Supporting Information

Ag$_2$O/Bi$_2$O$_3$ composites: Synthesis, Characterization and High Efficient Photocatalytic Activities

Lin Zhu,$^a$ Bo Wei,$^b$ Lingling Xu,$^{*,a}$ Zhe Lü,$^b$ Hailin Zhang,$^a$ Hong Gao,$^a$ Jixin Che,$^c$

$^a$ Key Laboratory of Photonic and Electric Bandgap Materials, Ministry of Education, School of Physics and Electronic Engineering, Harbin Normal University, Harbin 150025, P.R. China

$^b$ Center for Condensed Matter Science and Technology, Department of Physics, Harbin Institute of Technology, Harbin, 150080, P.R. China

$^c$ The Aviation University of Air Force, Changchun, 130022, P.R. China

Email: xulingling_hit@163.com; bowei@hit.edu.cn
Fig. S1 Change of MO solution concentration with Ag₂O/Bi₂O₃ composite (3:1) stirred in darkness.
Fig. S2. High-magnification SEM images of Ag$_2$O/Bi$_2$O$_3$ composite with different ion ratio of Ag : Bi, (a) 1:3, (b) 1:2, (c) 1:1, (d) 2:1, (e) 4:1 and (f) 5:1 respectively.
Fig. S3  XPS survey spectra of Ag$_2$O/Bi$_2$O$_3$ (3:1) composite (a), High-resolution of XPS analysis of Bi 4f spectrum(b) and Ag 3d spectrum (c).

In high-resolution spectrum of Bi 4f (Fig. S3b), two peaks at 159.0eV and 164.4eV are found, which indicates that Bi is in the +3 oxidation state (Dumitriu D et al, J. Cata., 2003,219:337-351 ). While in high-resolution spectrum of Ag 3d (Fig. S3c), two peaks at 368.3eV and 374.3 eV are determined, indicative of Ag(I) with a splitting of 5.9 eV, which is close consistent with standard separation of 6.0 eV.
Fig. S4  The XRD patterns of Ag$_2$O/Bi$_2$O$_3$ (3:1) composite before and after the photocatalytic reaction. Diffraction peaks of cubic Ag$_2$O (JCPDS NO. 76-1393) are given. Slight diffraction peak of pure Ag (JCPDS NO.04-0783) is found (square).
Fig. S5 the SEM image of Ag$_2$O/Bi$_2$O$_3$ (3:1) composite after the photocatalytic reaction.