Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Particularly developed transition from $^5D_1$ level of Eu^{3+} and its significant contribution to the improved photocatalysis of $(Bi_3Li)O_4Cl_2$ via prolonging decay time of excited state

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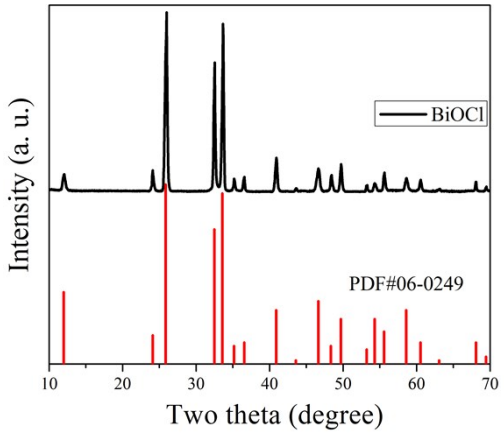

Fig. S1 XRD pattern for the comparative sample of BiOCl compared with standard PDF# 06-0249.

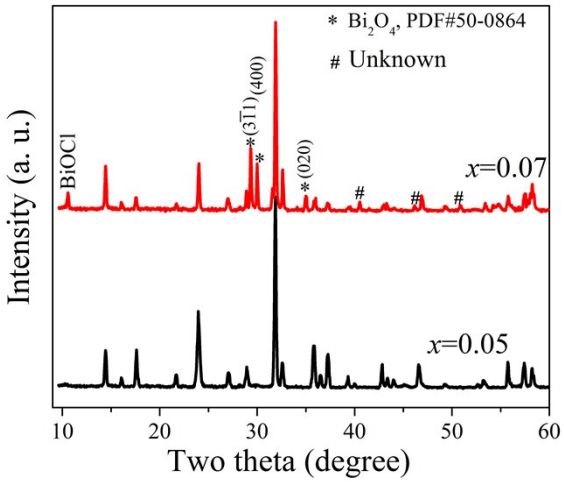

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Fig. S2 XRD patterns of $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ with x=0.05 and 0.07 indicating some impurity phased appeared when x>0.05.

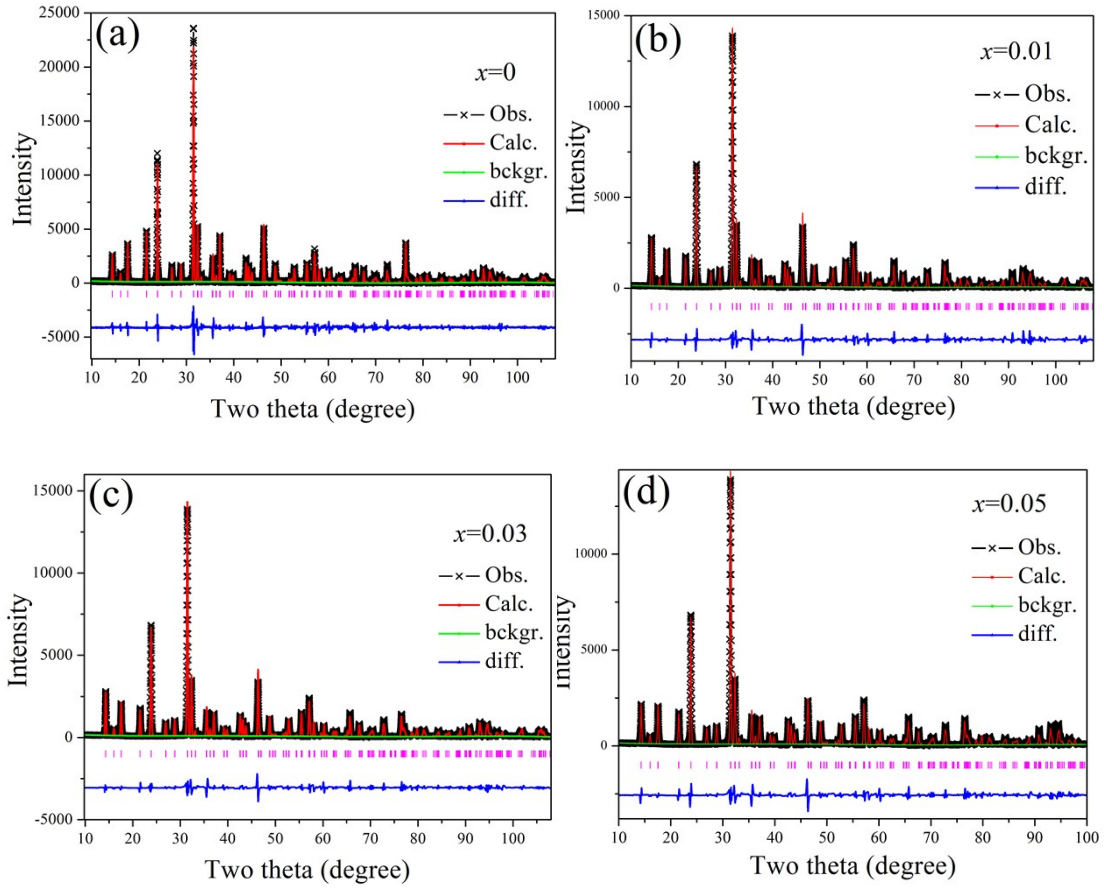

Fig. S3 Representative Rietveld refinements of $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ with x=0 (a), 0.01 (b), 0.03 (c) and 0.05 (d).

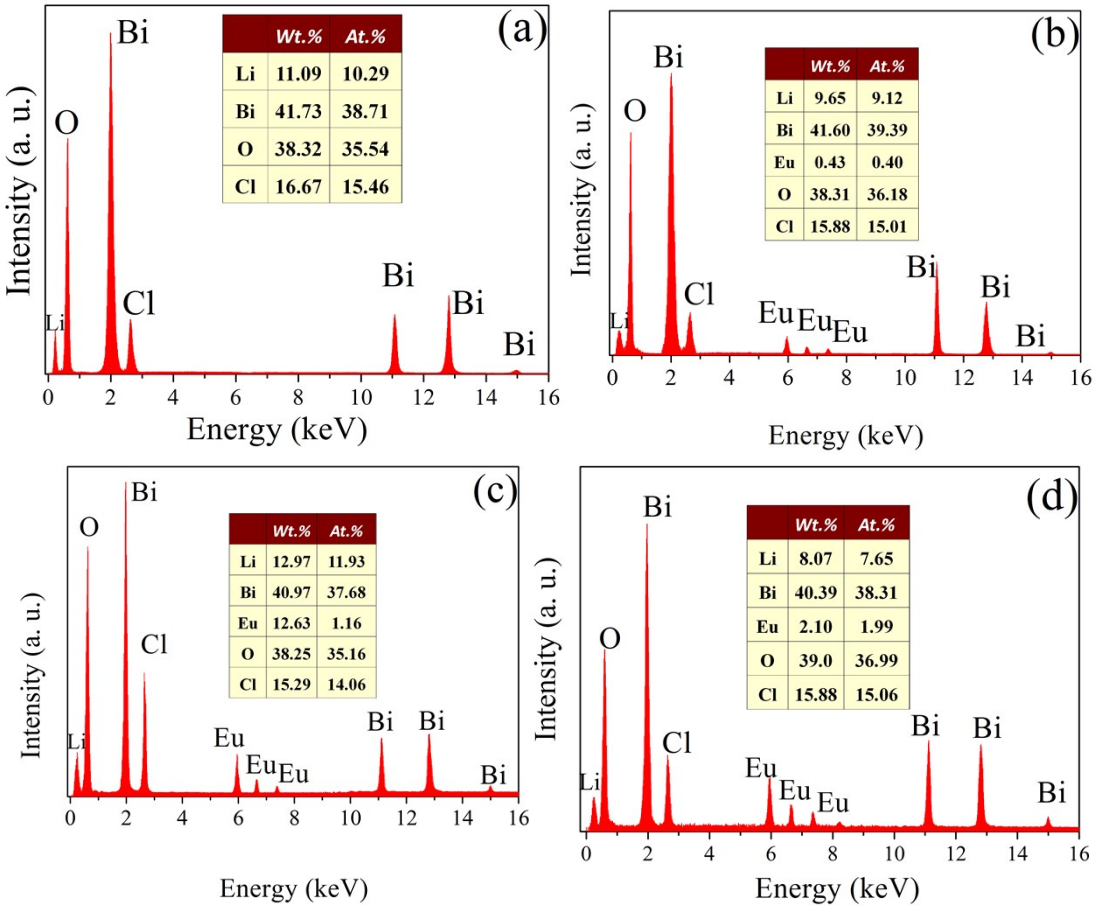

Fig. S4 EDS patterns and the experimental element ratios of $(Bi_{3-3x})Eu_{3x}Li)O_4Cl_2$, x=0 (a), 0.01 (b), 0.01 (c) and 0.05 (d).

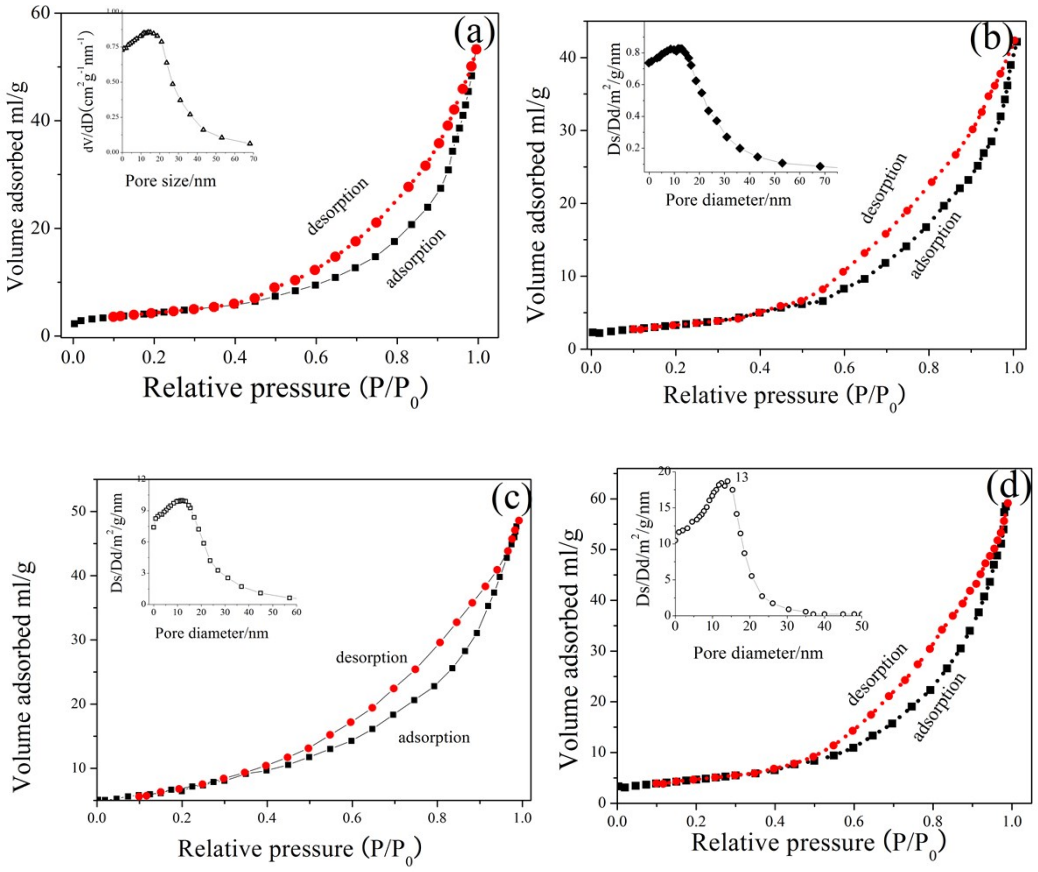

Fig. S5 N_2 sorption isotherms for $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ with x=0 (a), 0.01 (b), 0.03 (c) and 0.05 (d). The insets of the figures show BJH-desorption pore-sizes.

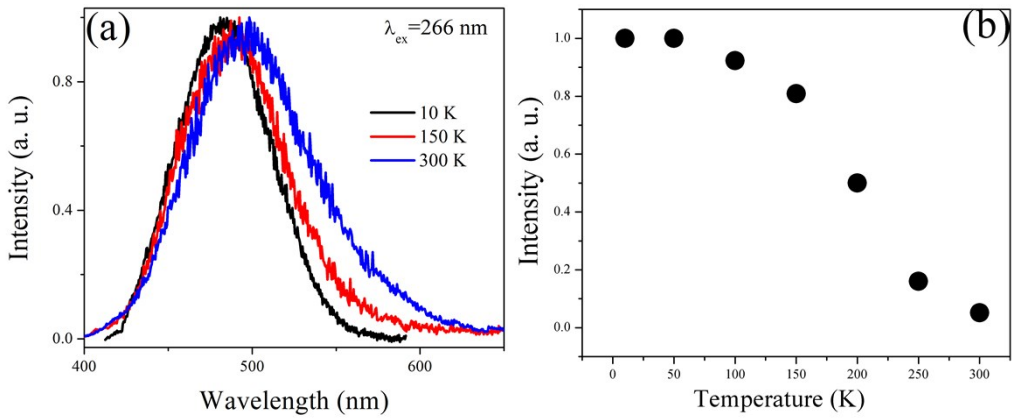

Fig. S6 the normalized representative emission spectra at 10, 150, and 300 K (a) and the temperature dependent intensity (b) of $(Bi_3Li)O_4Cl_2$ (λ_{ex}=266 nm).

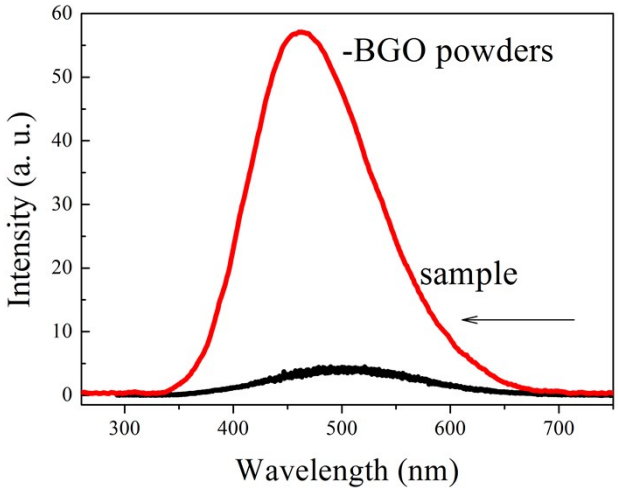

Fig. S7 the comparison of XEL spectra at 300 K between $(Bi_3Li)O_4Cl_2$ and BGO powders.

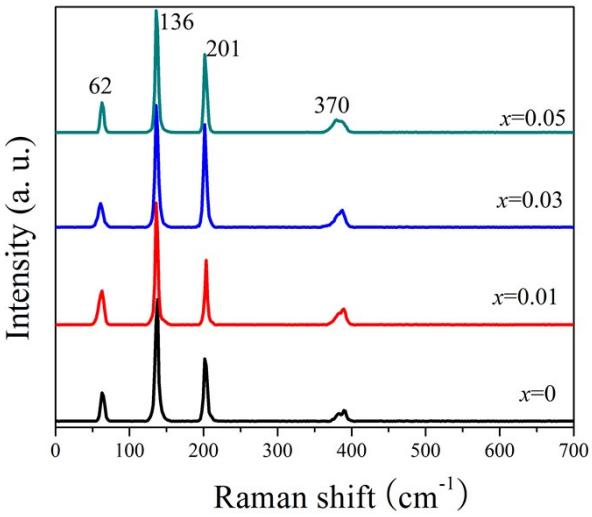

Fig. S8 the Raman spectra of $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ (x=0, 0.01, 0.03, 0.05).

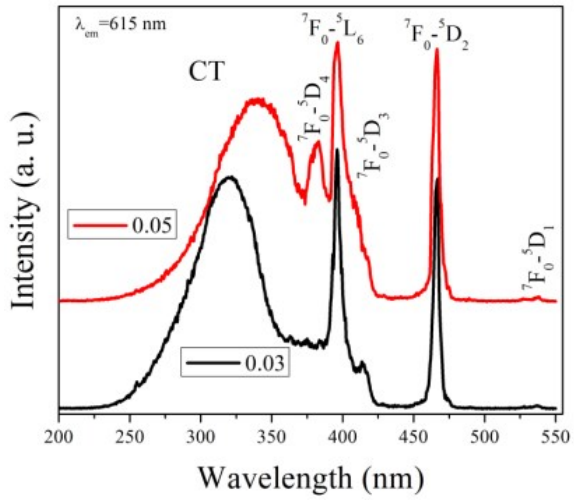

Fig. S9 the normalized values of $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ (x=0.03, 0.05) (λ_{em}=615 nm).

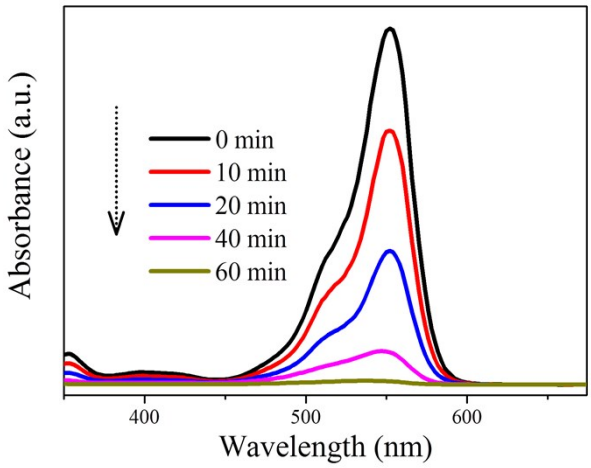

Fig. S10 the typical optical absorption of RhB solutions after photodegradation by $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ (x=0.05).

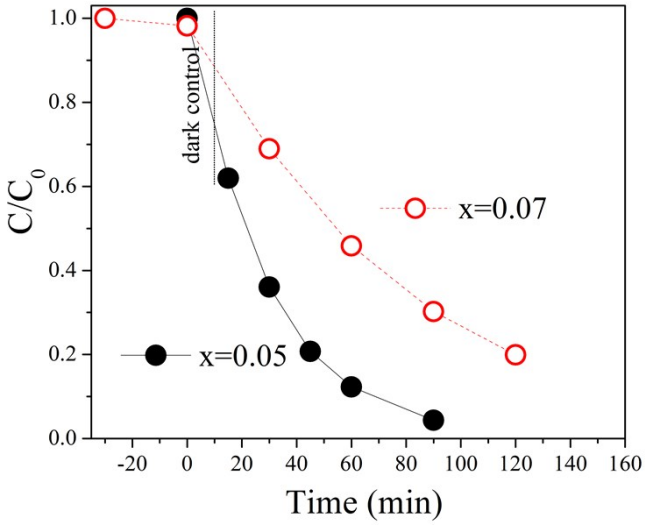

Fig. S11 photo-degradation effects of $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ compared between x=0.05 and 0.07.

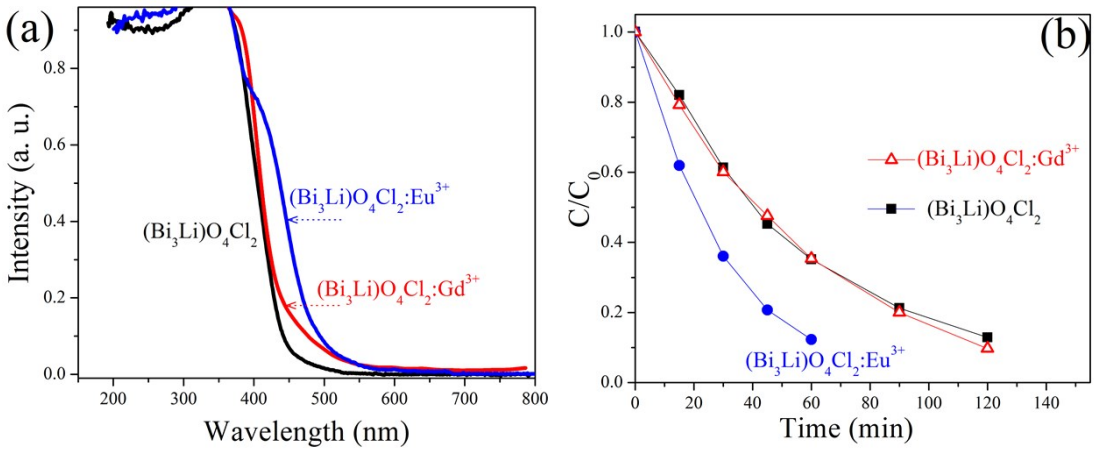

Fig. S12 the comparison of absorption (a) and photodegradation (b) of $(Bi_{3-3x}Eu_{3x}Li)O_4Cl_2$ (x=0, 0.05) and $(Bi_{3-3x}Gd_{3x}Li)O_4Cl_2$ (x=0.05).