Supporting Information for

Synthesis of Ag_2CO_3/Bi_2WO_6 heterojunctions with enhanced photocatalytic activity and cycling stability

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Electronegativity calculation for the electronic band structures of Ag_2CO_3 and Bi_2WO_6.

The relative position of conduction band (CB) of Ag_2CO_3 and Bi_2WO_6 were estimated by the empirical formula in eqn (1).[1]

$$E_{CB} = X - E_0 - 0.5\,E_g \qquad (1)$$

where E_{CB} is the CB edge potential, E_0 is the energy of free electrons of the hydrogenscale (4.5 eV), E_g is the band gap energy of the semiconductor obtained from the UV-visible diffuse reflectance absorption, X is the electronegativity of the semiconductor, which can be expressed as the geometric mean of the absolute electronegativity of the constituent atoms. The X values for Bi_2WO_6 and Ag_2CO_3 are calculated to be 6.36 and 6.02 eV,[2,3] and the band gap energies of Ag_2CO_3 and Bi_2WO_6 are 2.17 and 2.74 eV, respectively. Therefore, the E_{CB} for Ag_2CO_3 and Bi_2WO_6 were calculated to be 0.49 and 0.43 eV respectively. The relative position of conduction band (VB) of Ag_2CO_3 and Bi_2WO_6 can be deduced from from eqn (2)

$$E_{VB} = E_{CB} + E_g \qquad (2)$$

The E_{VB} for Ag_2CO_3 and Bi_2WO_6 were calculated to be 3.23 and 2.61 eV respectively. The details of the energy band of Ag_2CO_3 and Bi_2WO_6 are shown in Fig. S1.

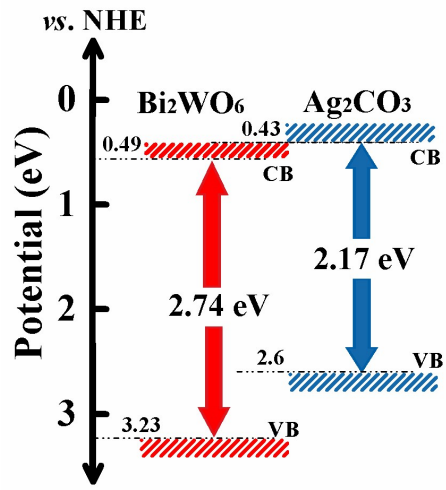

Fig. S1 Schematic diagram for energy band of Ag_2CO_3 and Bi_2WO_6.

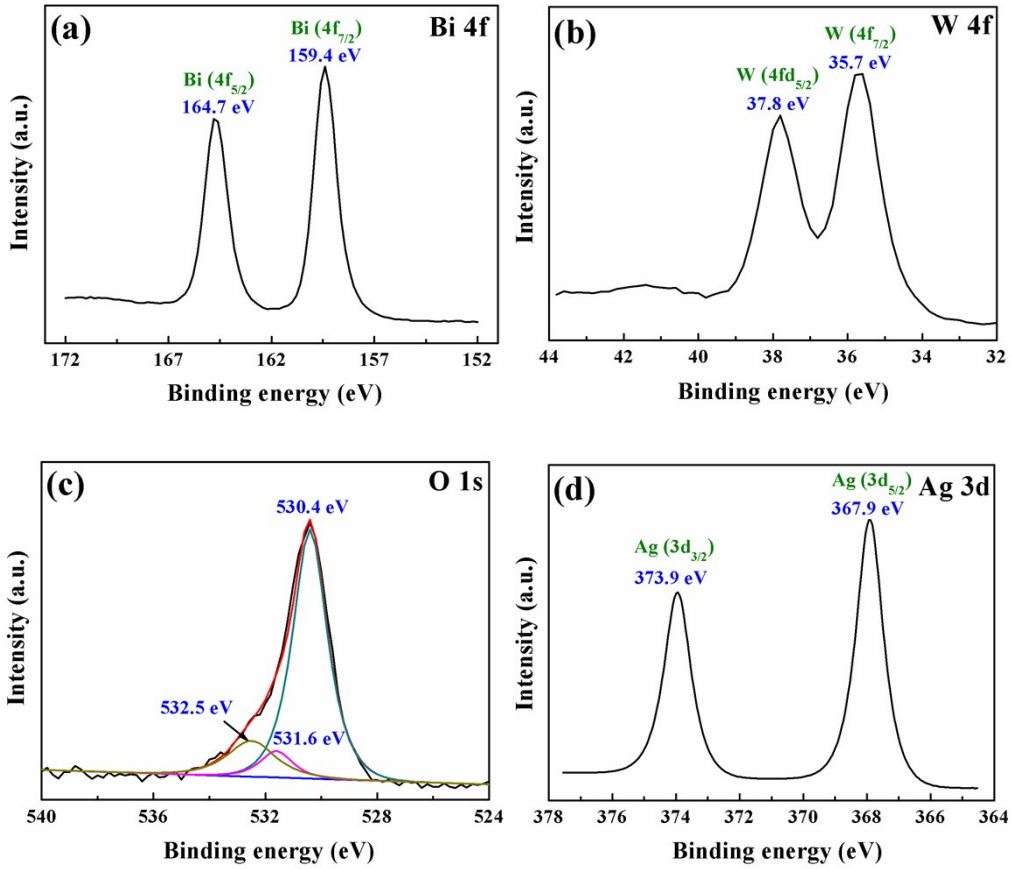

Fig. S2 XPS spectra of Bi 4f (a),W 4f (b) O 1s (c) for pure Bi_2WO_6 and Ag 3d (d) for pure Ag_2CO_3.

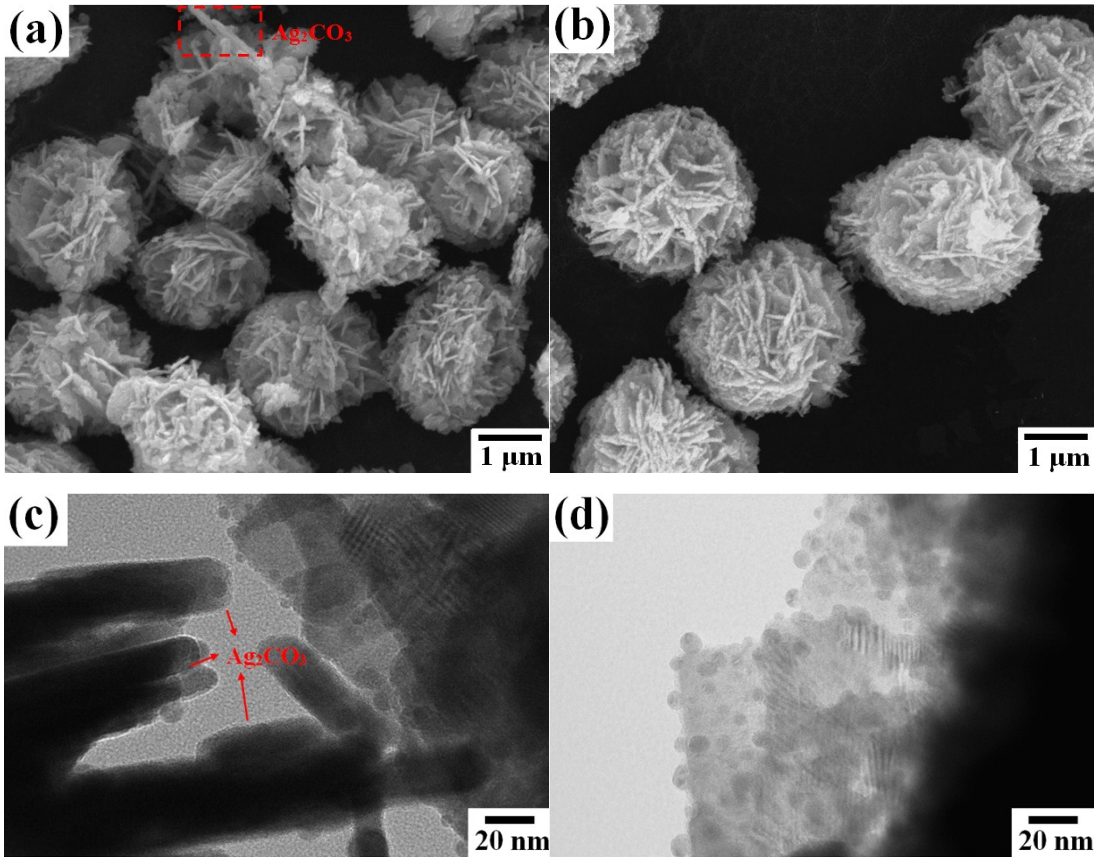

Fig. S3 SEM and TEM images of the Ag_2CO_3/Bi_2WO_6 (30 wt%) composite prepared in the absence (a and c) and presence (b and d) of $NH_3•H_2O$.

The pseudo-first-order kinetics model was used to fit the experimental data as expressed by eqn (3)[4]

$$\ln(C_0/C) = kt \qquad (3)$$

where k is the reaction rate constant, t is the time, C and C_0 are the reactant concentrations at time $t = t$ and 0, respectively. On the basis of the experimental data in Fig. 8 (a) and (c), the pseudo-first-order reaction kinetic for the degradation of RhB and MO solution was displays in Fig S4 (a) and (b).

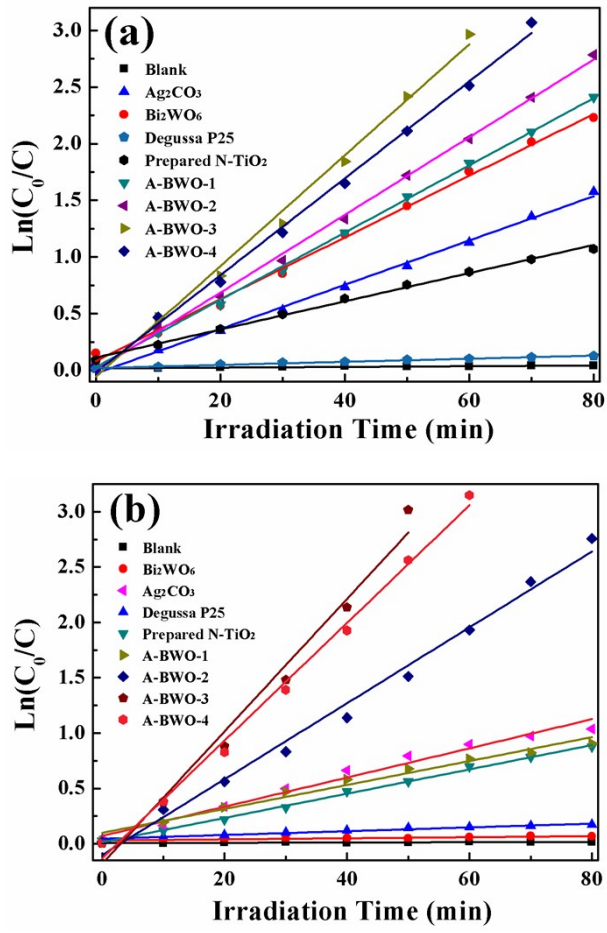

Fig. S4 The pseudo-first-order rate constants of as-samples for the degradation of RhB (a) and MO (b) under visible light.

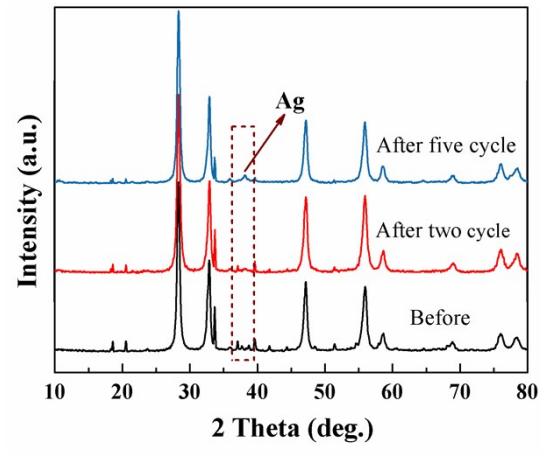

Fig. S5 XRD patterns of A-BWO-3 before and after photo-degradation of RhB.

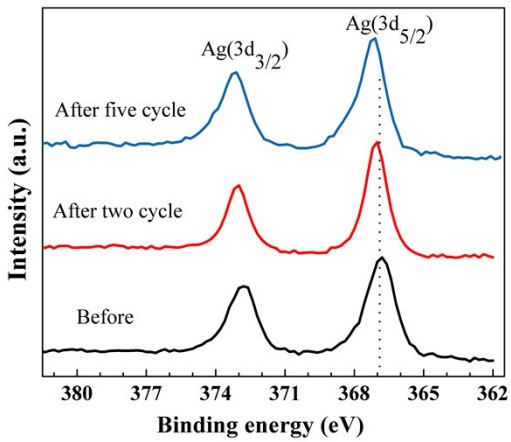

Fig. **S6** XPS spectra of Ag peaks in A-BWO-3 before and after photo-degradation of RhB.

References

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