

## Supplementary data

### Synergetic degradation of rhodamine B on $\text{BiOCl}_x\text{Br}_{1-x}$ sheets by combined photosensitization and photocatalysis under visible light irradiation

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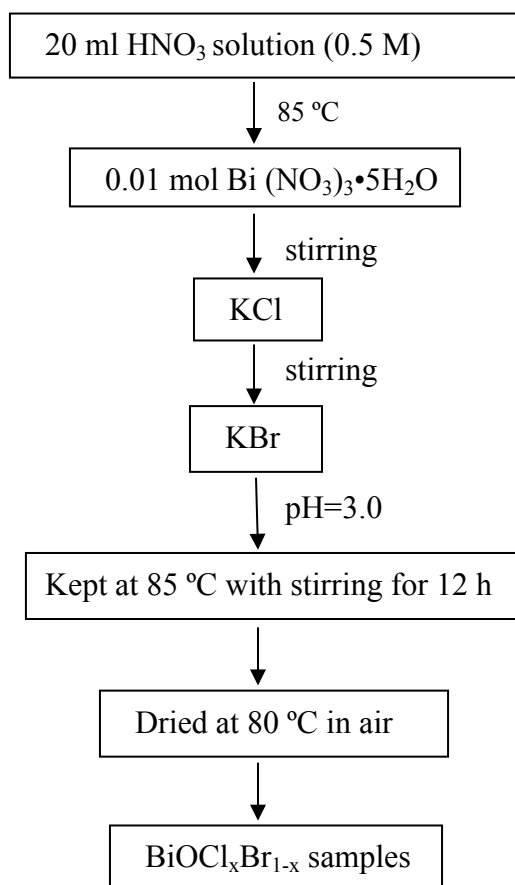
**Summary:** This file contains 9 pages, 2 tables, 7 figures.

**Table S1** The Eg of samples with different Cl/Br ratios

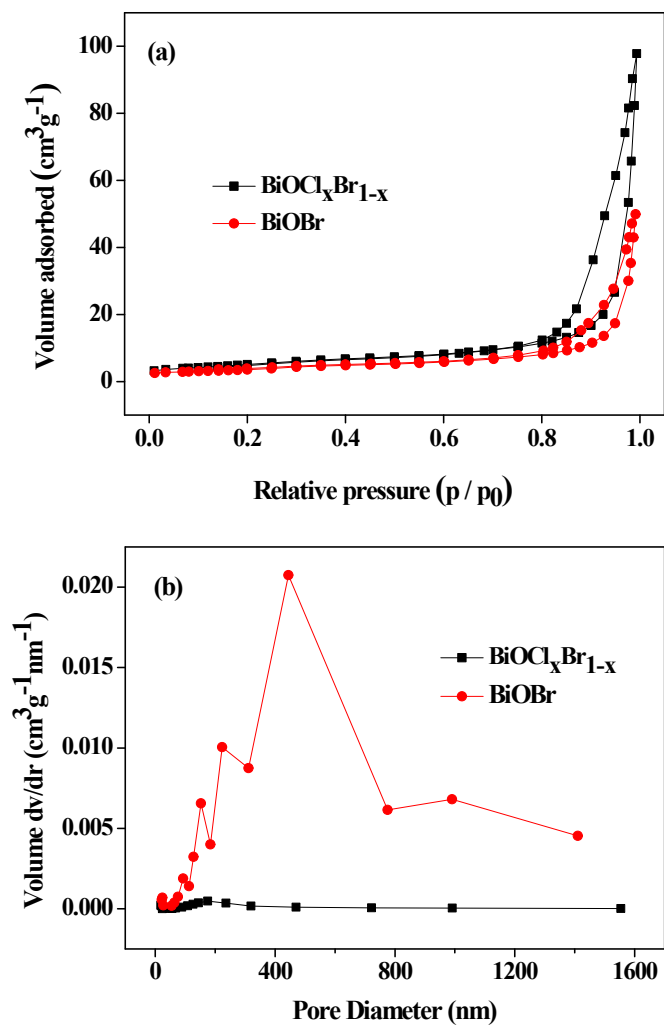
Samples with different Cl/Br ratios	Eg (eV)
0:1	2.75 ( $E_{CB}=0.30$ , $E_{VB}=3.05$ )
1:1	2.93 ( $E_{CB}=0.27$ , $E_{VB}=3.20$ )
2:1	3.03
5:1	3.24
1:0	3.26 ( $E_{CB}=0.13$ , $E_{VB}=3.39$ )
1:2	2.83
1:5	2.79

**Table S2** BET surface areas of  $\text{BiOCl}_x\text{Br}_{1-x}$  samples

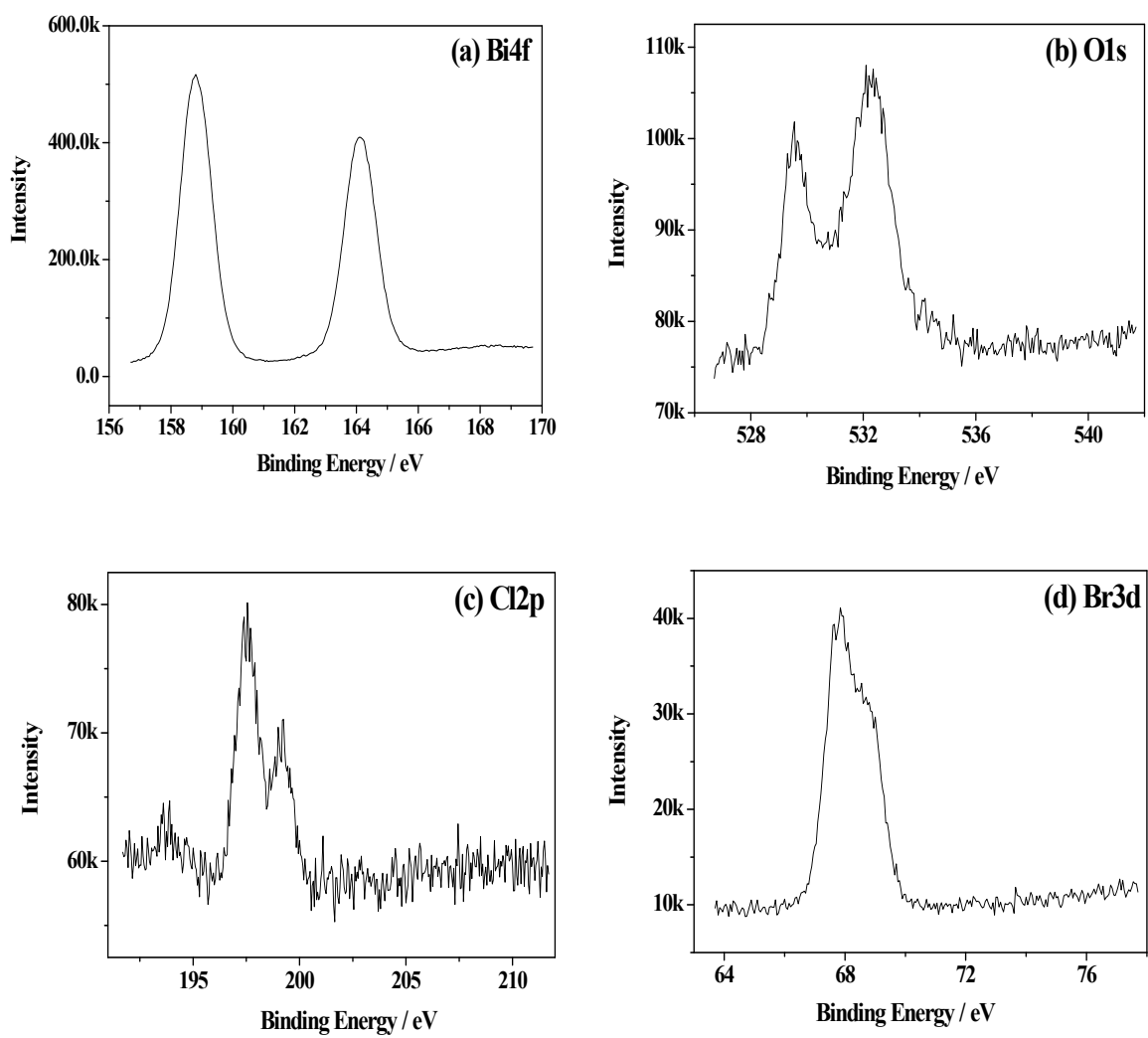
Samples with different Cl/Br ratios	$A_{\text{BET}}$ ( $\text{m}^2\text{g}^{-1}$ )
0:1	13.02
1:1	19.00
2:1	10.94
5:1	10.31
1:0	5.70
1:2	9.18
1:5	6.51



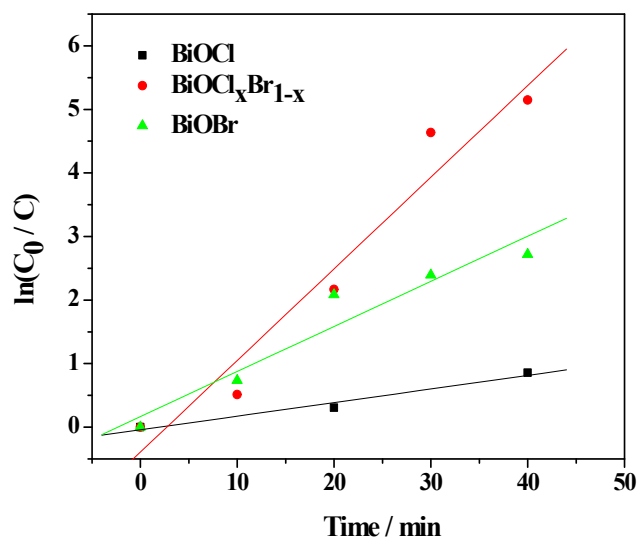
**Figure S1** A schematic diagram for the synthesis routes of  $\text{BiOCl}_x\text{Br}_{1-x}$  samples



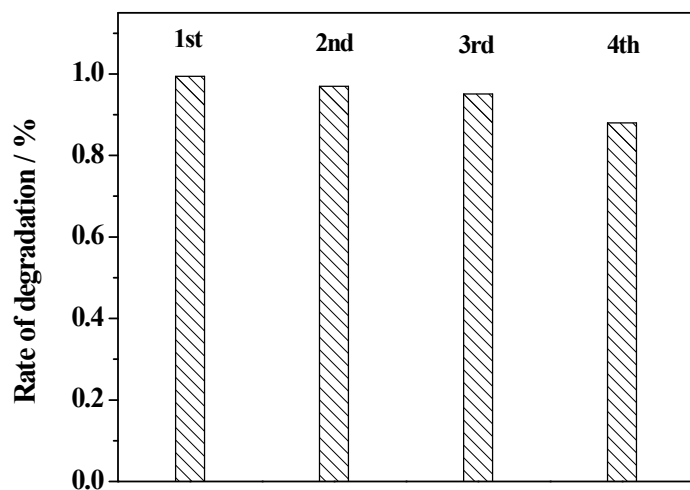
**Figure S2** Nitrogen adsorption–desorption isotherms (a) and pore size distributions (b) of the as-synthesized  $\text{BiOCl}_x\text{Br}_{1-x}$  (Cl:Br=1:1) and  $\text{BiOBr}$



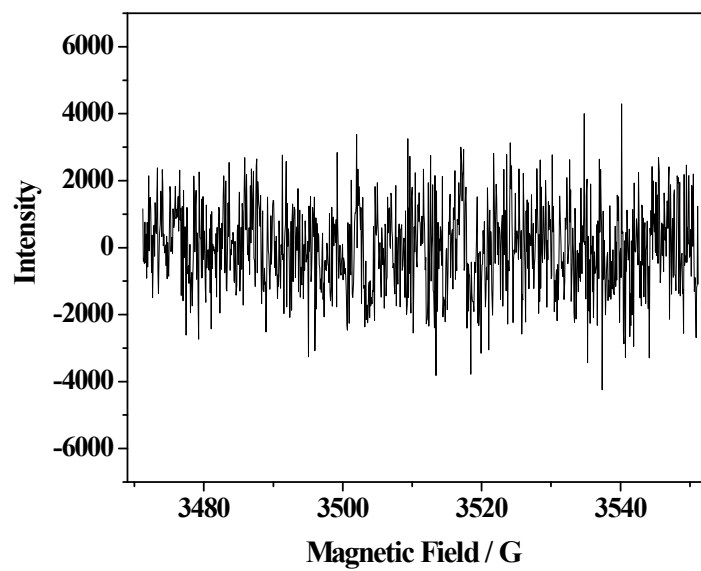
**Figure S3** XPS peaks for Bi4f, O1s, Cl2p and Br3d in  $\text{BiOCl}_x\text{Br}_{1-x}$  (Cl:Br=1:1) sample



**Figure S4** Comparison of rate constants (fitted by pseudo-1st-order kinetic model) of BiOCl<sub>x</sub>Br<sub>1-x</sub> (Cl:Br=1:1), BiOBr and BiOCl

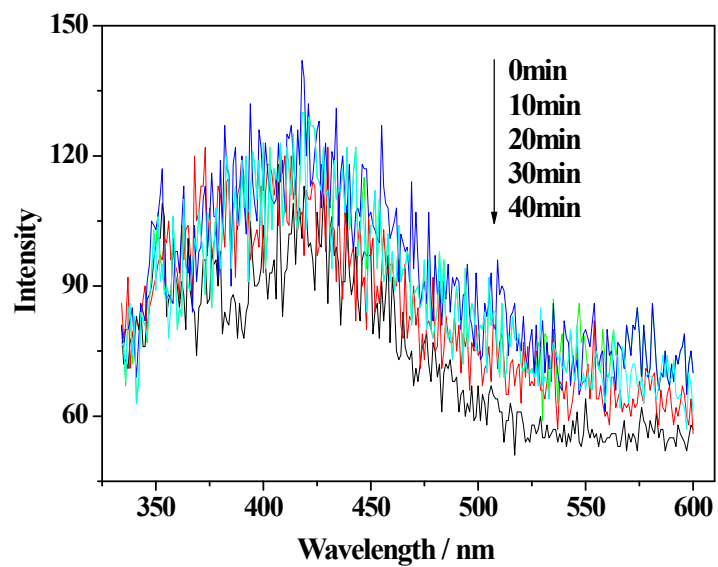


**Figure S5** The degradation rate of cycling runs for the photodegradation of RhB in the presence of  $\text{BiOCl}_x\text{Br}_{1-x}$  (Cl:Br=1:1) under visible light irradiation



**Figure S6** DMPO spin-trapping ESR spectra in  $\text{BiOCl}_x\text{Br}_{1-x}$  (Cl:Br=1:1) aqueous dispersion for DMPO- $\cdot\text{OH}$  under visible light irradiation





**Figure S7** •OH-trapping PL spectra of suspensions in  $\text{BiOCl}_x\text{Br}_{1-x}$  (Cl:Br=1:1) / TA system under visible light irradiation