Electronic Supplementary Information for

Simultaneous Introduction of Oxygen Vacancy and Bi Metal onto the {001} Facet of Bi_3O_4Cl Woven Nanobelts for Synergistically Enhanced Photocatalysis

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Table of Context

Experimental section:

Characterization of photocatalysts

We used X-ray diffraction (XRD) with Cu Kα radiation (model D/max RA, Rigaku Co., Japan) to analyze the crystal phases of the samples. Surface properties were investigated by X-ray photoelectron spectroscopy (XPS) with Al Kα X-rays (Thermo ESCALAB 250, U.S.A.). The morphology and structure of our samples were examined by scanning electron microscopy (SEM, model JSM-6490, JEOL, Japan) and transmission electron microscopy (TEM, JEM-2010, Japan). The UV-vis diffuse-reflectance spectrometry (UV-vis DRS) spectra were performed on the dry-pressed disk samples using a scanning UV-vis spectrophotometer (TU-1901, China) equipped with an integrating sphere assembly, using 100% BaSO4 as the reflectance sample. Nitrogen adsorption-desorption isotherms were obtained on a nitrogen adsorption apparatus (ASAP 2020, U.S.A.) with all samples degassed at 150 ℃ for 4 h before measurements. Photoluminescence (PL) studies (F-7000, HITACHI, Japan) were conducted to investigate the optical properties of the samples. Steady and time-resolved fluorescence emission spectra were recorded at room temperature with a fluorescence spectrophotometer (Edinburgh Instruments, FLSP-920). Electron spin resonance (ESR) of radicals spin-trapped by 5, 5-dimethyl-1-pyrroline N-oxide (DMPO) was recorded on a JESFA200 spectrometer. Samples for ESR measurement were prepared by mixing the samples in a 40 mM DMPO solution tank (aqueous dispersion for DMPO-•OH and methanol dispersion for DMPO-•O^{2-}) and irradiated with visible light. Electron paramagnetic resonance (EPR) measurements were carried out on a Bruker ESP 500 spectrometer.

In situ DRIFTS investigation

We used the Tensor II FT-IR spectrometer (Bruker) equipped with an in situ diffuse reflectance cell (Harrick) to conduct in situ DRIFTS measurements. The designed reaction system has been reported in our previous paper.[1,2] Before the measurement, photocatalysts were put into the cell. First, the residual hydrocarbons, H_2O and CO_2 were removed by He gas (100 mL/min). The real-time FT-IR spectrum after ventilation was utilized as background. Then, the reaction mixtures (50 mL/min NO, 50 mL/min O_2) were introduced into the cell. The NO adsorption on the catalysts was carried out for 20 min. Next, photocatalysts were illuminated by a visible light source (MUA-210) for 1 hour. The real-time FTIR spectra were detected every eight minutes. Meanwhile the gas fluxes remain

constant (50 mL/min NO, 50 mL/min O_2). After turning off the light, FT-IR spectra were tested every two minutes with the same gas fluxes. The IR scanning ranges were 4000-600 cm^{-1} and 2200-700 cm^{-1}, which were analyzed to reveal the photocatalytic oxidation process on the catalysts.

Figures:

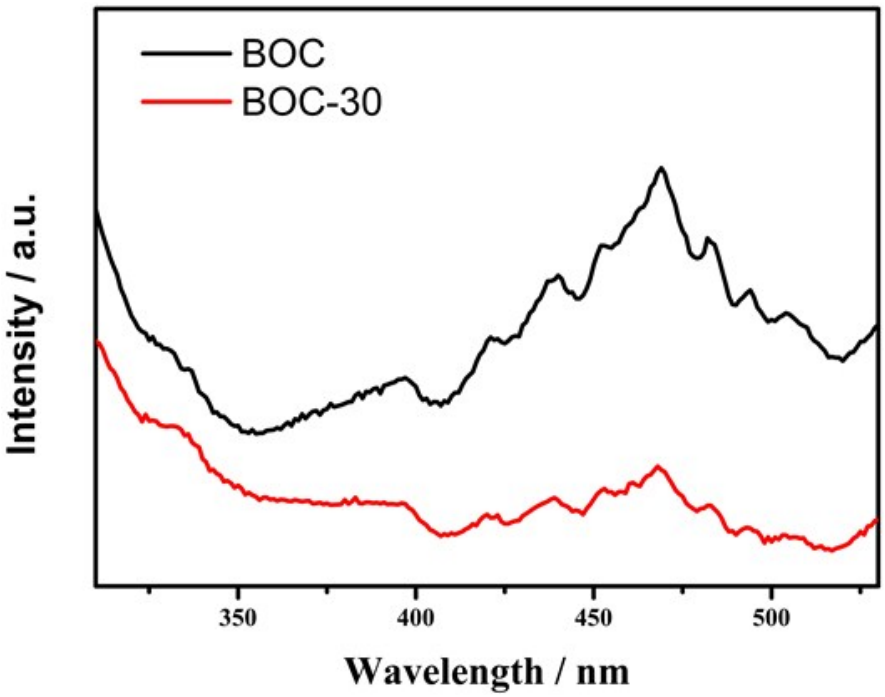

Figure S1. Photoluminescence spectra (PL) of BOC and BOC-30 samples.

Tables:

Table S1. The S_{BET}, pore volume, peak diameter, and NO removal ratio of as-prepared samples.

Sample name	S_{BET} (m^2/g)	Pore volume(cm^3/g)	Peak diameter(nm)	NO η（%）
BOC	4.77	0.01	9.00	11.76
BOC-10	6.45	0.02	12.61	24.13
BOC-30	7.29	0.04	18.18	36.78
BOC-50	6.80	0.02	12.40	31.82

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(1) Cui, W.; Li, J. Y.; Dong, F.; Sun, Y. J.; Jiang, G. M.; Cen, W. L.; Lee, S. C.; Wulle, Z. B. Highly Efficient Performance and Conversion Pathway of Photocatalytic NO Oxidation on SrO-Clusters@Amorphous Carbon Nitride. *Environ. Sci. Technol.* **2017**, 51, 10682-10690.

(2) Zhao, Z.W.; Zhang, W.D.; Sun, Y.J.; Yu, J.Y.; Zhang, Y.X.; Wang, H.; Dong, F.; Wu, Z.B. Bi Cocatalyst/Bi_2MoO_6 microspheres nanohybrid with SPR-promoted visible-light photocatalysis. *J. Phys. Chem.C* **2016**, 120, 11889-11898..