Supporting Information

The Enhanced Photocatalytic Properties for H_2O_2 Production over Bi/BiOCl Composite

Liran Liu, Hanping Fu, Yating Zeng, Li Feng, Tianxiang Zhang, Qingshuang Liang*, Xiufeng Xiao*

Fujian Provincial Key Laboratory of Advanced Materials Oriented Chemical Engineering, College of Chemistry and Material Science, Fujian Normal University, Fuzhou, Fujian 350007, China

It can be seen from the figure S1 that pure $Ti(SO_4)_2$ has no absorption peak at 400nm. The absorption curve of the complex solution after the reaction of $Ti(SO_4)_2$ and H_2O_2 was obtained by scanning. It was found that the complex formed a new peak at 400nm(H_2TiO_4) and became stronger with the increase of H_2O_2 concentration.

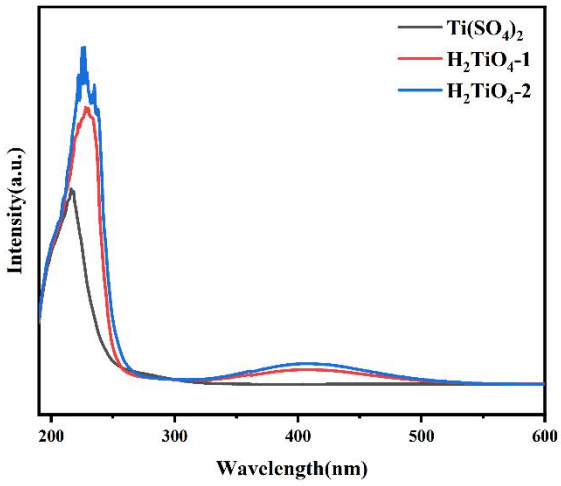

Fig. S1 UV-vis absorption spectra for H_2TiO_4

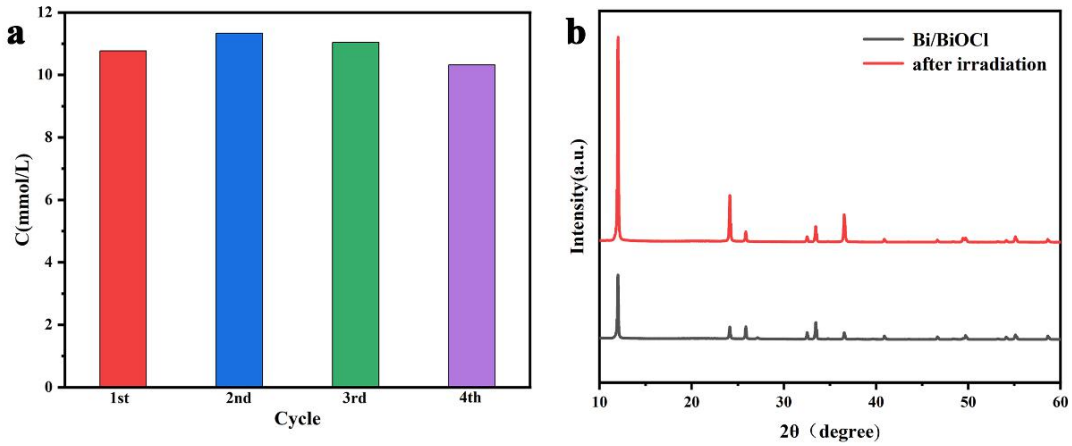

Fig. S2 catalytic stability of Bi/BiOCl (a) and XRD (b) of fresh and reused Bi/BiOCl

In the cycling tests, the main processes were the same as those of photocatalytic H_2O_2-production experiments. After each cycle, in order to reduce the possible loss of photocatalyst, the resulting suspension solution was centrifugated, washed with water for one time and directly re-dispersed in 40 mL of aqueous solution containing 5 vol% formic acid. Then start the next cyclic stability test.

Table. S1 Comparison of photocatalytic H_2O_2 production with Different Catalysts

Catalysts	Dosage (mg)	energy	Reaction solution	H_2O_2 production μmol /h
Pt/Bi_2WO_6[1]	65	150 W Xe arc lamp >400 nm	phenol/water solution	5
$Au/BiVO_4$[2]	50	Xe arc lamp >420 nm	EtOH/water solution	257
BiOCl[3]	50	150 W Ultrasonic cleaner	water	28
$CoWO_4/Bi_2WO_6$[4]	50	300 W Xenon lamp with a 420 nm cut-off filter	Water (adjusting the pH with $HClO_4$)	<50
xrGO−$BiVO_4$[5]	8	Newport solar simulator with an AM 1.5 air filter	Water (PH=3)	<175

This work	50	300 W Xe lamp	HCOOH/water solution	5400

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