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$V_2O_5 \cdot xH_2O$-$BiVO_4$ 纳米复合材料的可控合成和可见光响应的光催化性质

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Adjustable Synthesis and Visible-Light Responsive Photocatalytic Performance of $V_2O_5 \cdot xH_2O$-$BiVO_4$ Nanocomposites

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1 The details of the synthesis of pure $BiVO_4$ are presented as follows.

In a typical procedure, $Bi(NO_3)_3 \cdot 5H_2O$ (1 mmol) was dissolved in distilled water (40 mL) by ultrasound to give a clear solution. Then $Na_3VO_4 \cdot 12H_2O$ (1.0 mmol) was added and stirred for 5 min to give an opaque solution. The pH value of the solution was adjusted to approximately 3.0 with diluted sulfuric acid (H_2SO_4/H_2O volume ratio 1:4). The solution was then sealed in a glass bottle (60 mL), kept static at 80 °C for 24 h. After the solution was cooled to room temperature, the bright yellow precipitate was collected, washed several times with distilled water and ethanol, and dried in a vacuum drying oven at 50 ˚C for 12 h.

2 The XRD pattern of pure $BiVO_4$

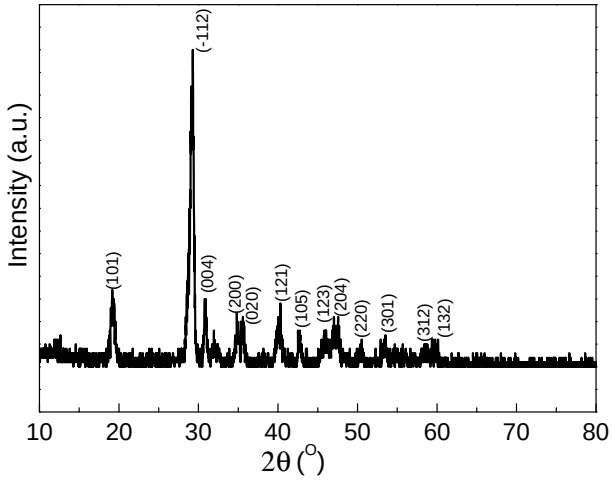

Fig.S1 The XRD pattern of $BiVO_4$

3 The energy disperse X-ray (EDX) analysis of the $V_2O_5 \cdot xH_2O$-$BiVO_4$ composite

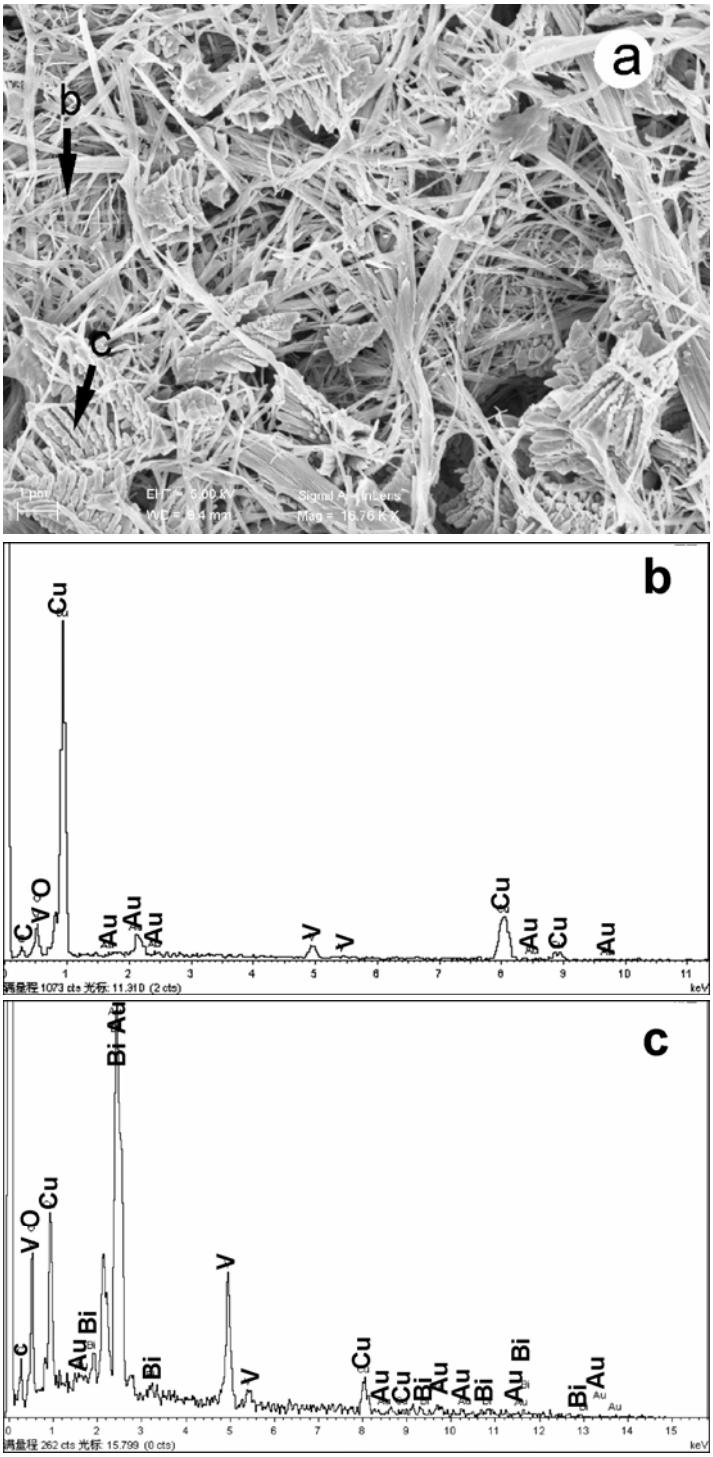

Fig.S2 (a) FESEM image of V_2O_5-$BiVO_4$-6 sample, (b, c) EDX spectra from the nanowires marked with arrow a and the dendritic particles marked with arrow b, respectively, in Fig. S2a

4 UV-Vis absorption spectrum of the aqueous solution of MB

Fig.S3 shows the UV-Vis absorption spectrum of the aqueous solution of MB (initial concentration, 5.0×10^{-5} mol/L; 100 mL) with 80 mg of V_2O_5-$BiVO_4$-12 as photocatalyst and exposure to the visible light for various durations. The characteristic absorption of MB at 665 nm decreases rapidly with extension of the exposure time, and almost disappears after about 90 min. Further exposure leads to no absorption peak in the whole spectrum, indicating the total degradation of MB.

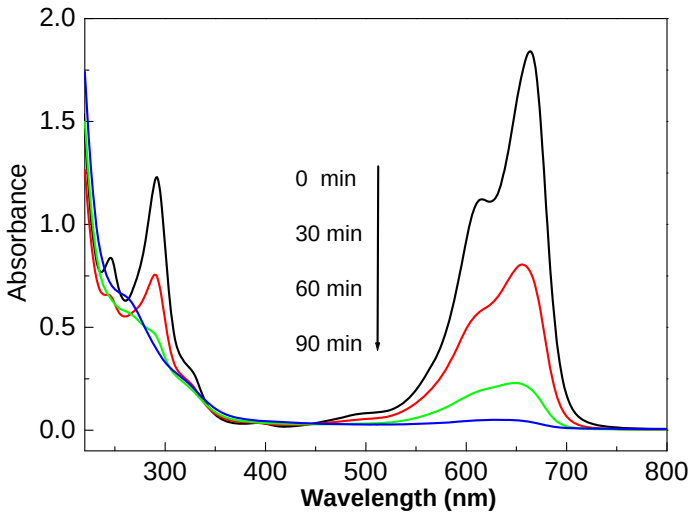

Fig.S3 UV-Vis absorption spectrum of MB aqueous solution with 80 mg of V_2O_5-$BiVO_4$-12 as photocatalyst and exposure to the visible light for various durations