Supporting information for

Band gap engineering design for construction of energy-levels well-matched semiconductor heterojunction with enhanced visible-light-driven photocatalytic activity

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Table S1. Band gap, CB and VB of $Mg_{1-x}Cu_xWO_4$ (x=0, 0.1, 0.2 0.3 0.4 and 1)

	$MgWO_4$	$Mg_{0.9}Cu_{0.1}WO_4$	$Mg_{0.8}Cu_{0.2}WO_4$	$Mg_{0.7}Cu_{0.3}WO_4$	$Mg_{0.6}Cu_{0.4}WO_4$	$CuWO_4$
X(eV)	6.135	6.141	6.171	6.189	6.191	6.315
Eg(eV)	3.89	2.87	2.85	2.79	2.74	1.84
CB(eV)	-0.31	0.21	0.25	0.30	0.32	0.6
VB(eV)	3.58	3.08	3.10	3.09	3.06	2.44

$E_{VB}=X-E^e+0.5E_g$; $E_{CB}=E_{VB}-E_g$

where X is the absolute electronegativity of the semiconductors, which is defined as the geometric average of the absolute electronegativity of the constituent atoms, E^e is the energy of free electrons on the hydrogen scale (≈4.5 eV), and E_g is the band gap.

Table S2. ICP Elemental Analysis of $Mg_{0.7}Cu_{0.3}WO_4/Bi_2WO_6$ with different molar ratios (calculated in stoichiometric proportion)

$Mg_{0.7}Cu_{0.3}WO_4/Bi_2WO_6$	1:2	1:4	1:6	1:10
Mg	2.40	2.35	2.34	2.63
Cu	1	1	1	1
Bi	13.6	27.2	42.2	77.11
W	9.5	16.1	23.8	42.63

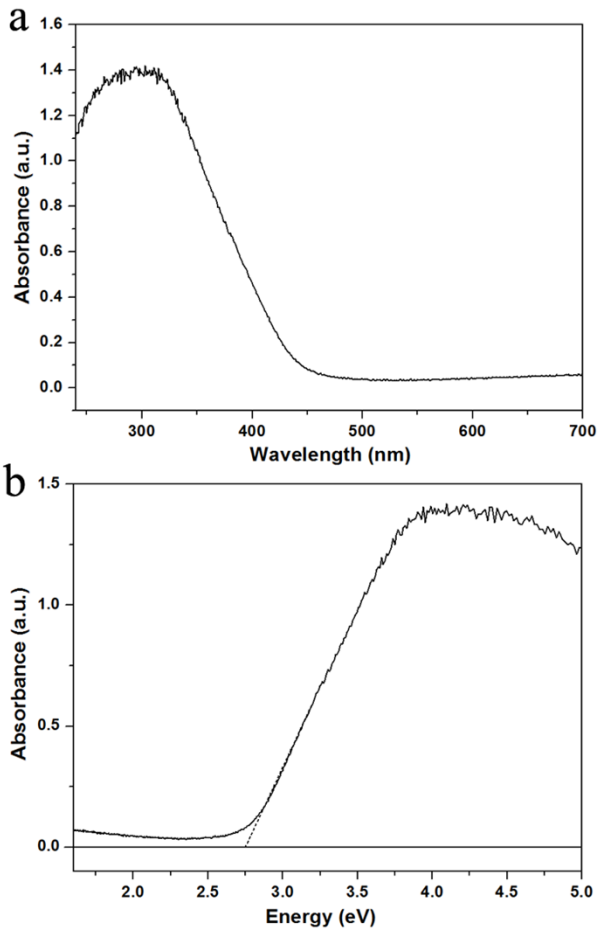

Fig. S1 (a) Diffuse reflectance spectra and (b) Band gap of Bi_2WO_6.

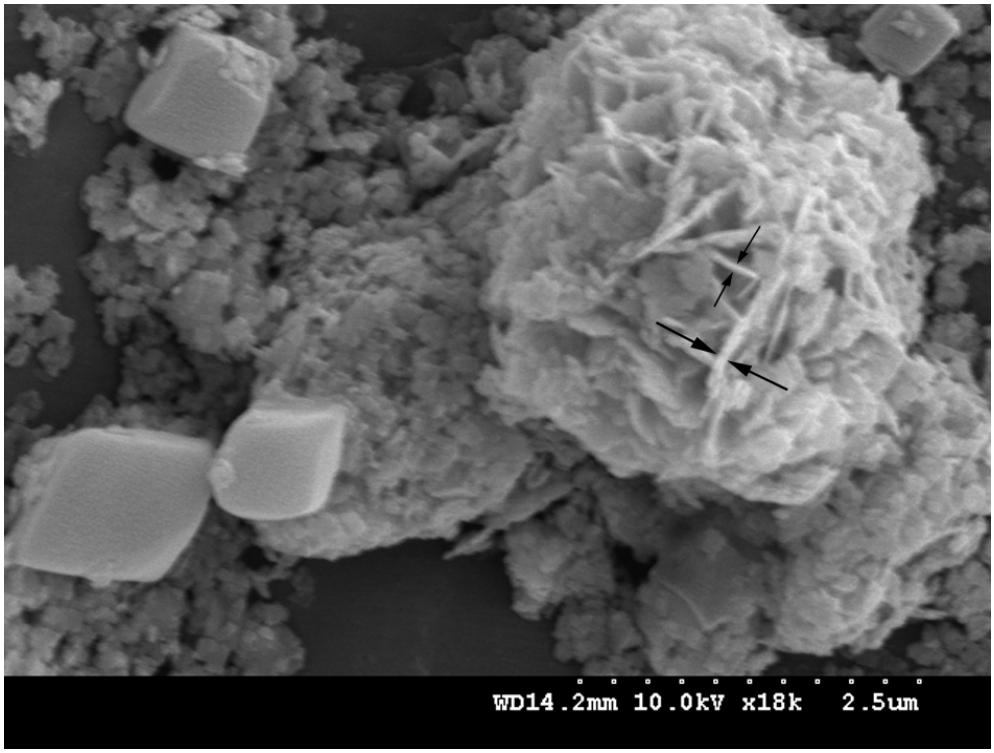

Fig. S2 SEM image of 1:4 $Mg_{0.7}Cu_{0.3}WO_4/Bi_2WO_6$ heterojunction.

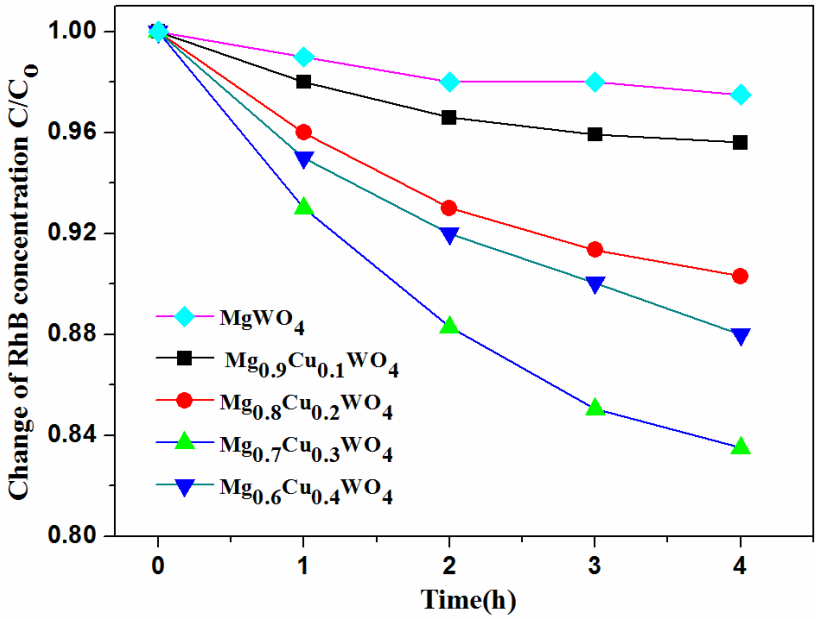

Fig. S3 Photocatalytic degradation curves of RhB under visible-light irradiation over $Mg_{1-x}Cu_xWO_4$ (x=0, 0.1, 0.2 0.3 and 0.4).