Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Enhanced *p*-Cresol Photodegradation over $BiOBr/Bi_2O_3$ in the Presence of Rhodamine B

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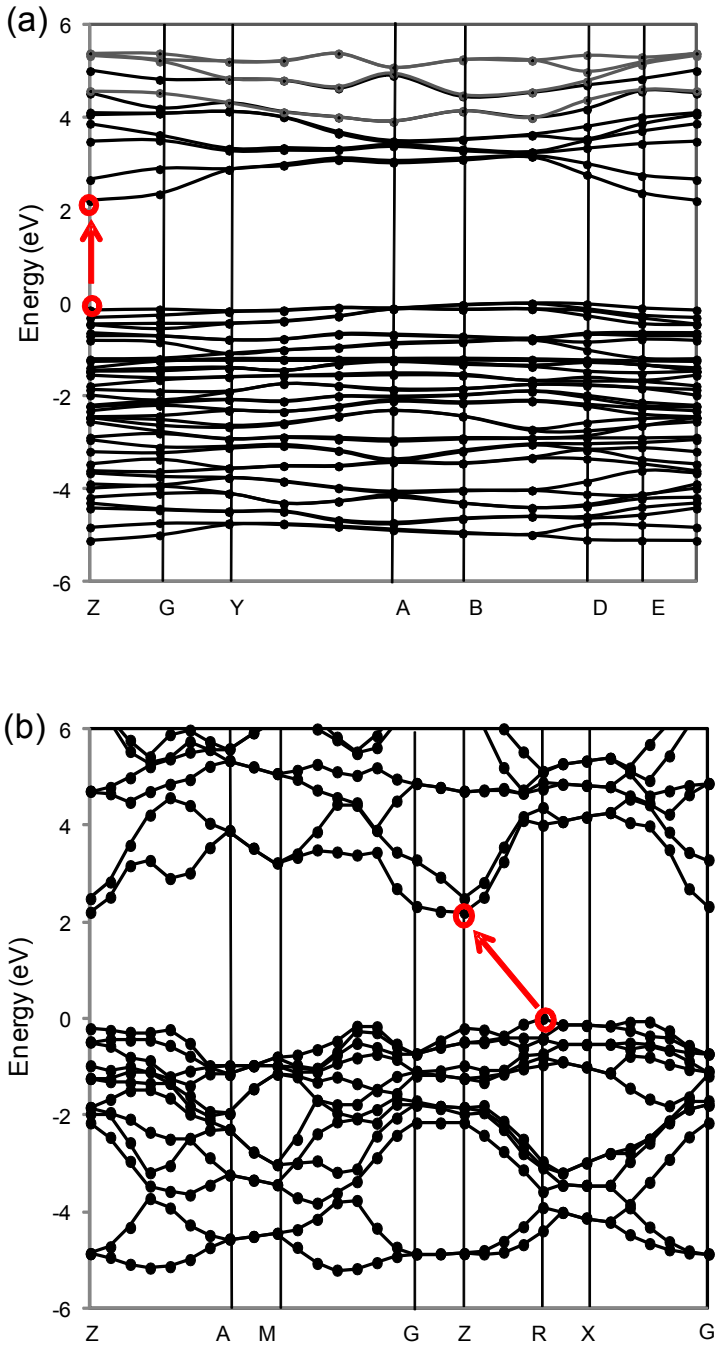

Fig. S1. Band structures of (a) Bi_2O_3 and (b) BiOBr.

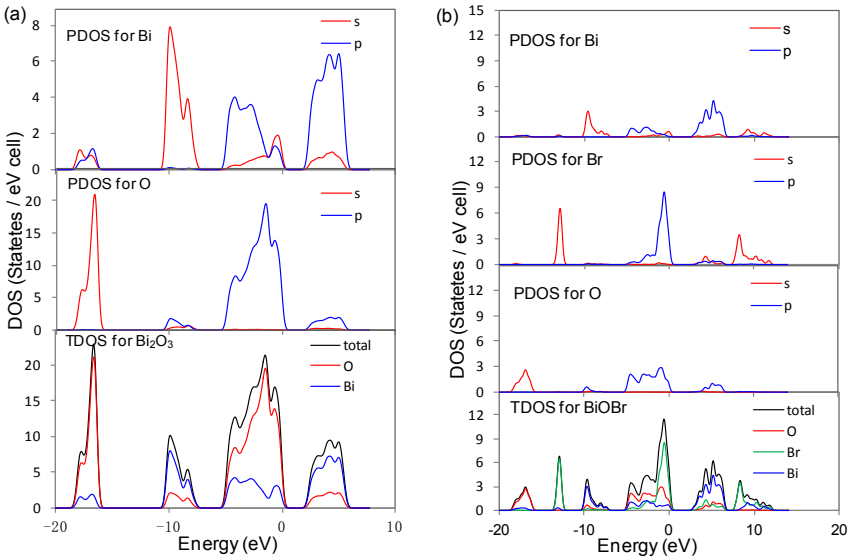

Fig. S2. Total and partial density of state of (a) Bi_2O_3 and (b) BiOBr calculated using CASTEP program package.

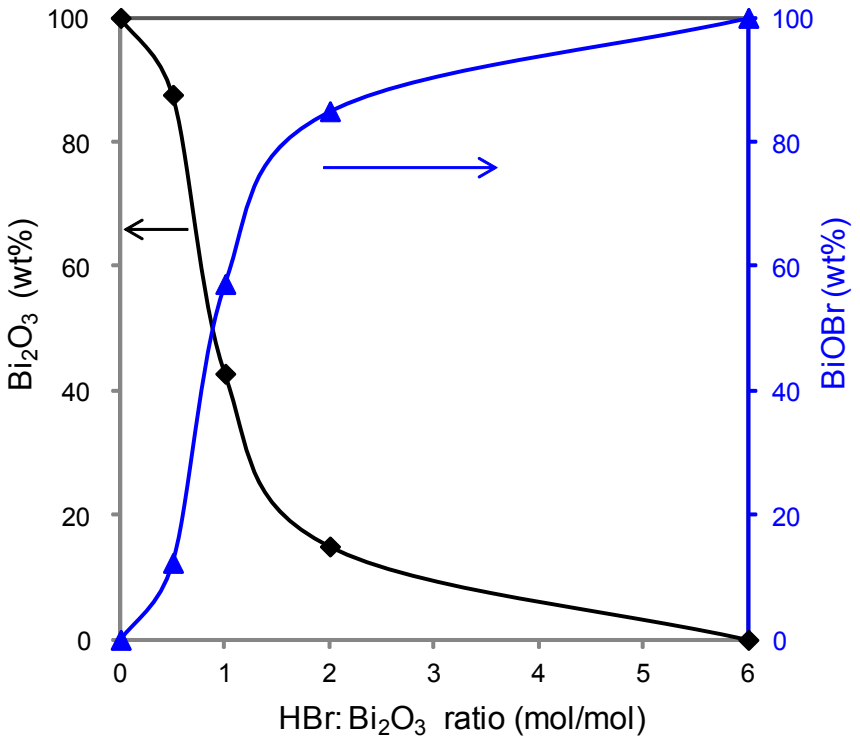

Fig. S3. Weight percentage of BiOBr and Bi_2O_3 as a function of HBr:Bi_2O_3 molar ratio.

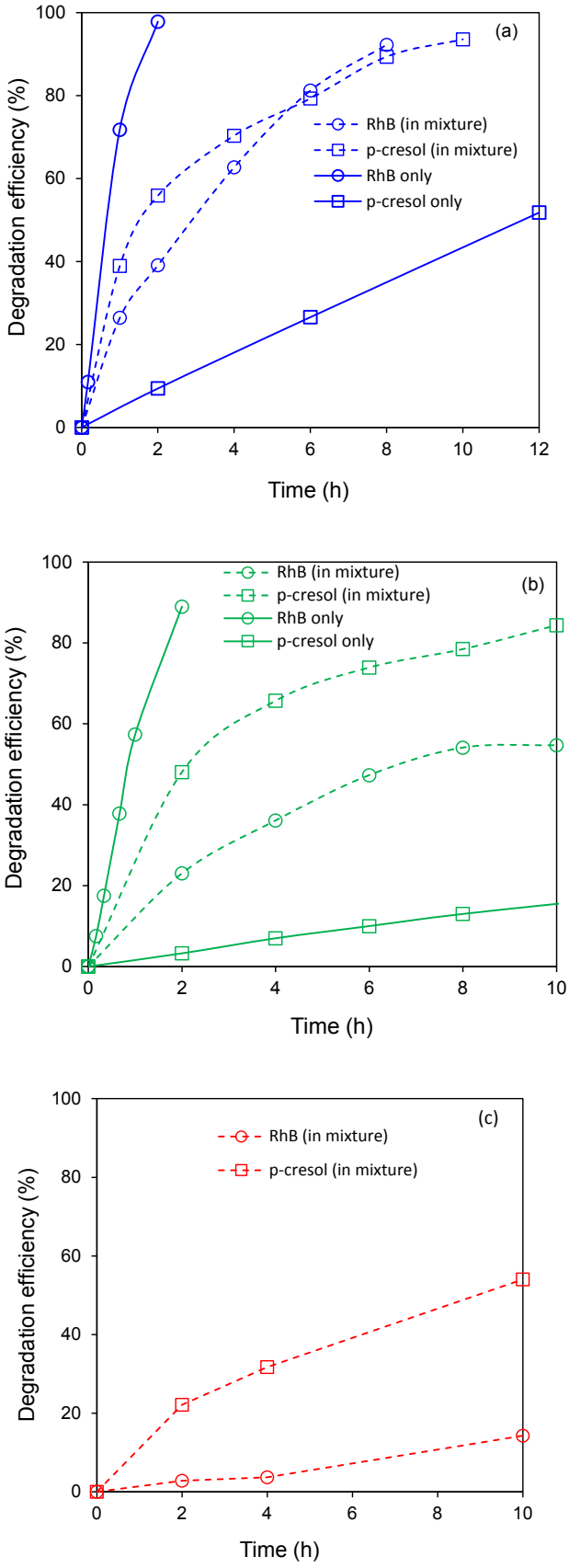

Fig. S4. Degradation of RhB and *p*-cresol singly and in mixtures under (a) blue and (b) green and (c) red LED light using 85% BiOBr/Bi_2O_3 as catalyst.

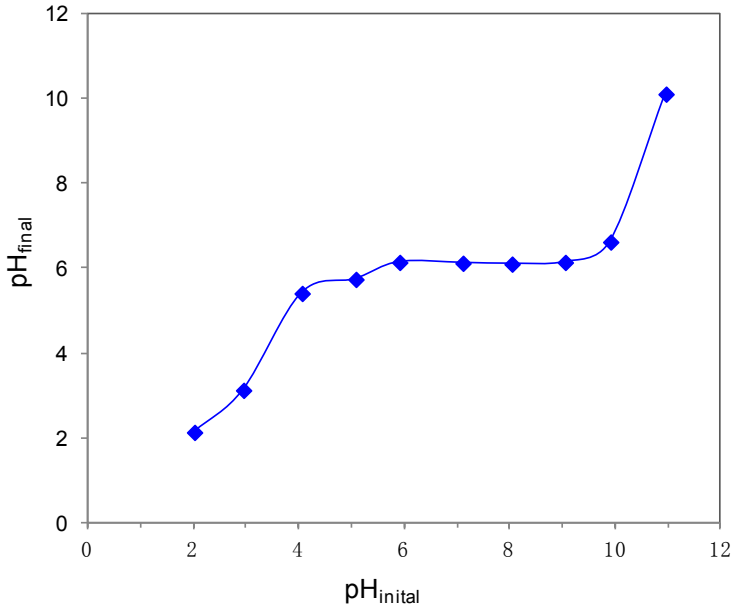

Fig. S5. Determination of pH at point of zero charge for 85% $BiOBr/Bi_2O_3$ composite.

Procedure:

To find the pH at the point of zero charge (pH_{PZC}), 0.01 g of the sample was placed in 10 ml of 0.1 M NaCl with the initial pH adjusted from 2.0 to 12.0 with either 0.1 mol/L HCl or NaOH. After equilibration, the final pH was determined and the pH_{PZC} was obtained from the plateau in the plot of pH_{final} versus $pH_{initial}$.[S1]

[S1] L. Xiao, W. Ma, M. Han, Z. Cheng, J. Hazard. Mater. 186 (2011) 690-698.

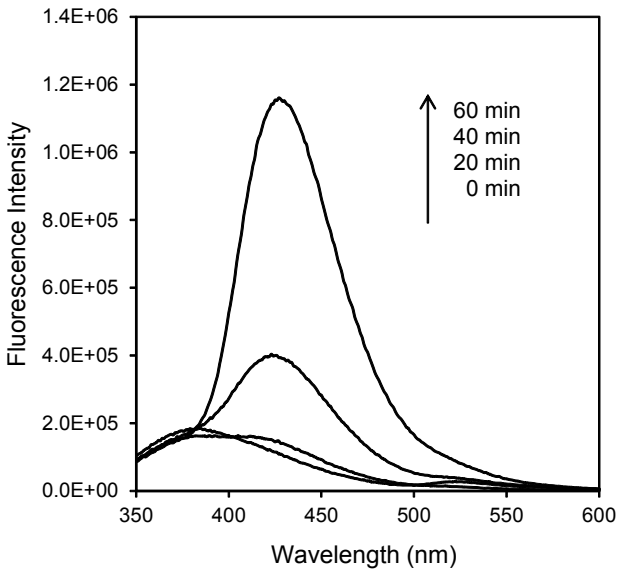

Fig. S6. Fluorescence spectrum of terephthalic acid solution under different illumination time in the presence of 85% $BiOBr/Bi_2O_3$.

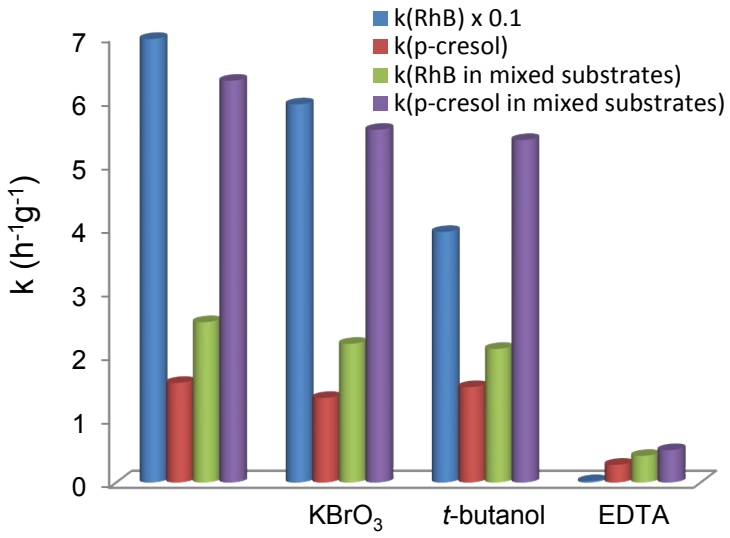

Fig. S7. Pseudo first-order rate constant for *p*-cresol and RhB with addition of $KBrO_3$, *tert*-butanol, EDTA as scavengers for $\bullet O_2^-$, •OH, and holes, respectively. 21 μmol of the scavenger was added to 100 ml solutions containing 20 ppm RhB, 24 ppm *p*-cresol or mixtures of both under visible light irradiation. Photocatalyst: 85% $BiOBr/Bi_2O_3$.

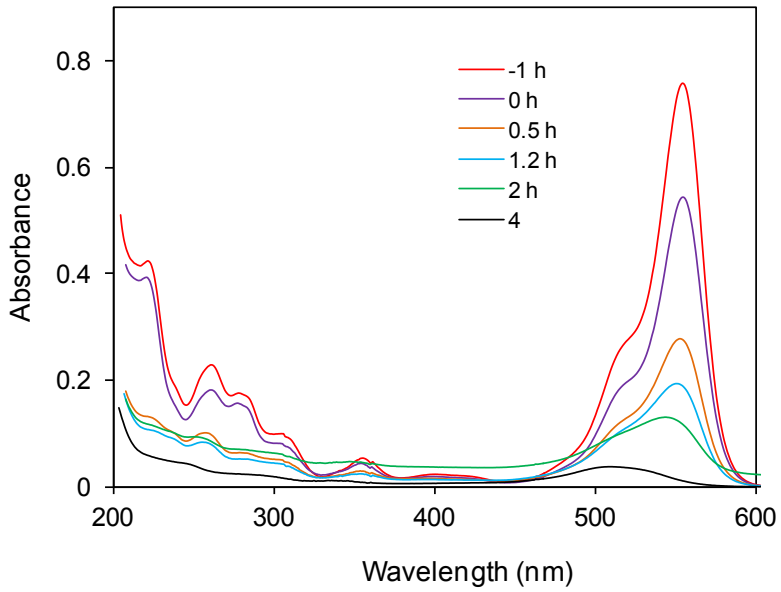

Fig. S8. UV-vis spectral changes of RhB in the presence of *p*-cresol and Fe^{3+} as a function of reaction time under visible light irradiation.

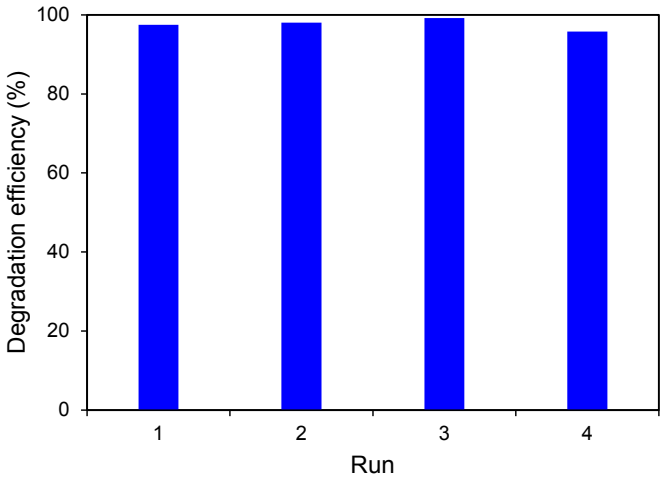

Fig. S9(a) Reuse of 85% $BiOBr/Bi_2O_3$ in RhB degradation.

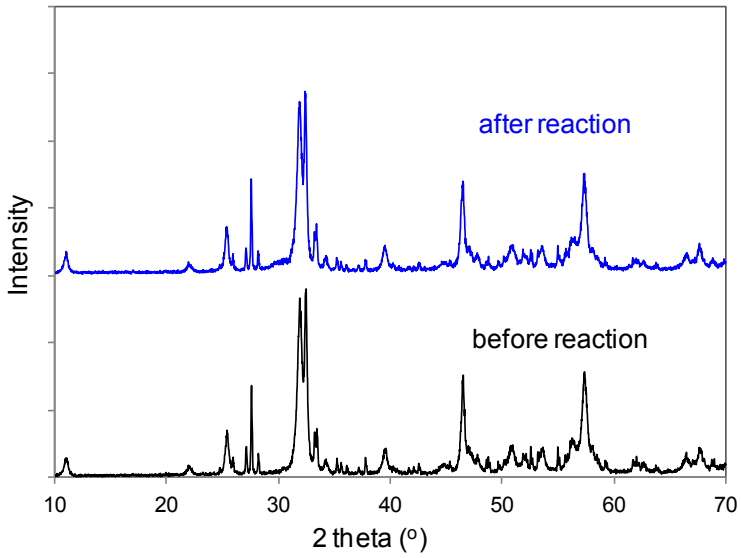

Fig. S9(b) XRD patterns of 85% $BiOBr/Bi_2O_3$ before and after four runs.