**Supporting Information**

# Flux Synthesis of Single Crystal Bismuth Vanadate ($BiVO_4$) Nanowires and their Visible Light Driven Photocatalytic Water Oxidation Properties

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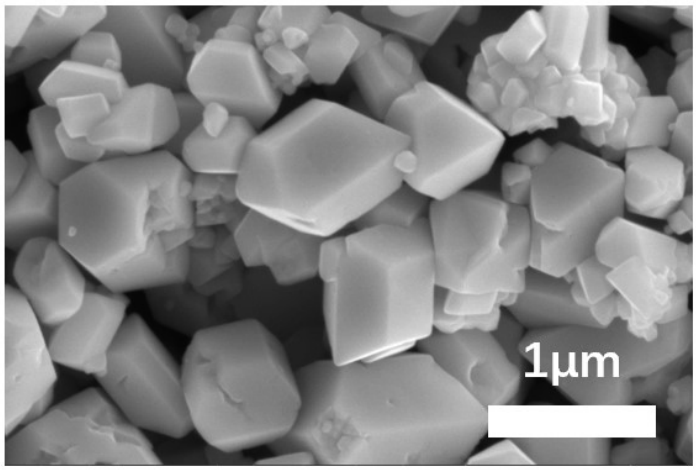


**Figure S1**. SEM image of the $BiVO_4$ ($BiVO_4$) microparticles used as the precursor for flux synthesis of $BiVO_4$ NWs.

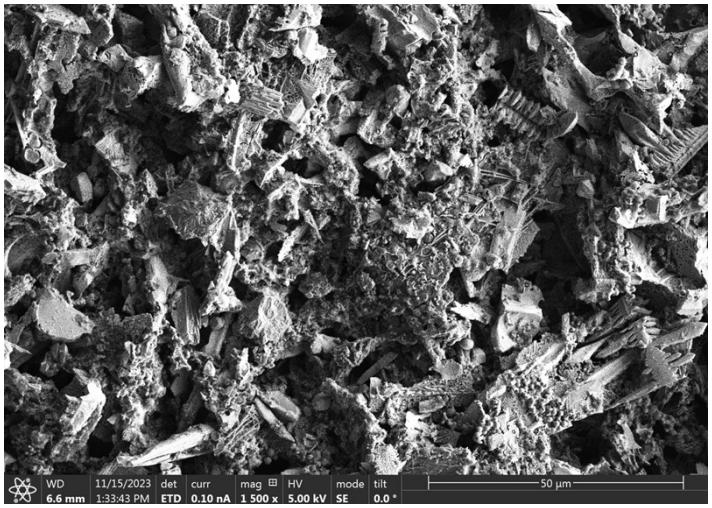


**Figure S2**. SEM of the $BiVO_4$ product from a flux synthesis using 1:20 $BiVO_4$-to-$NaVO_3$ ratio. The other conditions of the flux synthesis were the same as Figure 1 shows.

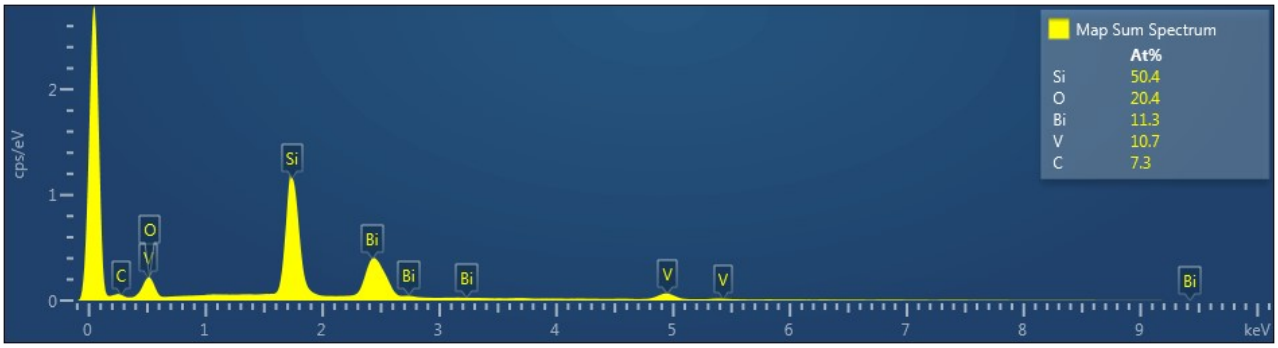


**Figure S3**. EDX spectrum of the respective $BiVO_4$ NW sample. The Si and C signals were respectively from the Si substrate and residue of ethanol solvent used during sample preparation for drop-coating a suspension of $BiVO_4$ NWs.

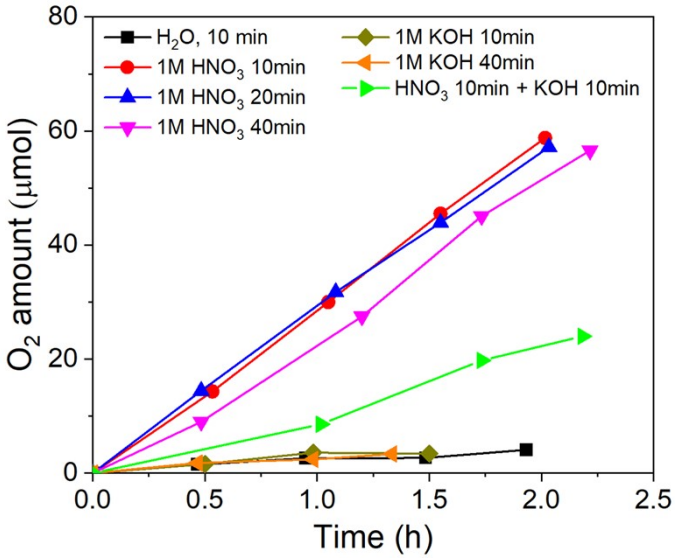


**Figure S4**. Visible-light-driven $O_2$ evolution of 100 mg $BiVO_4$ NWs in 100 mL 0.02 M $Fe(NO_3)_3$ solution. The $BiVO_4$ NWs samples used here are either after 10 min, 20 min, 40 min of 1 M $HNO_3$ wash (red, blue, purple curve, respectively), 10 min, 40 min of 1 M KOH wash (dark yellow, orange curves, respectively), 10 min of 1 M $HNO_3$ wash followed by 10 min of 1 M KOH wash (green curve), or 10 min $H_2O$ wash (black curve). The gas evolution reaction was done under the illumination of a 100 W Xe lamp with a 0.22 M $NaNO_2$ chemical long-pass filter to cut off the UV light, and the visible light intensity was 390 $mW/cm^2$ measured by a GaAsP detector (International Light NIST traceable photometer).

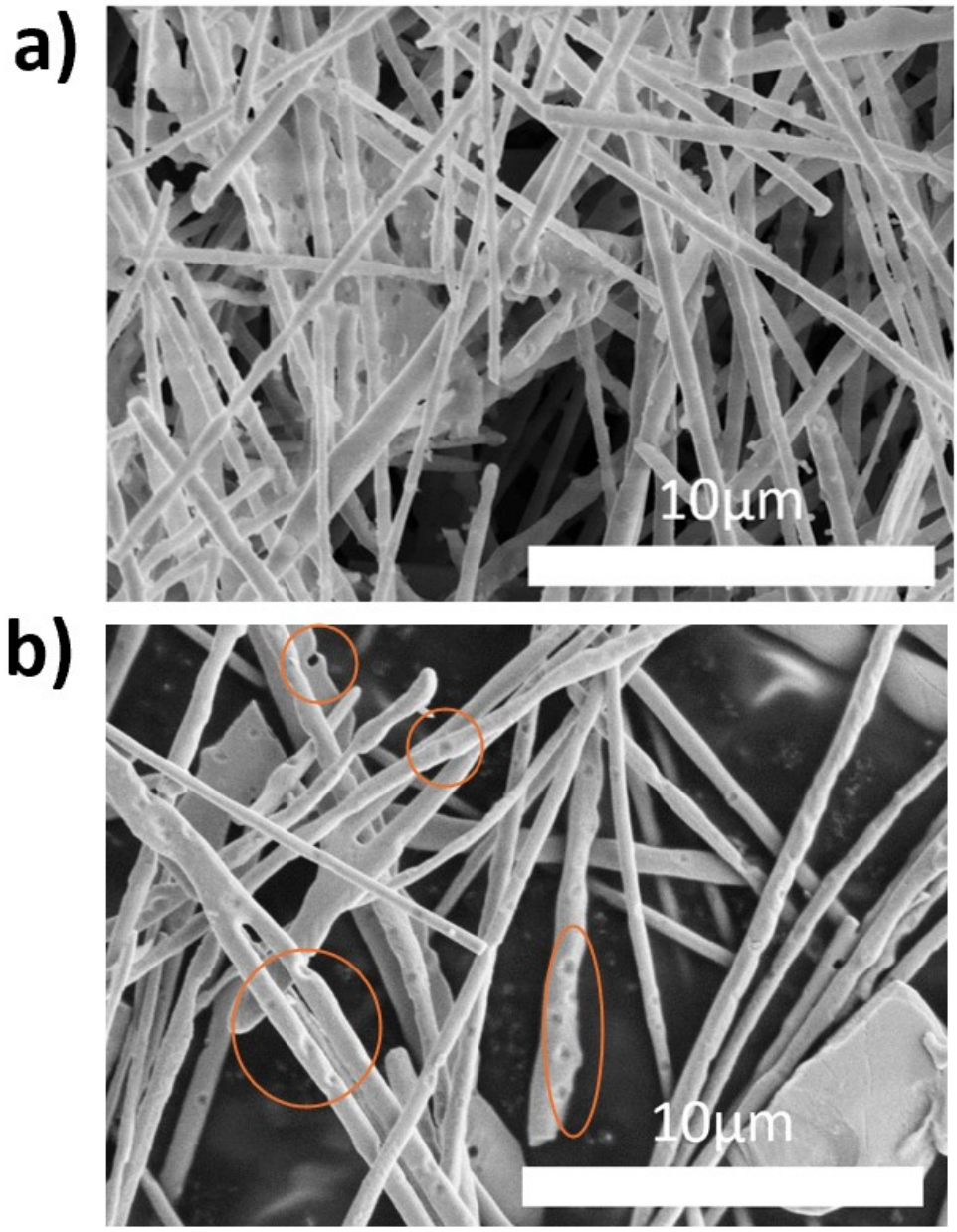


**Figure S5.** SEM images of $BiVO_4$ NWs (a) before and (b) after 5 min soaking in 1.0 M $HNO_3$. Surface pits were observed as marked in orange circles.

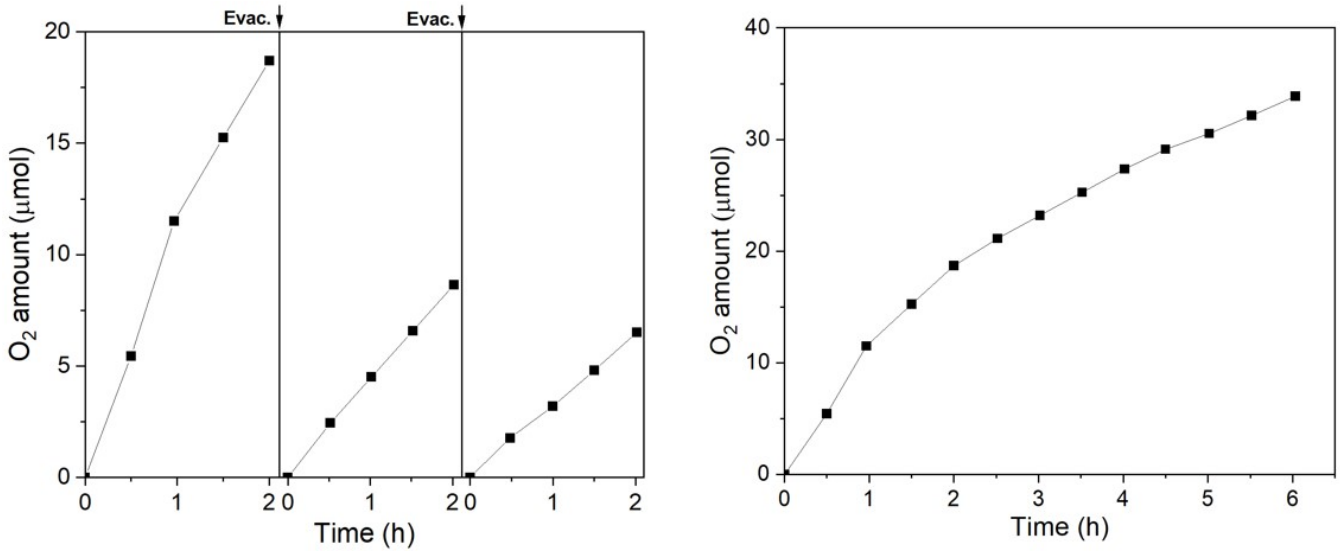


**Figure S6. (Left)** 6-hour continuous $O_2$ evolution test of $BiVO_4$ NWs in 100 mL of 0.02 M $Fe(NO_3)_3$ under visible Xe illumination at ~350 mW/cm$^2$ ($\lambda > 400$ nm). The $BiVO_4$ NWs were etched for 5 min in 1.0 M $HNO_3$ prior to the experiment and the flask was evacuated after every 2 hours. **(Right)** Cumulative amount of evolved oxygen (data from plot on the left).

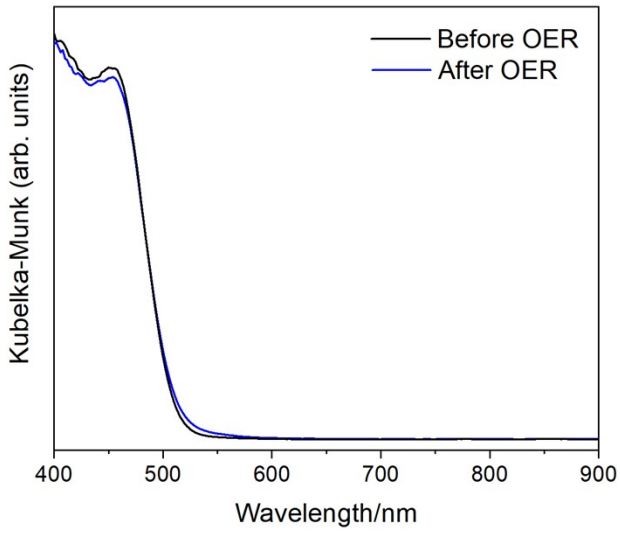


**Figure S7**. UV-Vis spectra of $BiVO_4$ NWs before and after the 6 h photocatalytic oxygen evolution reaction (OER).

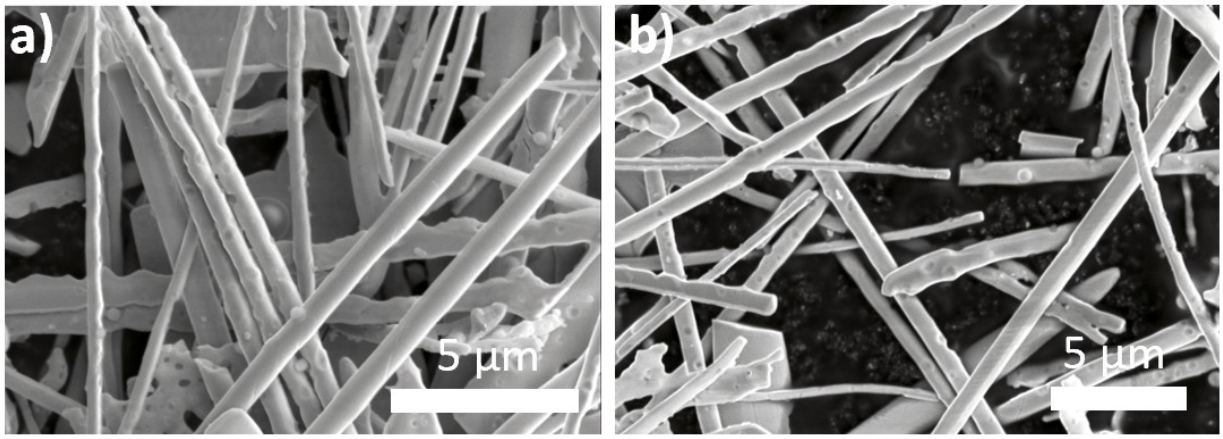


**Figure S8**. SEM images of $BiVO_4$ NWs (a) before and (b) after the OER experiment. The $BiVO_4$ NWs here were etched for 5 min in 1.0 M $HNO_3$ prior to the illumination experiment.

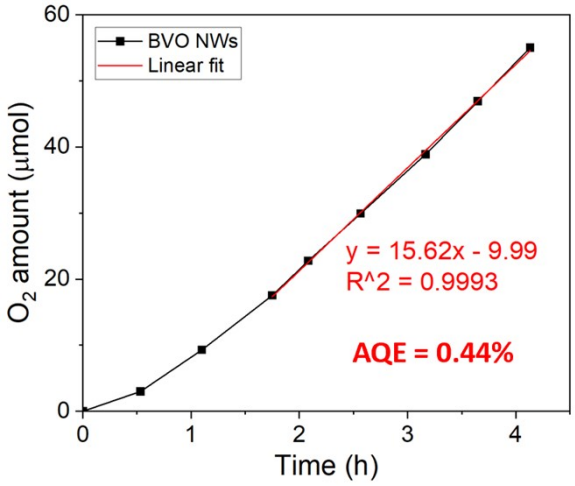


**Figure S9.** $O_2$ evolution of the $BiVO_4$ NWs in 0.02 M $Fe(NO_3)_3$ under illumination from a 405 nm LED (622 mW/cm$^2$), as measured with a GaAsP photodetector (International Light). The area of illumination was 1.90 cm$^2$. The $O_2$ rate was obtained from the linear region of the curve.

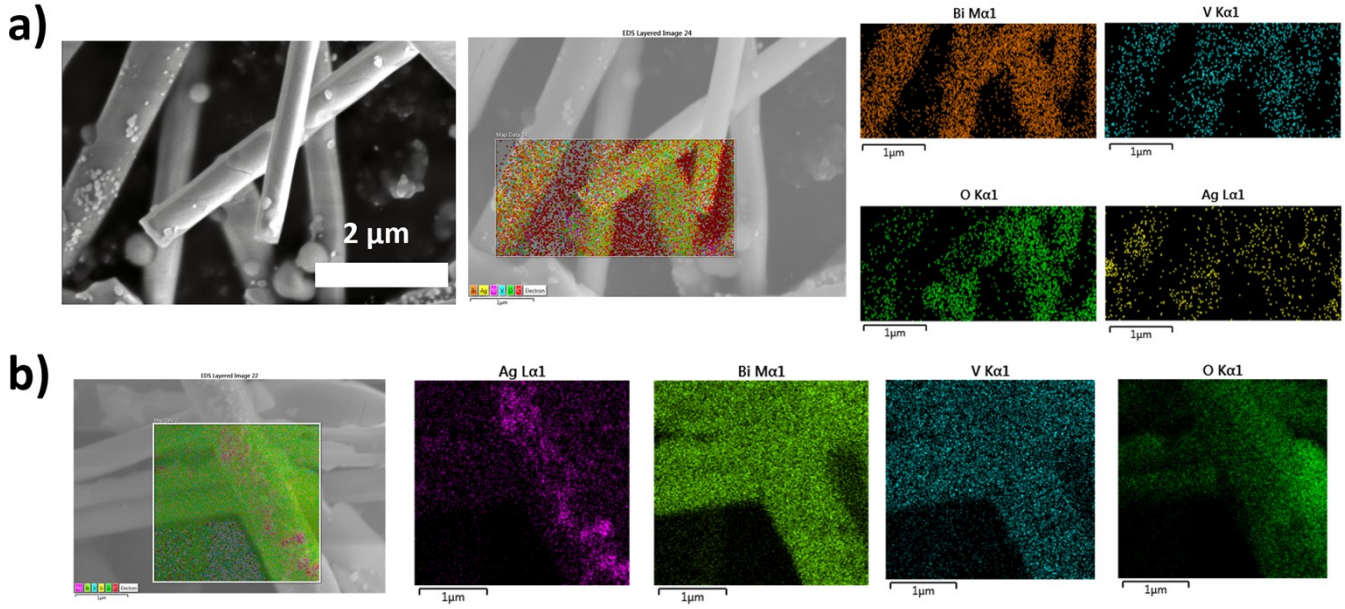


**Figure S10**. EDX elemental mapping at the (a) nanowire tip and (b) lateral surface of $BiVO_4$ NWs after photodeposition of Ag. Ag was found to cover the lateral surface mainly, rather than the NW ends.

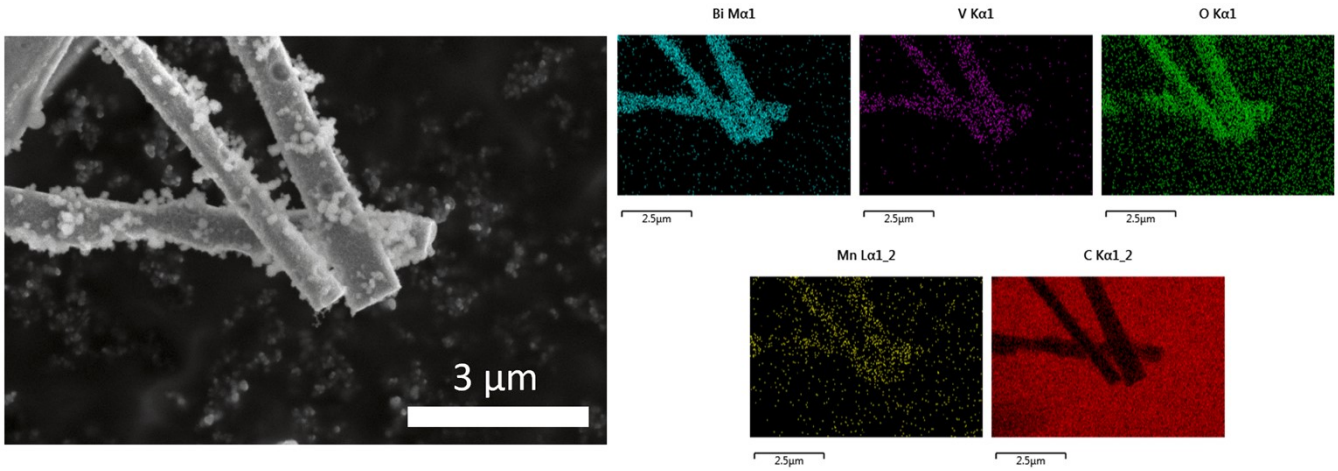


**Figure S11**. SEM and EDX elemental mapping of the $BiVO_4$ nanowire after 2 h photodeposition of $MnO_x$.

**Table S1**. Apparent quantum efficiency (AQE), photocatalytic oxygen evolution and the corresponding experimental parameters of $BiVO_4$ NWs and other reported $BiVO_4$ photocatalysts.

| Photocatalyst | $e^-$ acceptor | Light source | Light intensity/mW·cm$^{-2}$ | $O_2$ evolution rate | AQE/% | Reference # |
|---|---|---|---|---|---|---|
| $BiVO_4$ NWs | $Fe^{3+}$ | 300 W Xe lamp + UV filter | ~550 mW/cm$^2$ | 28.75 μmol·h$^{-1}$ | 0.44 | This work |
| $BiVO_4$ nanowires | $Fe^{3+}$ | 300 W Xe lamp + UV filter | N/A | 0.19 μmol·h$^{-1}$ | N/A | 1 |
| Well-defined $BiVO_4$ crystals | $Fe^{3+}$ | 300 W Xe lamp + UV filter | - | ~150 μmol·h$^{-1}$ | 71 | 2 |
| Ir-$FeCoO_x$/$BiVO_4$ | $[Fe(CN)_6]^{3-}$ and HEP | 300 W Xe lamp + UV filter | - | 80 μmol·h$^{-1}$ | 12.3 | 3 |
| $BiVO_4$-100 | $Ag^+$ | 300 W Xe lamp + UV filter | - | 4476 μmol·h$^{-1}$·m$^{-2}$ | 9.3 | 4 |
| $BiVO_4$-100 | $Fe^{3+}$ | 300 W Xe lamp + UV filter | - | 1750 μmol·h$^{-1}$·m$^{-2}$ | 4.5 | 4 |
| $BiVO_4$ fine particles | $Fe^{3+}$ | 300 W Xe lamp + UV filter | - | ~90 μmol·h$^{-1}$ | 1.2 | 5 |
| F/Ce-codoped $BiVO_4$ | $Ag^+$ | 250 W Hg lamp + UV filter | - | 17.5 μmol·h$^{-1}$ | - | 6 |
| Ni@NiO-loaded W:$BiVO_4$ nanofibers | $Ag^+$ | 450 W Xe lamp + UV filter | - | 0.075 μmol·h$^{-1}$ | - | 7 |
| mesoporous undoped $BiVO_4$ NFs | $Ag^+$ | 300 W Xe lamp | - | 13.7 μmol·h$^{-1}$ | - | 8 |
| Mesoporous Cu:BVO nanotubes/$CoO_x$ | $Na_2S_2O_8$/$OH^-$ | 300 W Xe lamp + UV filter | - | 7.004 μmol·h$^{-1}$ | 2.63 | 9 |
| 24-faceted concave BiVO4 | $Ag^+$ | 300 W Xe lamp + UV filter | - | 178.8 μmol·h$^{-1}$ | 30.7 | 10 |

**References**


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