

## Supplementary Information

### **Reactable ionic liquid assisted rapid synthesis of BiOI hollow microspheres at room temperature with enhanced photocatalytic activity**

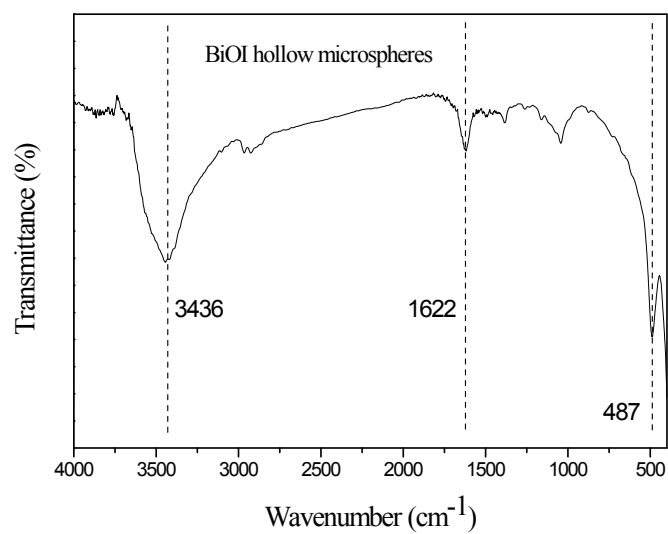
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Zhenjiang, 212013, P. R. China

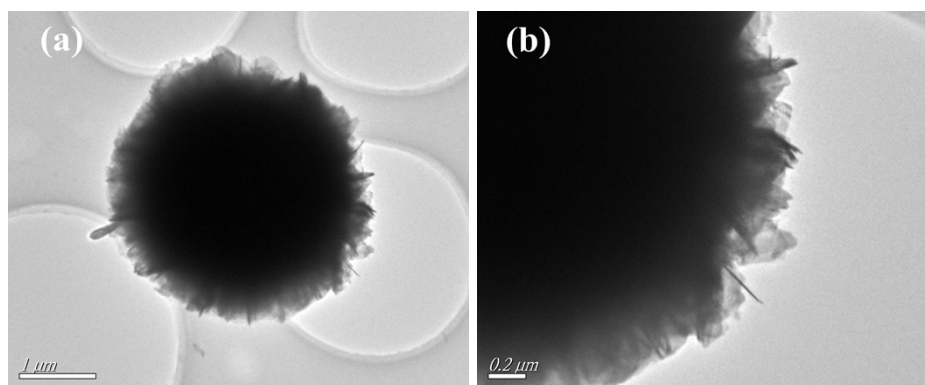
<sup>b</sup>School of the Environment, Jiangsu University, Zhenjiang 212013, P. R. China

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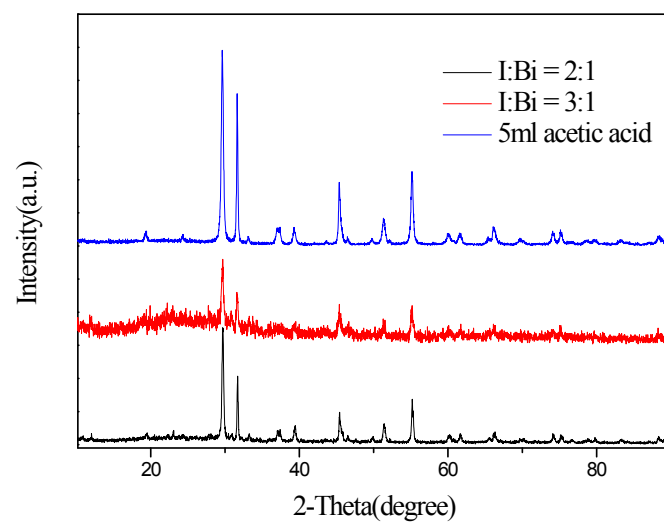
E-mail address: xjx@ujs.edu.cn; lhm@ujs.edu.cn



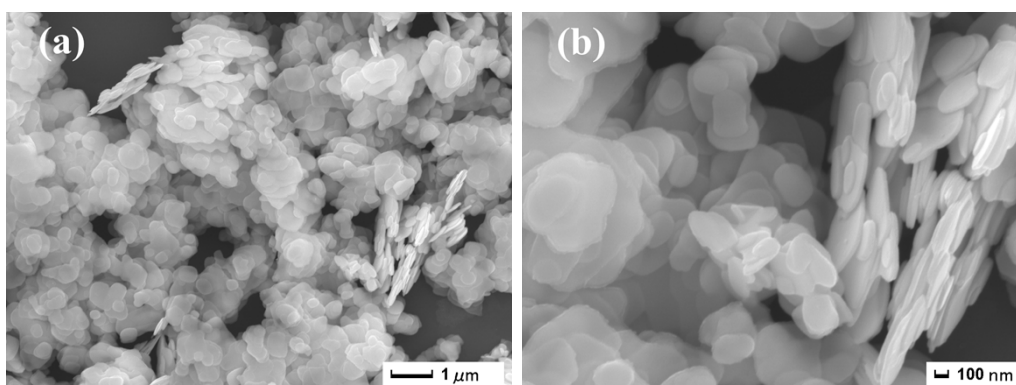
**Figure S1** FT-IR spectra of BiOI hollow microspheres synthesized by [Bmim]I ionic liquid.



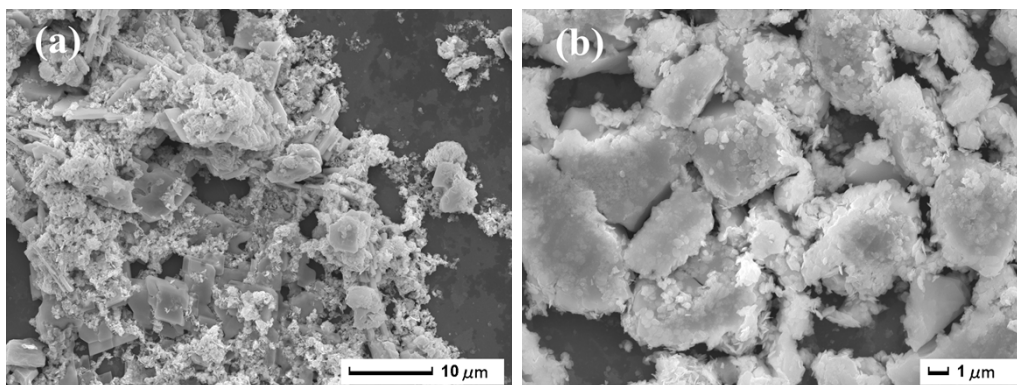
**Figure S2** TEM images of the BiOI hollow microspheres synthesized by ionic liquid [Bmim]I after the dropwise addition completed and without further stirred.



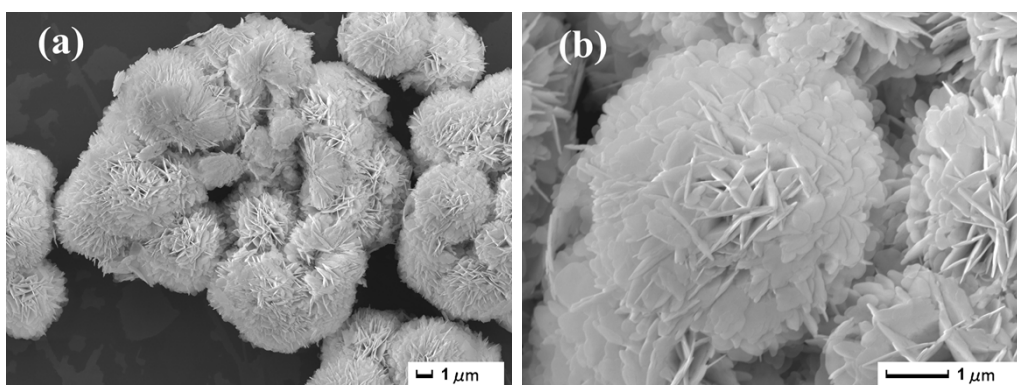
**Figure S3** XRD pattern of BiOI samples synthesized by ionic liquid [Bmim]I with different I:Bi ratio and the amount of acetic acid.



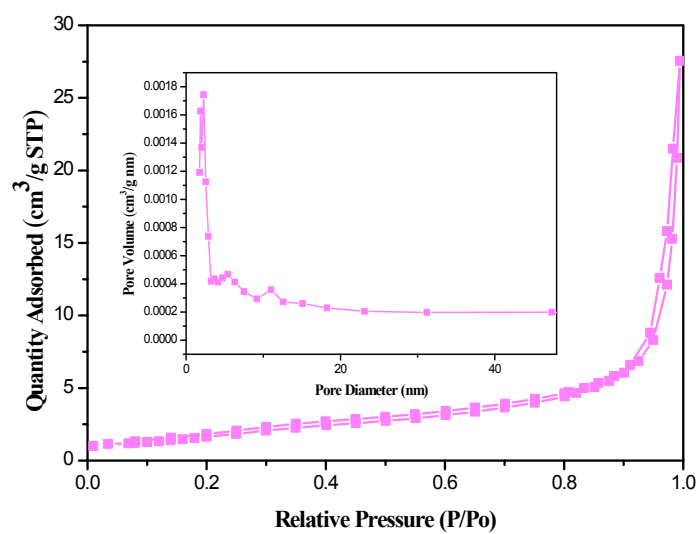
**Figure S4** SEM images of the BiOI sample synthesized by ionic liquid [Bmim]I with I:Bi ratio was 2:1.



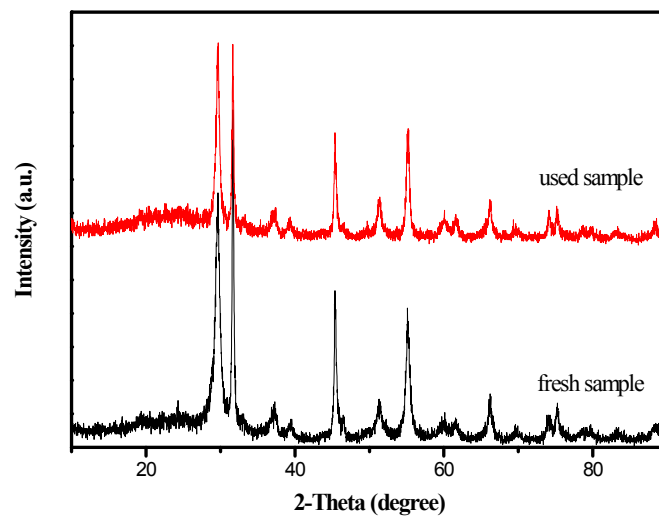
**Figure S5** SEM images of the BiOI sample synthesized by ionic liquid [Bmim]I with I:Bi ratio was 3:1.



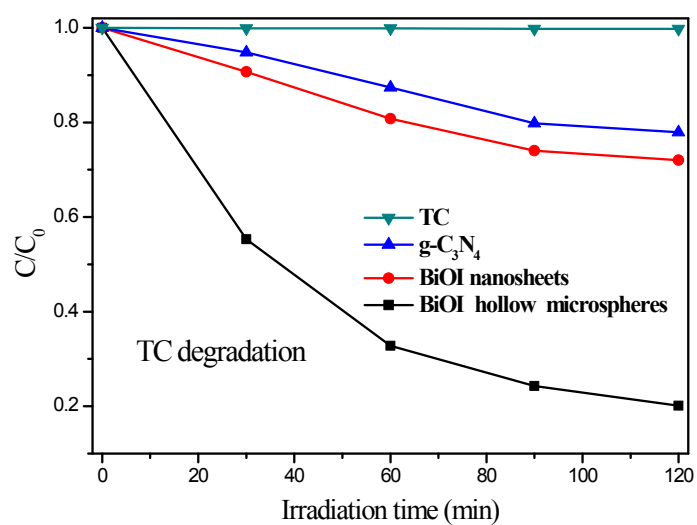
**Figure S6** SEM images of the BiOI sample synthesized by ionic liquid [Bmim]I with the amount of acetic acid was 5 ml.



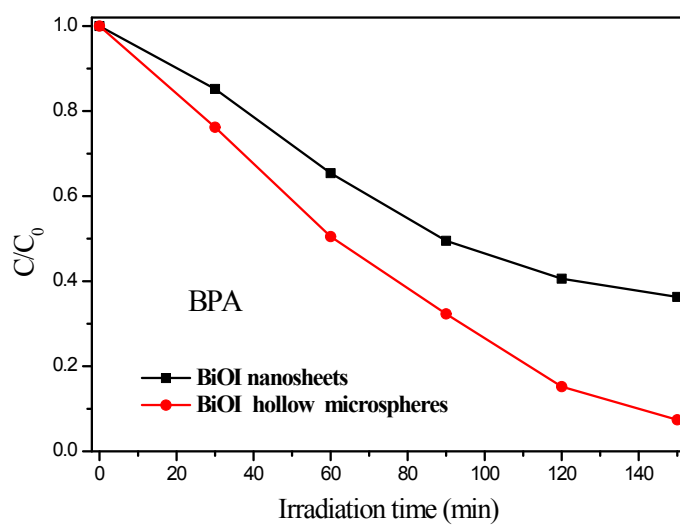
**Figure S7** Nitrogen absorption-desorption isotherms of BiOI nanosheets synthesized by using KI.



**Figure S8** XRD patterns of the BiOI hollow microspheres before and after the photocatalytic experiments.



**Figure S9** Photocatalytic degradation of TC in the presence of BiOI hollow microspheres, BiOI nanosheets and g-C<sub>3</sub>N<sub>4</sub> under visible light irradiation.



**Figure S10** Photocatalytic degradation of BPA in the presence of BiOI hollow microspheres and BiOI nanosheets under visible light irradiation.

Series	Photocatalyst	The first order kinetic equation	$k$ ( $min^{-1}$ )	$R^2$
1	BiOI hollow microspheres	$-\ln(C/C_0)=0.0238 t$	0.0238	0.9901
2	BiOI nanosheets	$-\ln(C/C_0)=0.0059 t$	0.0059	0.9988
3	TiO <sub>2</sub>	$-\ln(C/C_0)=0.0023 t$	0.0023	0.9913
4	g-C <sub>3</sub> N <sub>4</sub>	$-\ln(C/C_0)=0.0012 t$	0.0012	0.9932

**Table S1** Pseudo-first-order rate constant for RhB photocatalytic oxidation under different photocatalysts