectric constant, and free-space dielectric constant, respectively. According to the above equations, the IEF can be quantitatively measured by photogenerated charge density and open circuit potential (OCP).

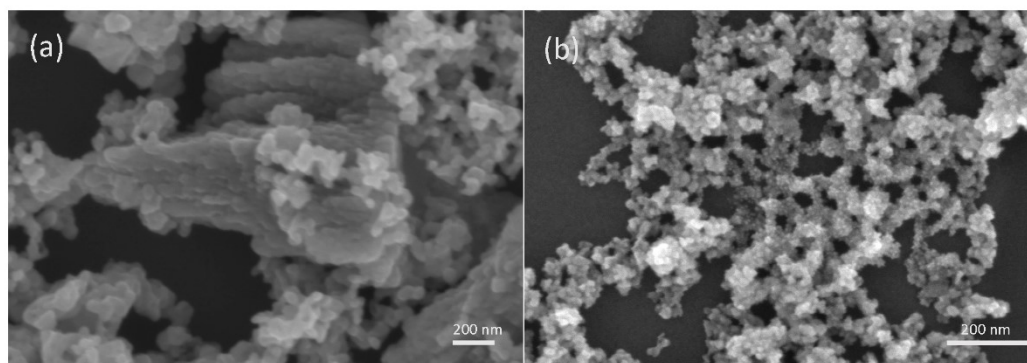


Fig.S1 SEM image of BVO (1) (a), SEM image of BVO (2) (b).

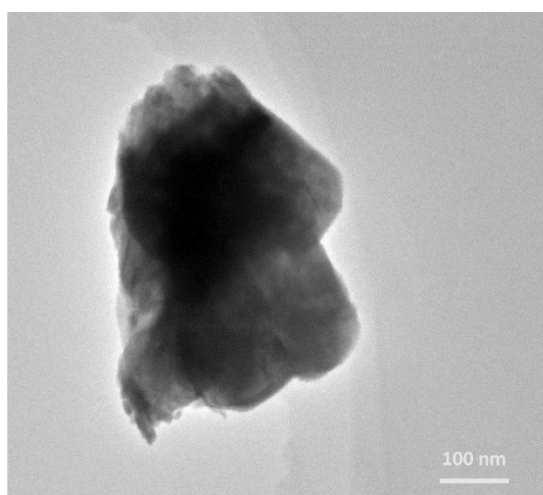


Fig. S2 TEM image of BVO (0.5).

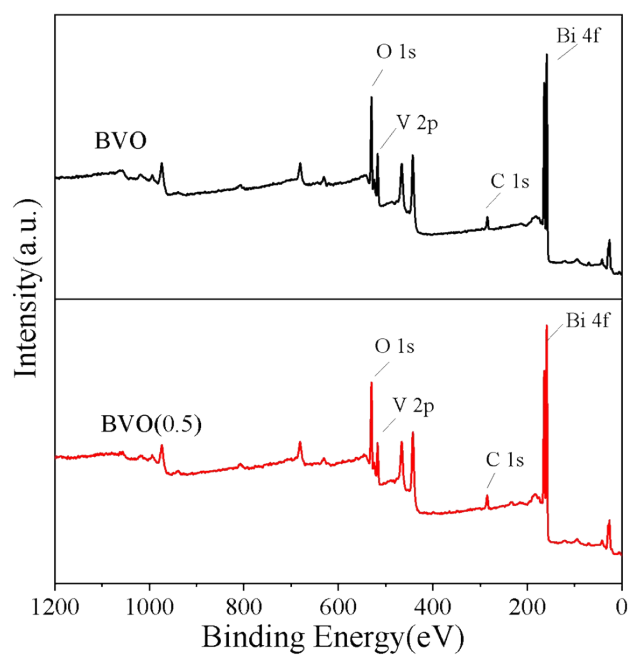


Fig. S3 XPS spectra of BVO and BVO (0.5).

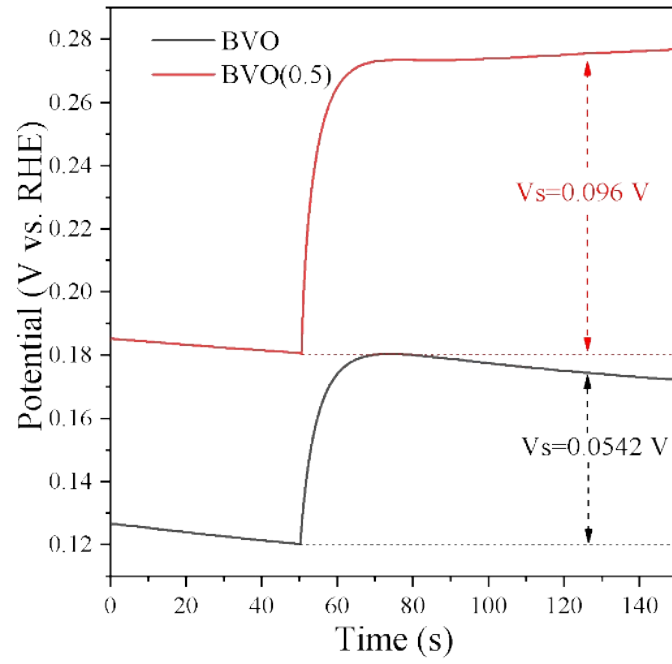
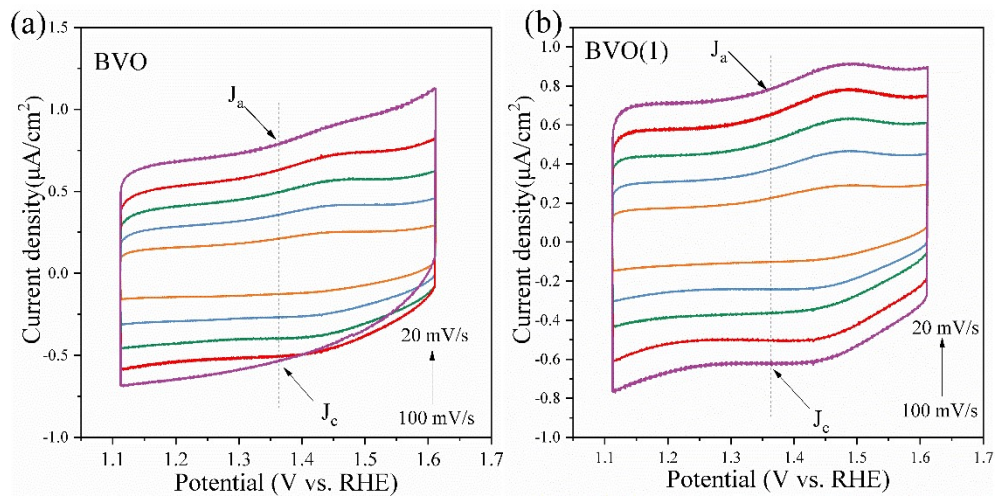


Fig. S4 Open current potential of BVO and BVO (0.5).



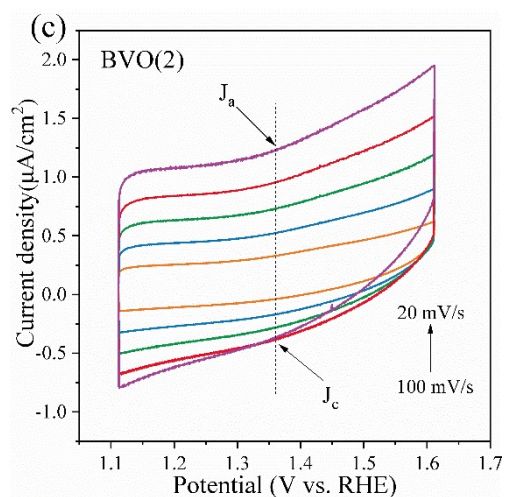


Fig. S5 CV curves at different scan rates of 20–100 mV/s in a non-faradaic reaction region of BVO (a), BVO(1) (b) and BVO (2) (c).

Table S1. The peak position and peak ratio of O 1s.

		BVO	BVO(0.5)
Peak position	O <sub>L</sub>	530.03	529.67
	O <sub>V</sub>	531.34	530.56
	-OH	0	532.04
Peak ratio	O <sub>L</sub>	83.21%	71.32%
	O <sub>V</sub>	16.79%	25.76%
	-OH	0	2.92%

Table S2. Comparison with other photocatalysts for tetracycline degradation

Photocatalysts	Pollutant concentration (mg/L)	Catalysts Dosage (g/L)	Removal efficiency	Ref.
CFs/g-C <sub>3</sub> N <sub>4</sub> /BiOBr	20	3	86.1%- 120 min	2
CuInS <sub>2</sub> /Bi <sub>2</sub> MoO <sub>6</sub>	15	0.6	84.7%- 120 min	3
BiOCl <sub>0.9</sub> /15%β-Bi <sub>2</sub> O <sub>3</sub>	20	0.4	82.4%- 120 min	4
CQDs/BiOCl/BiOBr	20	0.3	77%- 120 min	5

BiOBr/SiC	10	0.25	60%- 60 min	6
Bi <sub>3</sub> O <sub>4</sub> Br	20	0.5	77.7%- 120 min	7
BVO (0.5)	10	0.2	86.3%-90min	This work

Reference:

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