# Supporting Information

## Controlled Synthesis and Structural Modulation to Boost Intrinsic Photocatalytic Activity of $BiVO_4$

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## Supporting Information S1

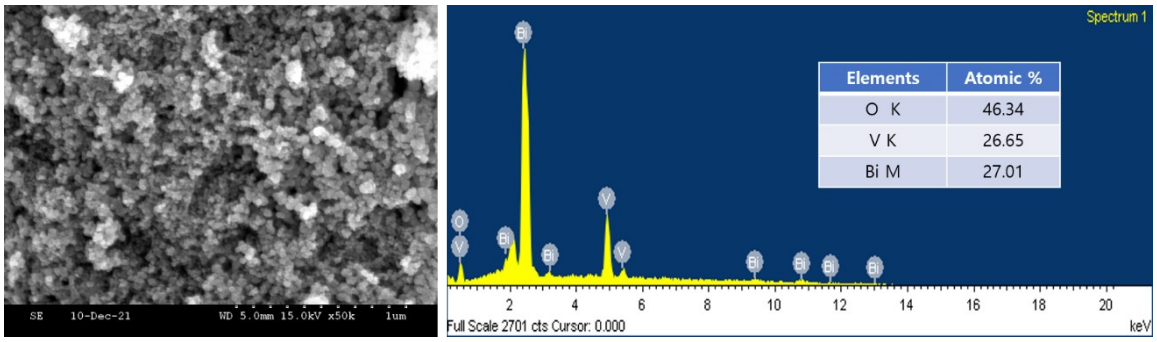


**Fig. S1.** FESEM image of a $BiVO_4$ prior to the hydrothermal treatment and corresponding EDS elemental image.

## Supporting Information S2

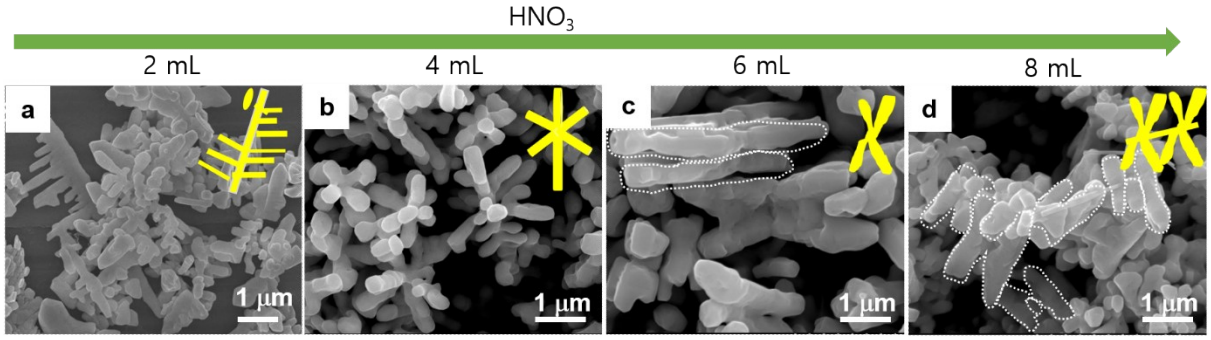


**Fig. S2.** FESEM image of a BVO-SLR´24 prepared with different content of $HNO_3$ (a) 2 mL (b) 4 mL (c) 6 mL and (d) 8 mL.

**Supporting Information S3**

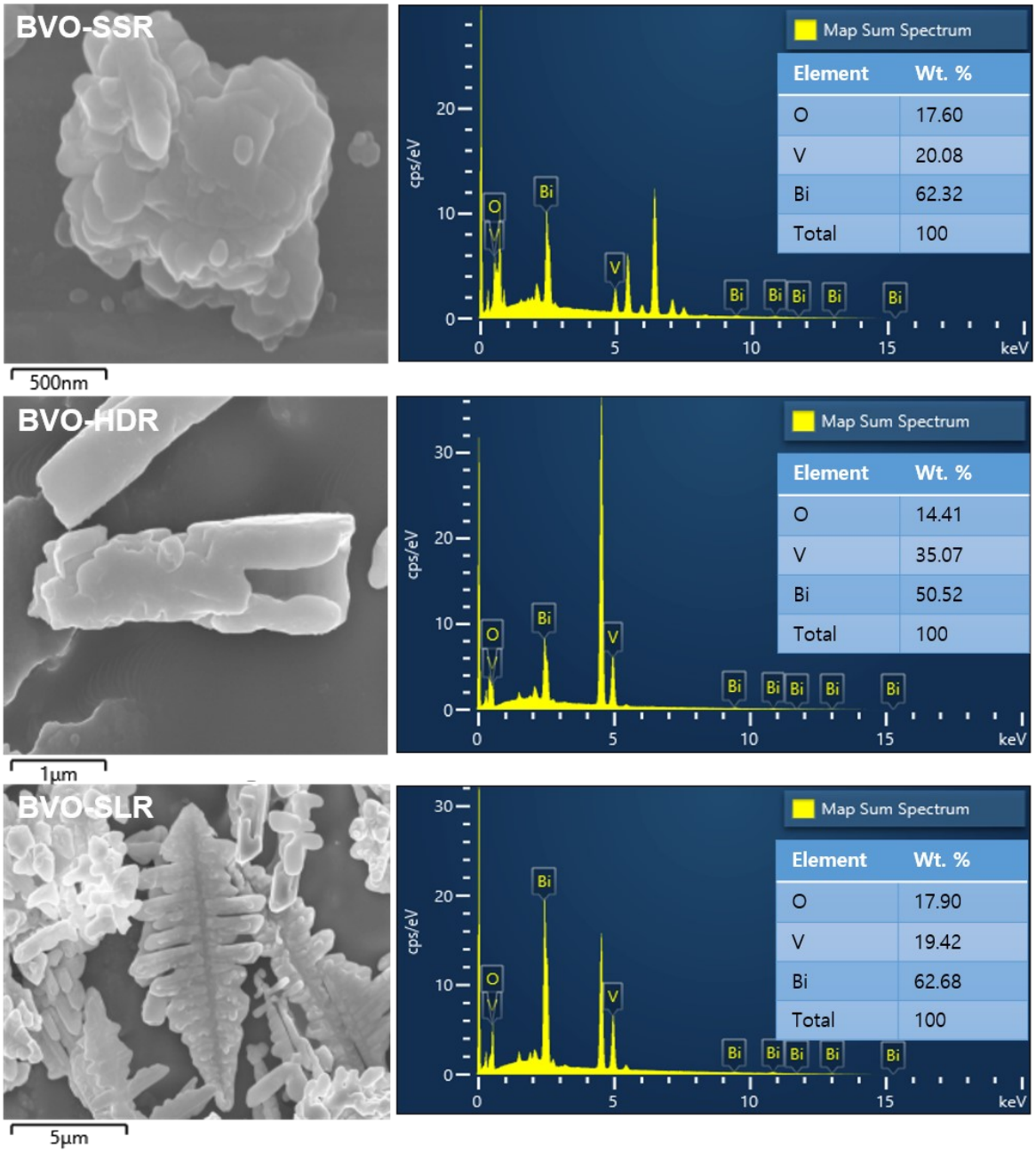


**Fig. S3.** EDS (compositional analysis) of BVO-SSR, BVO-HDR, and BVO-SLR samples prepared with different synthesis strategies.

**Supporting Information S4**

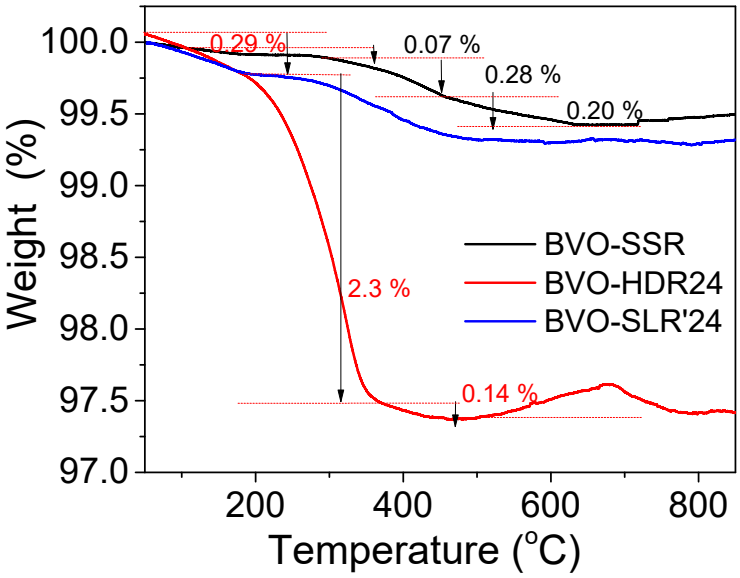


**Fig. S4** TGA curves of BVO-SSR, BVO-HDR24, and BVO-SLR'24 samples.

TGA curves were also utilized to clarify the oxygen vacancies. As illustrated in Fig.S4, the TGA curves of the catalysts BVO-SSR and BVO-SLR'24 indicate that $BiVO_4$ decomposition proceeds in four stages at temperatures ranging from 30–100 °C to 100–270 °C, 270–550 °C, and 550–800 °C. The catalysts lost weight in the first step (30–100 °C) due to the removal of adsorbed water molecules from the surface. The second stage of weight loss for BVO-SSR was 0.07 percent, the third stage was 0.28 percent, and the final stage was 0.20 percent. Weight loss for the BVO-SSR and BVO-SLR'24 catalysts occurred between 270 and 550 °C due to phase change from tetragonal to monoclinic $BiVO_4$, as well as oxygen vacancies that can be filled by oxygen atoms at this temperature.[1–3]

**Supporting Information S5**

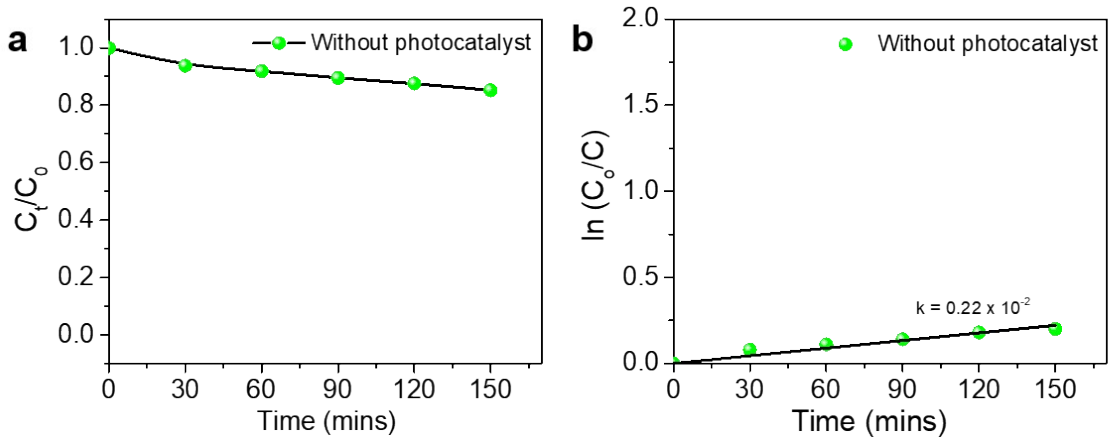


**Fig. S5.** (a) Photodegradation of MB with time during photolysis (without photocatalyst) under light irradiation and (b) corresponding kinetics of degradation studies.

**Table S1 Rate constant (*K*) of the photocatalytic MB degradation using the as-prepared photocatalyst samples.**

| Sr. No. | Catalyst | Rate constant (K) for MB degradation [$min^{-1}$] | Std. Dev. |
|---|---|---|---|
| 1 | BVO-HDR 24 | $1.10 \times 10^{-2}$ | 0.00068 |
| 2 | BVO-SLR'24 | $3.19 \times 10^{-2}$ | 0.0045 |
| 3 | BVO-SLR12 | $1.46 \times 10^{-2}$ | 0.00043 |
| 4 | BVO-SLR24 | $1.16 \times 10^{-2}$ | 0.00068 |
| 5 | BVO-SLR36 | $1.62 \times 10^{-2}$ | 0.00048 |
| 5 | BVO-SLR 48 | $0.98 \times 10^{-2}$ | 0.001 |
| 6 | BVO-SSR | $1.38\times 10^{-2}$ | 0.00067 |

**Supporting Information S6**

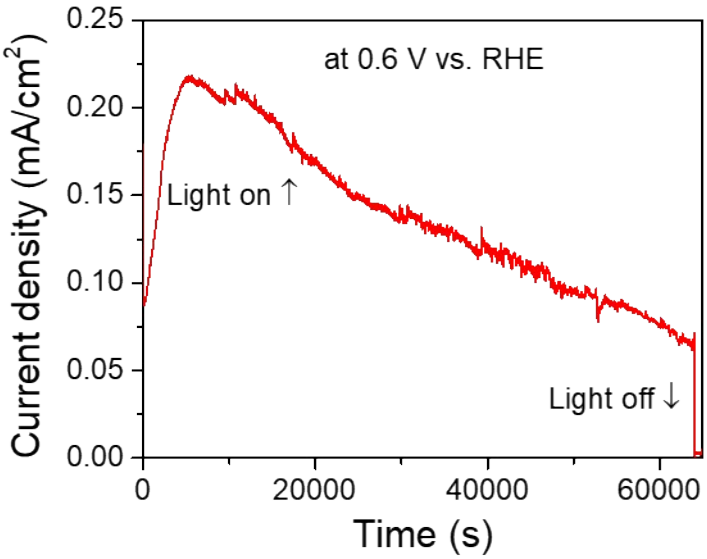


**Fig. S6.** Photocurrent density as a function of time for BVO-SLR'24 at 0.6 V versus RHE under 100 mW/cm$^2$ illumination.

References


1 S. D. Dolić, D. J. Jovanović, K. Smits, B. Babić, M. Marinović-Cincović, S. Porobić and M. D. Dramićanin, *Ceram. Int.*, 2018, **44**, 17953–17961.

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