**Supporting Information for**

# Ultrathin $BiVO_4$ Nanobelts: Controllable Synthesis and Improved Photocatalytic Oxidation of Water

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## Experimental Section

**Chemical Reagents and Instruments:** Ammonium metavanadate ($NH_4VO_3$), bismuth nitrate ($Bi(NO_3)$), ammonia ($NH_3 \cdot H_2O$), nitric acid ($HNO_3$), methanol ($CH_3OH$), silver nitrate ($AgNO_3$) were purchased from Sinopharm Chemical Regent Co., Ltd. Deionized water (18 MΩ, Molecular) was used for all solution preparations.

The morphology and size of the as-prepared products were characterized by using a field-emission scanning electron microscope (JSM-6701F, JEOL). The X-ray diffraction spectra (XRD) measurements were performed on a PANalytical X'Pert PRO instrument using Cu Kα radiation (40 kV). The XRD patterns were recorded from 10° to 90° with a scanning rate of 0.067 °/s. UV-visible diffuse reflectance spectra were taken on a UV-2550 (Shimadzu) spectrometer by using $BaSO_4$ as the reference. HRTEM imaging was carried out using an FEI Tecnai TF20 microscope operated at 200 kV.

**Preparation of $BiVO_4$ nanobelts:** Firstly, 0.036 g $NH_4VO_3$ was dissolved in 1 M ammonia solution (solution A) because it is slight soluble in pure water. 0.03 g $BiNO_3$ was dissolved into 1 M dilute nitric acid (solution B) since it could hydrolyze to $BiONO_3$ precipitates in aqueous solution. Secondly, solution A was added into solution B drop by drop. Along with the consumption of ammonia and nitric acid, $NH_4VO_3$ and $BiNO_3$ would react and produce tetragonal $BiVO_4$ nanoparticles. The PH is measured to be 5.1 after the full mixture of solution A with solution B. At last, the solution was transferred into a Teflon-lined stainless steel autoclave, which was kept at 180 °C for one day. After the hydrothermal reaction, the $BiVO_4$ nanobelts were obtained finally.

**Preparation of $BiVO_4$ nanoparticles:** The pure $BiVO_4$ nanoparticles was synthesized via a typical procedure, 1 mmol of $Bi(NO_3)_3 \cdot 5H_2O$ and 1mmol of $NH_4VO_3$ was added to 30 mL of 2 M nitric acid solution at room temperature and remained continuous stirring for 30 minutes. Then, an appropriate amount of $NH_4OH$ (25～28%) was also added into the prepared solution to fit the pH value to 8. After stirring for 30 min, a clear orange solution was obtained. This solution was poured into a 50 mL Teflon-lined autoclave and maintained at 180℃ for 24 h under autogenous pressure, and then naturally cooled to room temperature. The resulting precipitates were collected and washed with ethanol and deionized water thoroughly and dried at 80℃ in air.

**Photoelectrochemical measurements:** The $BiVO_4$ nanobelts suspended in water and the

mixtures were ultrasonically scattered for 15 min to form homogeneous solution. Then, the solution was spin coated on a Fluorine-doped tin oxide (FTO) substrate with a rate of 300 rpm for 30 s. This procedure was repeated for 3 times. Photoelectrochemical properties were measured in a three-electrode configuration. A Pt foil, saturated calomel electrode (SCE), and 0.2 M sodium sulfate with methanol were used as the counter-electrode, the reference electrode, and the electrolyte, respectively. The current-time (i-t) curves were collected at 0.4 V vs SCE. A 300 W Xe lamp was utilized as the light source.

**Photocatalytic reactions:** The photocatalytic $O_2$ evolution was carried out with 0.3 g photocatalyst suspending in $AgNO_3$ solution in a Pyrex glass reaction cell. The reaction cell was connected to a gas-closed system with a gas-circulated pump. A 300 W Xe arc lamp was employed for the light source of photocatalytic reaction. The evolved $O_2$ was analyzed by an online gas chromatograph (GC-8A; Shimadzu Corp., Japan) equipped with a thermal conductivity detector.

## Additional Figures

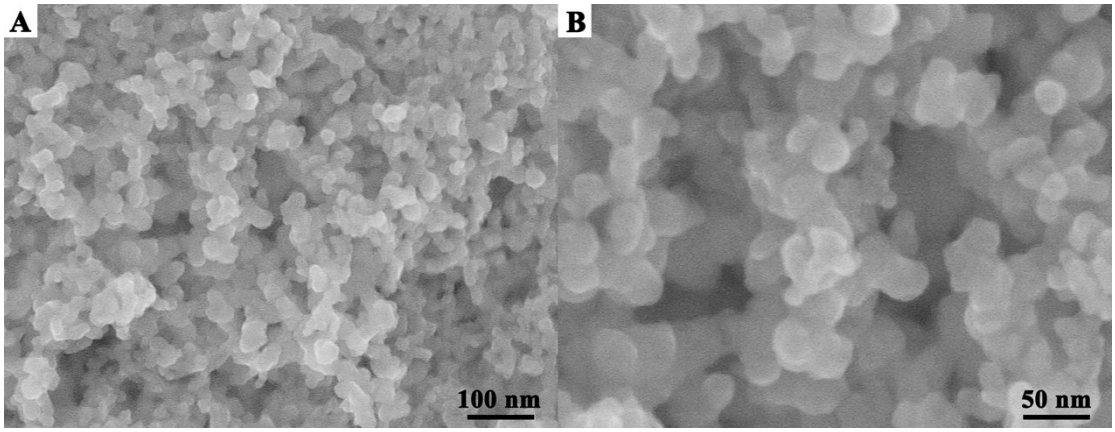


**Fig. S1.** SEM images of $BiVO_4$ nanoparticles before hydrothermal reaction.

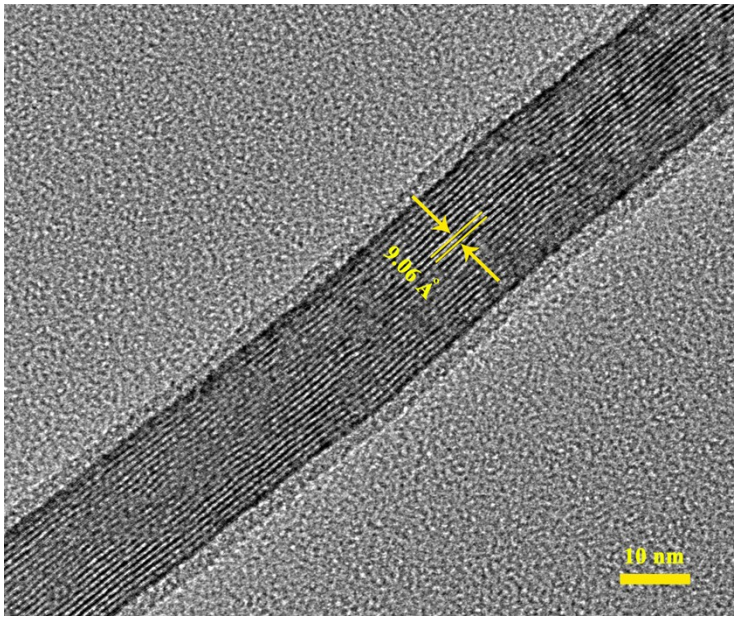


**Fig. S2.** Sideview TEM image of $BiVO_4$ nanobelts.

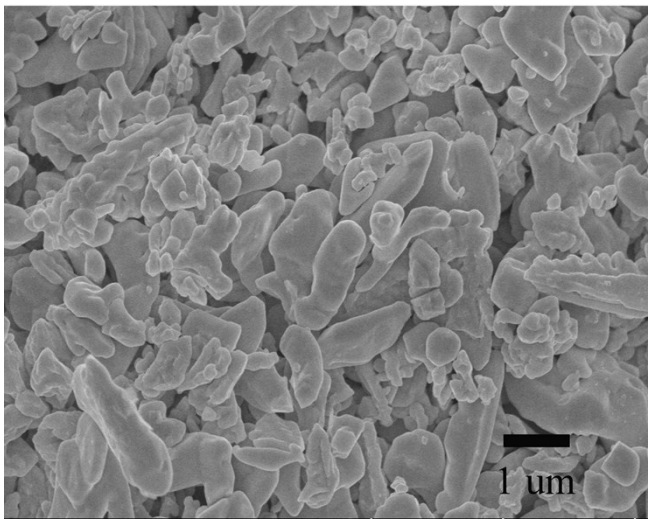


**Fig. S3.** SEM image of $BiVO_4$ nanoparticles.

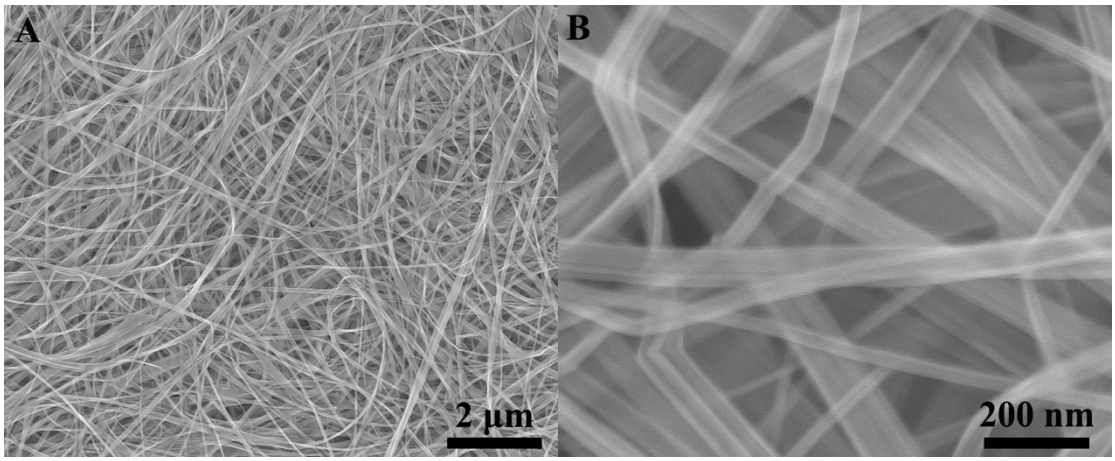


**Fig. S4**. SEM images of ultrathin $BiVO_4$ nanobelts after photocatalytic oxidation of water.