

## Supporting Information for

### Excitons-free, non-sensitized degradation of 2-naphthol by facet-dependent BiOCl under visible light: a novel evidence of surface-state photocatalysis

Sunxian Weng, ZengXia Pei, Zuyang Zheng, Jun Hu and Ping Liu\*

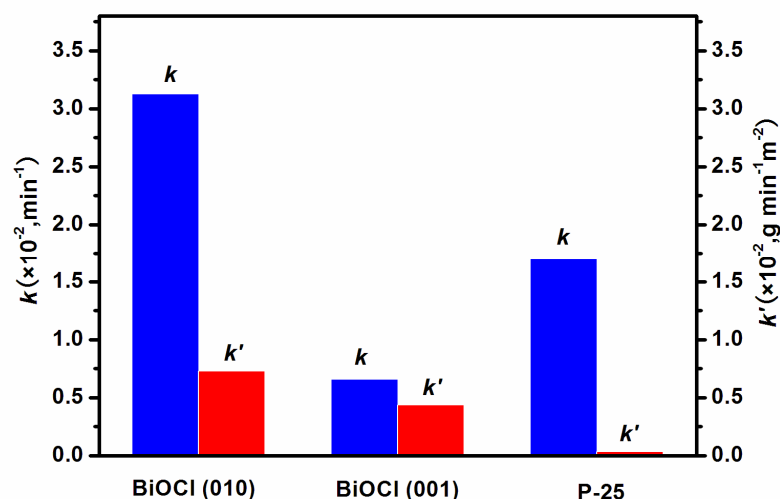
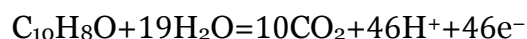
<sup>†</sup>Research Institute of Photocatalysis, Fujian Provincial Key Laboratory of Photocatalysis–State Key Laboratory Breeding Base, Fuzhou University, Fujian 350002, China

\*Corresponding Author: E-mail: liuping @fzu.edu.cn (P. Liu).

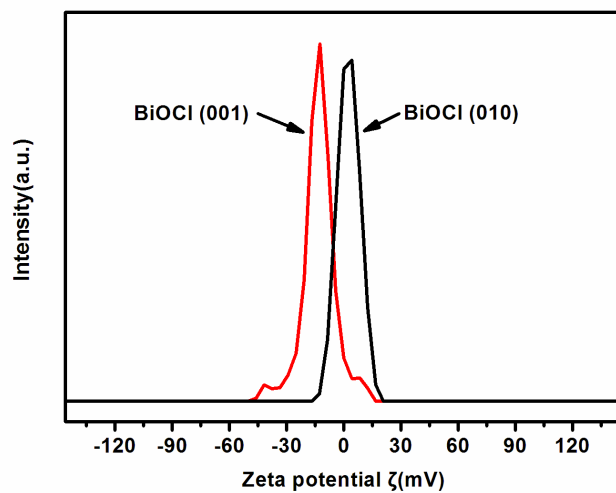
The apparent quantum yield (AQY) for degradation of 2-NAP was measured using a similar experimental setup, only with a 420 nm band-pass filter. The average intensity of irradiation was measured as 3.5 mW cm<sup>-2</sup> (ILT 950 spectroradiometer) and the irradiation area was 10 cm<sup>2</sup>. After 5 h irradiation, the degraded 2-NAP reached 1.07 μmol on BiOCl (010). The AQY was estimated as: <sup>1</sup>

$$\text{AQY (\%)} = \frac{\text{Number of reacted electrons}}{\text{Number of incident photons}} \times 100\%$$

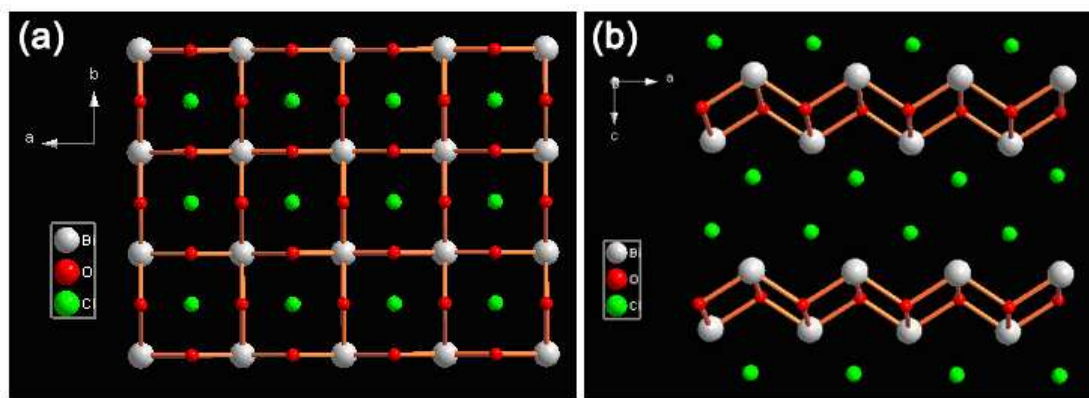
Because of the degradation of 2-NAP involves different processes of the chemical reaction, the calculation of AQY for degradation of 2-NAP only consider mineralization process of 2-NAP. In fact the stoichiometry mineralization of 2-naphthol will involve 46mol exchanged electrons.<sup>2</sup>



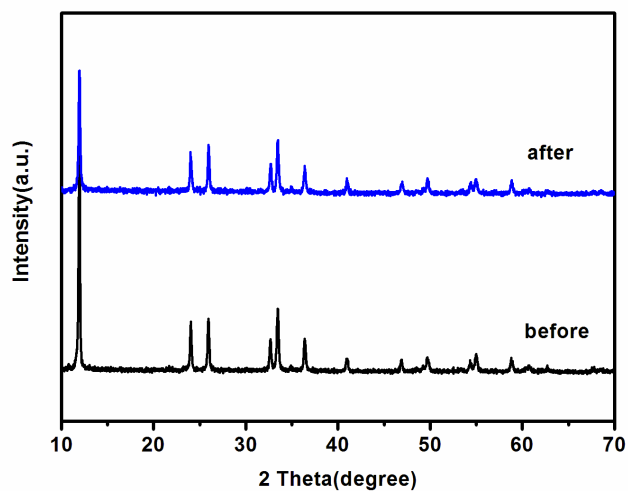
**Figure S1.** A comparison on the reaction rate constants for photocatalytic degradation of 2-NAP over the BiOCl (010), BiOCl (001) and P-25 under visible light irradiation



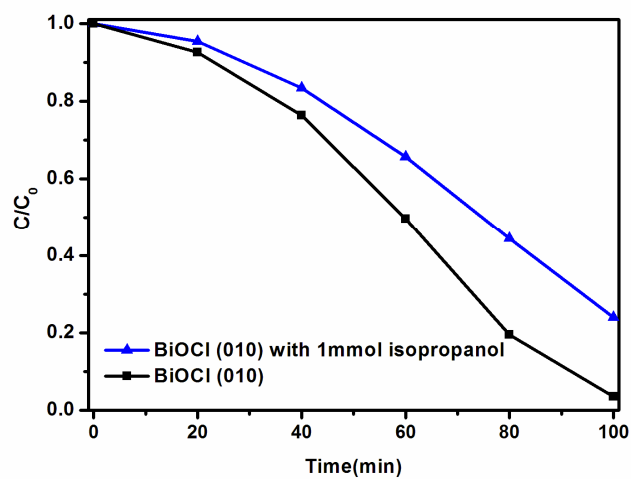
**Figure S2.** Zeta potential of BiOCl (001) and BiOCl (010)



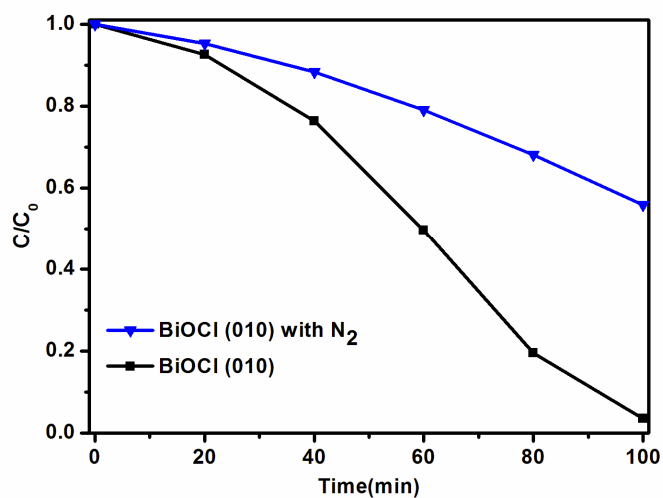
**Figure S3.** Top view of Atomic structure of the BiOCl crystals: (a) (001) facet and (b) (010) facet



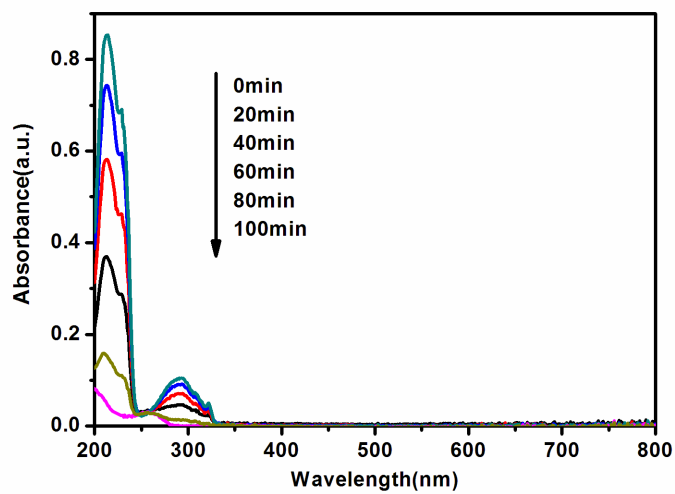
**Figure S4.** XRD patterns of the BiOCl (010) before and after photocatalytic reaction



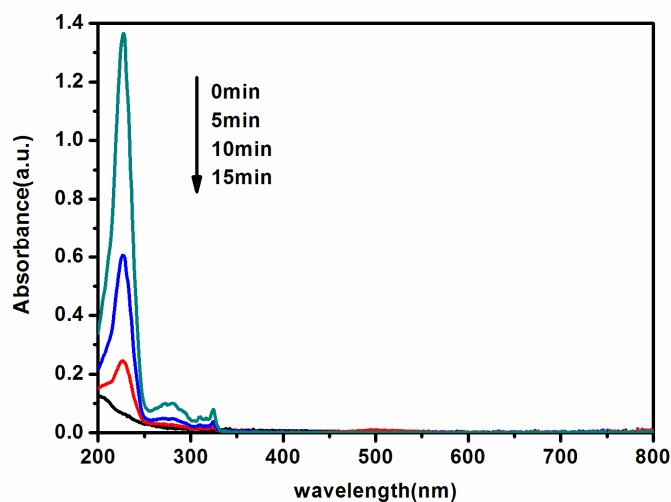
**Figure S5.** Photocatalytic degradation of 2-NAP in the presence of 1mmol isopropanol under visible light irradiation over BiOCl (010)



**Figure S6.** Photocatalytic degradation of 2-NAP in the presence of N<sub>2</sub> under visible light irradiation over BiOCl (010)



**Figure S7.** Temporal UV-visible adsorption spectral changes for 1-NAP solution ( $2 \times 10^{-5}$  mol L<sup>-1</sup>) as a function of visible irradiation time with BiOCl (010)



**Figure S8.** Temporal UV-visible adsorption spectral changes for 2, 3-DN solution ( $4 \times 10^{-5}$  mol  $L^{-1}$ ) as a function of visible irradiation time with BiOCl (010)

## Reference

- (1) Chen, X.; Shen, S.; Guo, L.; Mao, S. S. *Chem. Rev.* **2010**, *110*, 6503-6570.
- (2) Panizza, M.; Michaud, P. A.; Cerisola, G.; Comninellis, C. *J. Electroanal. Chem.* **2001**, *507*, 206-214.