Supporting Information

Tailored fabrication of triple-surface-features in well-crystalline BiOCl photocatalyst and their synergistic role in catalytic process

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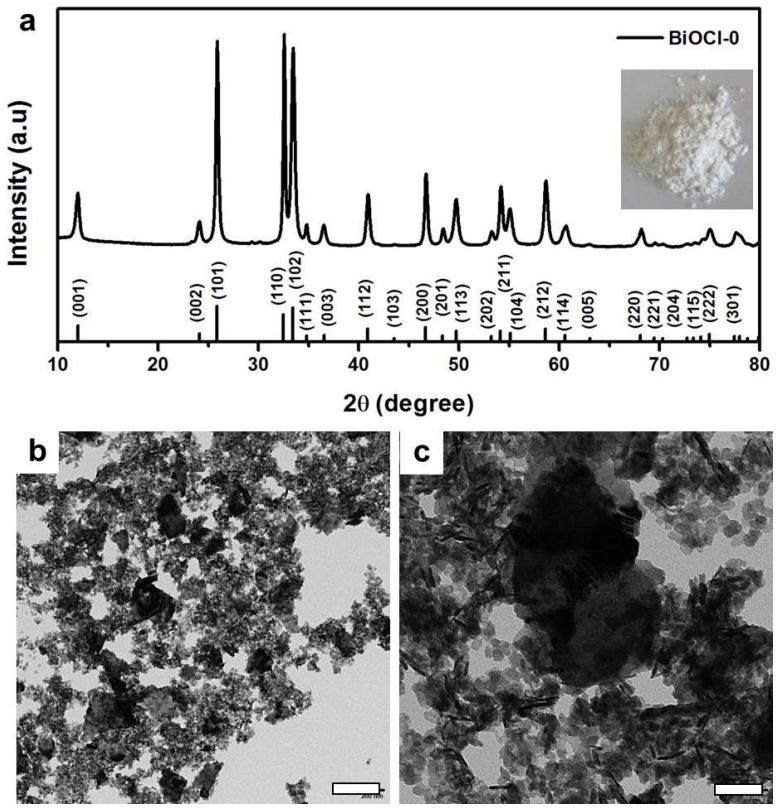

Fig. S1 (a) The PXRD pattern of BiOCl nanoplates synthesized without using dual-surfactants (PSS and PVP) in the reaction system (denoted as BiOCl-0). Inset is the corresponding powder of BiOCl-0; representing its white color. (b) Low- and (c) high- magnification TEM images of BiOCl-0. The scale bars for (b) and (c) are 200 and 50nm respectively.

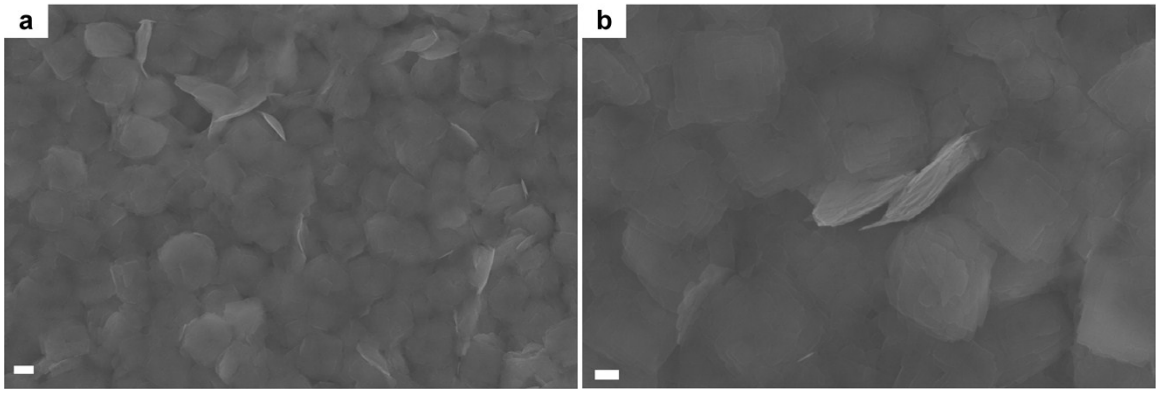

Fig. S2 SEM images of BiOCl-UCNP from (a) low magnification and (b) high magnification. The scale bars for (a) and (b) are 200 and 100 nm respectively.

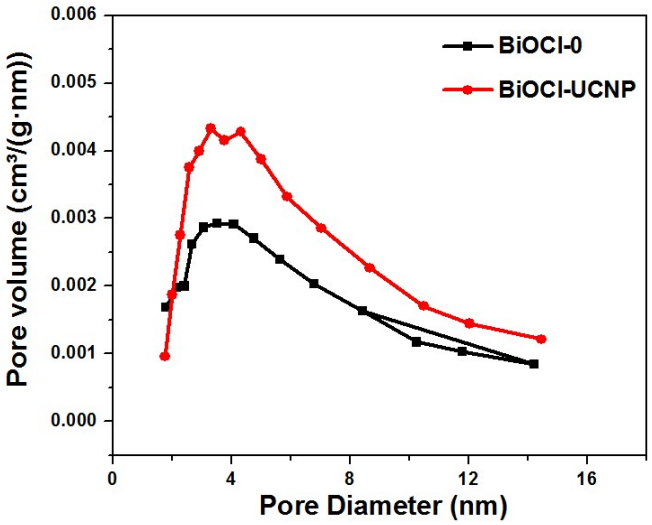

Fig. S3 Pore size distribution of BiOCl-UCNP and BiOCl-0.

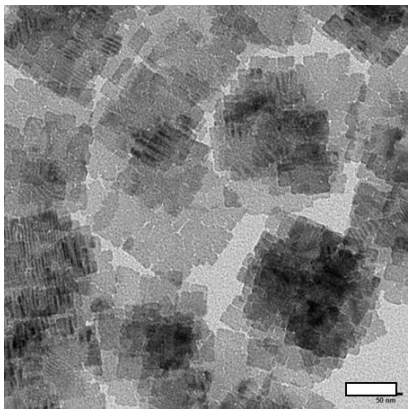

Fig. S4 TEM image of BiOCl-UCNP observed, after using it for 8 consecutive cycles of photodegradation; displaying that BiOCl-UCNP are highly stable and retained its morphology during multi-cycles of degradation. The scale bar is 50 nm.

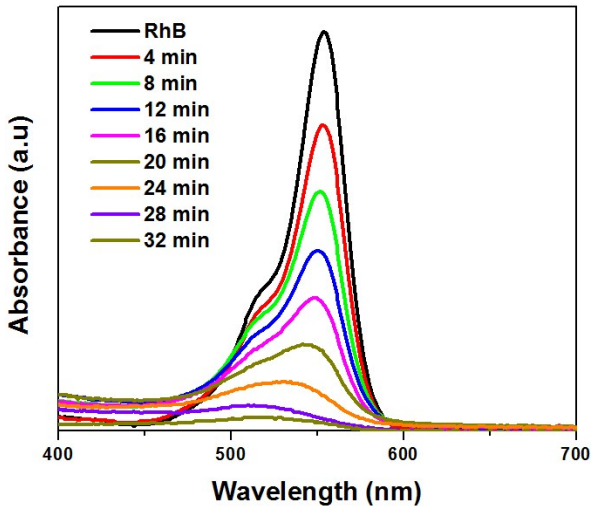

Fig. S5 Temporal absorption spectra of the RhB solution degraded with BiOCl-UCNP under the exposure of natural sunlight. This result confirmed the potential of BiOCl-UCNP for real solar-driven applications.

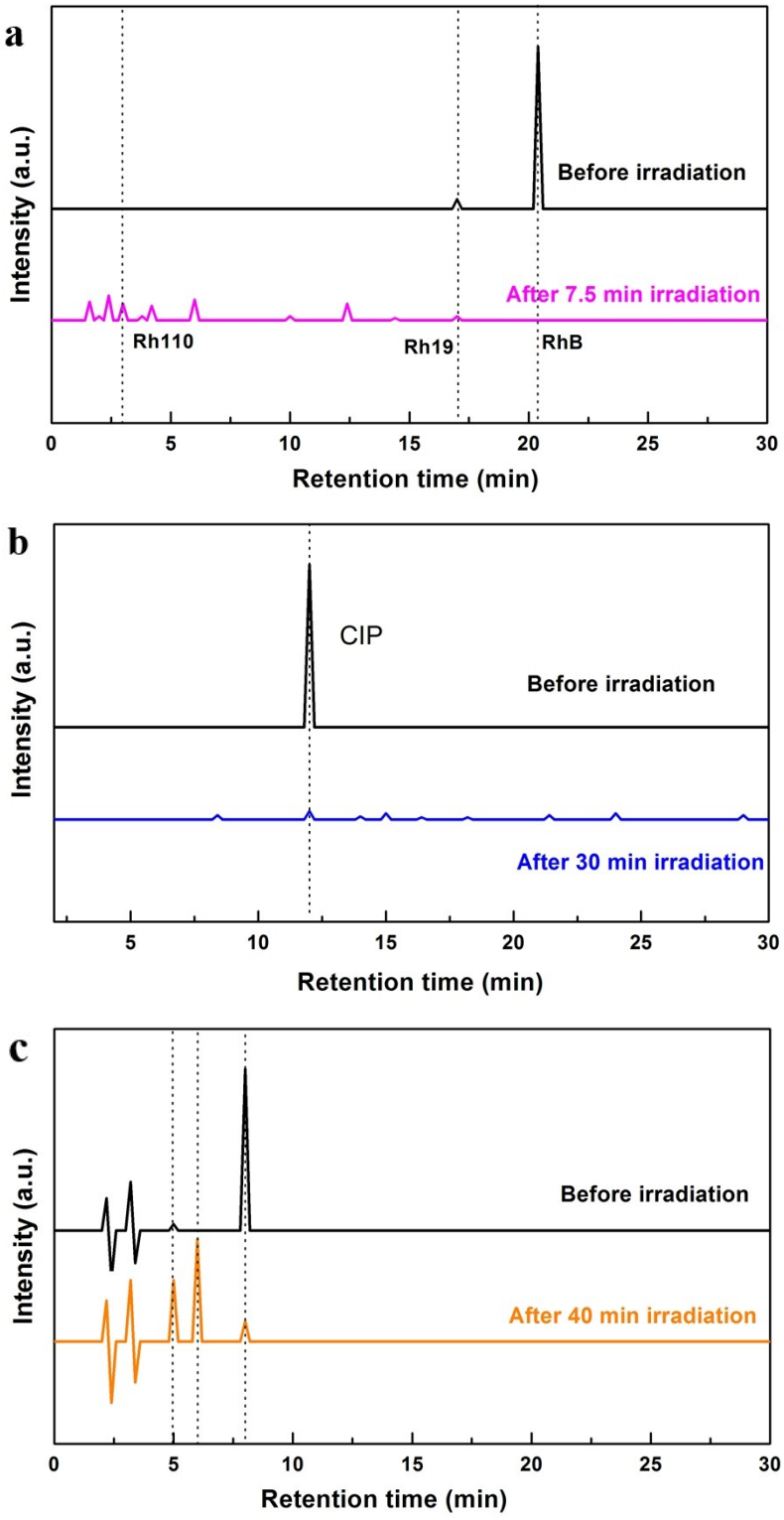

Fig. S6 HPLC spectra of the samples (a) RhB, (b) CIP and (d) BPA before and after photodegradation;

Discussion related to HPLC spectra of photodegraded samples

HPLC spectra was employed to further investigate the possible degradation pathways for the photodegradation of RhB, CIP and BPA over BiOCl-UCNP. As presented in Fig. S5a, the sample of RhB which was irradiated for given time shows significantly weakened chromatographic peak at retention time 20.4 min. This implies that RhB molecules were efficiently decomposed during photodegradation process. At the same time, new chromatographic peaks (particularly, Rh19 and Rh110) were detected in the photodegraded sample of RhB. This further indicates the formation of intermediates and stepwise N-dethylation of RhB, which finally lead to the photodegraded product carbon dioxide and water.

The HPLC spectra for the photodegradation of CIP over BiOCl-UCNP is shown in Fig. S5a. The comparative spectra of CIP samples before and after photodegradation clearly reveals the diminishing of chromatographic peaks at retention time 12.3 min, reflecting that CIP has been photodegraded, and further mineralized to the carbon dioxide and water. However, few new peaks appeared out in the photodegraded sample, indicating the generation of intermediates which obviously lead to degradation of CIP.

Photooxidation spectra of BPA before and after photodegradation is showed in Fig. S5c. After 40 minutes of photodegradation, the intensity of chromatographic peak at retention time 8.01 min decreases significantly, indicating photodegradation of BPA. Whereas, the photodegraded sample displayed two new peaks at retention time of 5.05 min and 6.1 min, which could be attributed to the two intermediate compounds products of the photooxidation of BPA. This directly reflect that BPA has been mineralized, and finally photodegraded to carbon dioxide and water.