**Supplementary Information**

**In-situ synthesis of adsorptive a β-Bi2O3 / BiOBr photocatalyst with enhanced degradation efficiency**

Shizi Wu, Yao Xie, Xianmei Zhang\*, Zhaohui Huang\*，Yangai Liu, Minghao Fang, Xiaowen Wu, Xin Min

*School of Materials Science and Technology, Beijing Key Laboratory of Materials Utilization of Nonmetallic Minerals and Solid Wastes, National Laboratory of Mineral Materials, China University of Geosciences, Beijing 100083, China*

*wushizi2013@163.com;*[*xieyao1895@163.com*](mailto:xieyao1895@163.com)*;zhangxianmei@chinapowder.com;* [*huang118@cugb.edu.cn*](mailto:huang118@cugb.edu.cn)*,*[*liuyang@cugb.edu.cn*](mailto:liuyang@cugb.edu.cn)*;*[*fmh@cugb.edu.cn*](mailto:fmh@cugb.edu.cn)*;*[*xwwu@cugb.edu.cn*](mailto:xwwu@cugb.edu.cn)*; minx@cugb.edu.cn;*

*\*Corresponding author Tel: +86-010-82322186, Fax: +86-010-82322186*

*E-mail:* *zhangxianmei@chinapowder.com,* [*huang118@cugb.edu.cn*](mailto:huang118@cugb.edu.cn)*,*

Fig. S1 Time resolved PL spectra and lifetime of S1, S3 and S5

Time-resolved fluorescence spectra were collected and determined by a double-exponential fitting (Fig. 1) to study the PL decay of the charge carriers. The inset table in Fig. S1 summarizes the carrier lifetime in S1, S3 and S5. It can be found that the average lifetimes of charge carriers in S1, S3 and S5 are 3.105, 2.561 and 3.118 ns, respectively. Compared to S1 and S5, S3 has a shorter fluorescence lifetime. Based on the results, we can reasonably assume the decrease of PL intensity and decay time was attributed by the appropriate band structure which promotes the separation of photogenerated carriers.