

Supporting Information

Synthesis of the bismuth oxyhalide solid solutions with tunable band gap and photocatalytic activities

Kuaixia Ren, Jie Liang, Jie Liu, Kun Zhang, Xiao Zheng, Hongde Luo, Yunbo Huang, Pujun Liu, and Xibin Yu*

Key Laboratory of Resource Chemistry of Ministry of Education, Shanghai Key Laboratory of
Rare Earth Functional Materials
College of Life and Environmental Science, Shanghai Normal University, Shanghai 200234, P. R.
China

Table S1. Summary of lattice parameters, composition and properties of the BiOMN-ss samples (three series: BiOCl_xBr_{1-x}, BiOCl_xI_{1-x}, and BiOBr_xI_{1-x}) prepared by the low-temperature precipitation with changing the molar ratios of two sources of halides ions.

The molar ratios of halides ions: x			1	0.75	0.5	0.25	0
BiOCl _x Br _{1-x}	Lattice	a = b	3.88618	3.89122	3.90417	3.9118	3.92533
	parameters (Å)	c	7.3827	7.51383	7.56156	7.92986	8.11728
	EDS(n(Cl):n(Br))		1/0	3.11	0.96	0.35	0/1
	Max(absorbance wavelengths)/nm		358.74	381.03	401.15	415.53	424.87
	E _g (eV)		3.29	3.02	2.92	2.82	2.71
	A _{BET} (m ² g ⁻¹)		22.27	24.99	21.71	23.49	20.18
	V _{BJH} -Pore radius (nm)		5.45	5.32	5.43	5.91	1.92
BiOCl _x I _{1-x}	Lattice	a = b	3.887	3.89509	3.9032	3.96272	3.99611
	parameters (Å)	c	7.354	7.51277	7.71764	9.0613	9.15309
	EDS(n(Cl): n(I))		1/0	3.17	1.07	0.32	0/1
	Max(absorbance wavelengths)/nm		358.74	482.28	589.12	635.49	675.39
	E _g (eV)		3.29	2.24	1.86	1.81	1.71
	A _{BET} (m ² g ⁻¹)		22.27	50.62	33.94	22.63	11.54
	V _{BJH} -Pore radius (nm)		5.45	5.91	5.02	11.82	10.55
BiOBr _x I _{1-x}	Lattice	a = b	3.9253	3.92996	3.94657	3.98277	3.99622
	parameters (Å)	c	8.12218	8.30562	9.11299	9.09759	9.1517
	EDS(n(Br):n(I):)		1/0	3.2	1.05	0.34	0/1
	Max(absorbance wavelengths)/nm		424.87	547.02	606.38	651.68	675.39
	E _g (eV)		2.81	2.02	1.86	1.78	1.71
	A _{BET} (m ² g ⁻¹)		20.18	31.04	27.92	20.96	11.54
	V _{BJH} -Pore radius (nm)		1.92	6.00	4.86	10.65	10.55

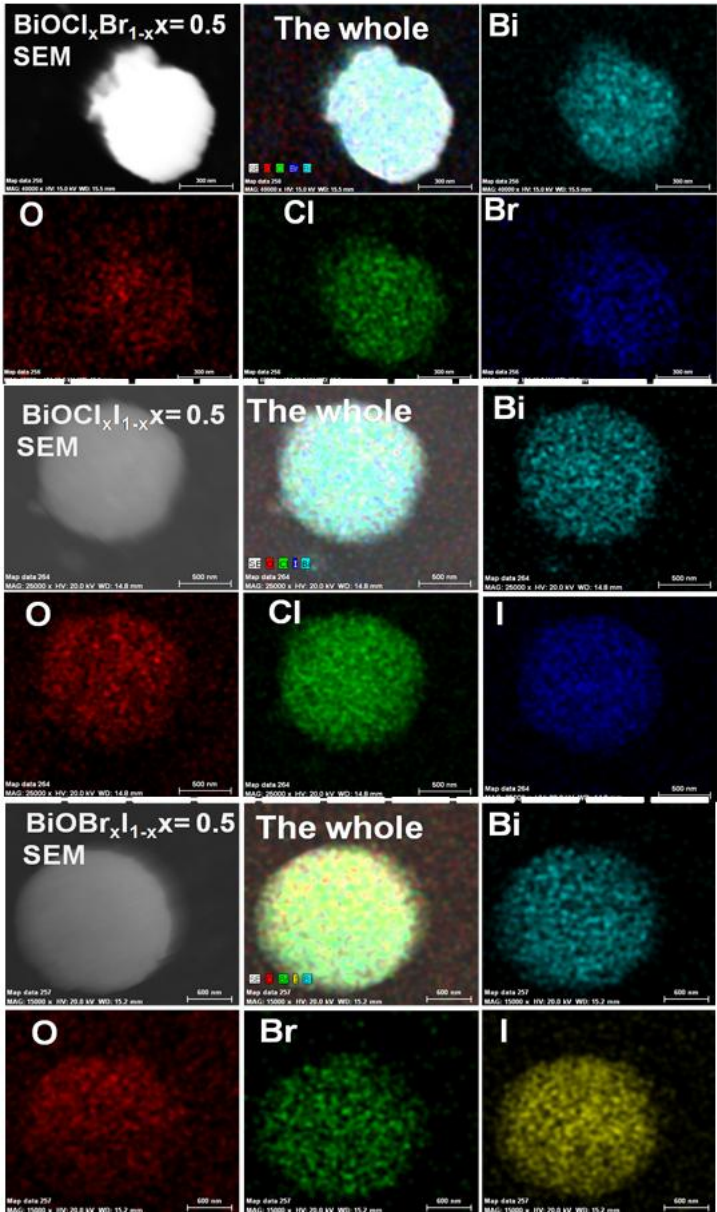


Fig. S1 Elemental mapping of the BiOMN-ss samples ($\text{BiOCl}_x\text{Br}_{1-x}$, $\text{BiOCl}_x\text{I}_{1-x}$, and $\text{BiOBr}_x\text{I}_{1-x}$, x= 0.5).

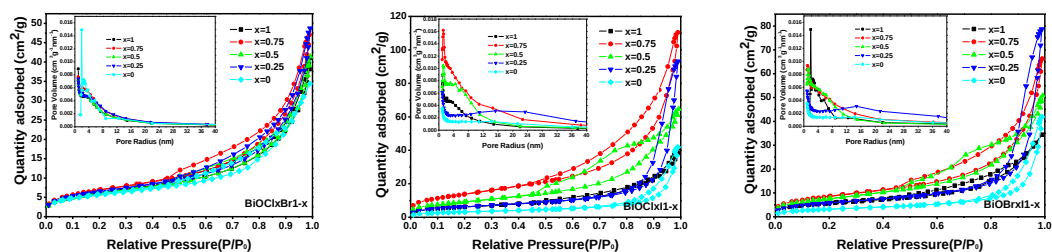


Fig. S2 Three series of nitrogen adsorption-desorption isotherms and pore size distributions (BiOCl_xBr_{1-x}, BiOCl_xI_{1-x}, and BiOBr_xI_{1-x}).

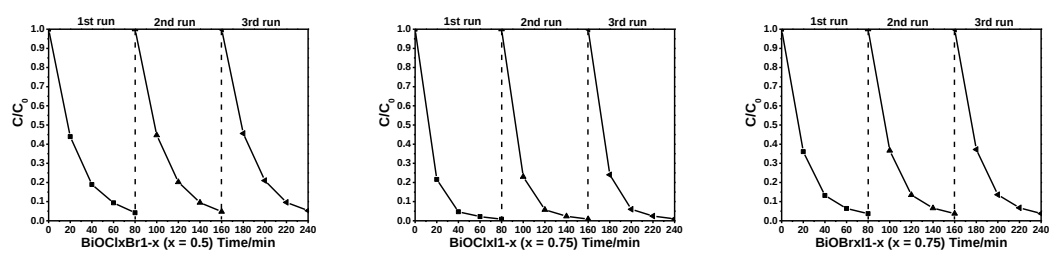


Fig. S3 Recycling degradation of RhB with the optimized solid solutions: BiOCl_xBr_{1-x} (x = 0.5), BiOCl_xI_{1-x} (x = 0.75), and BiOBr_xI_{1-x} (x = 0.75).