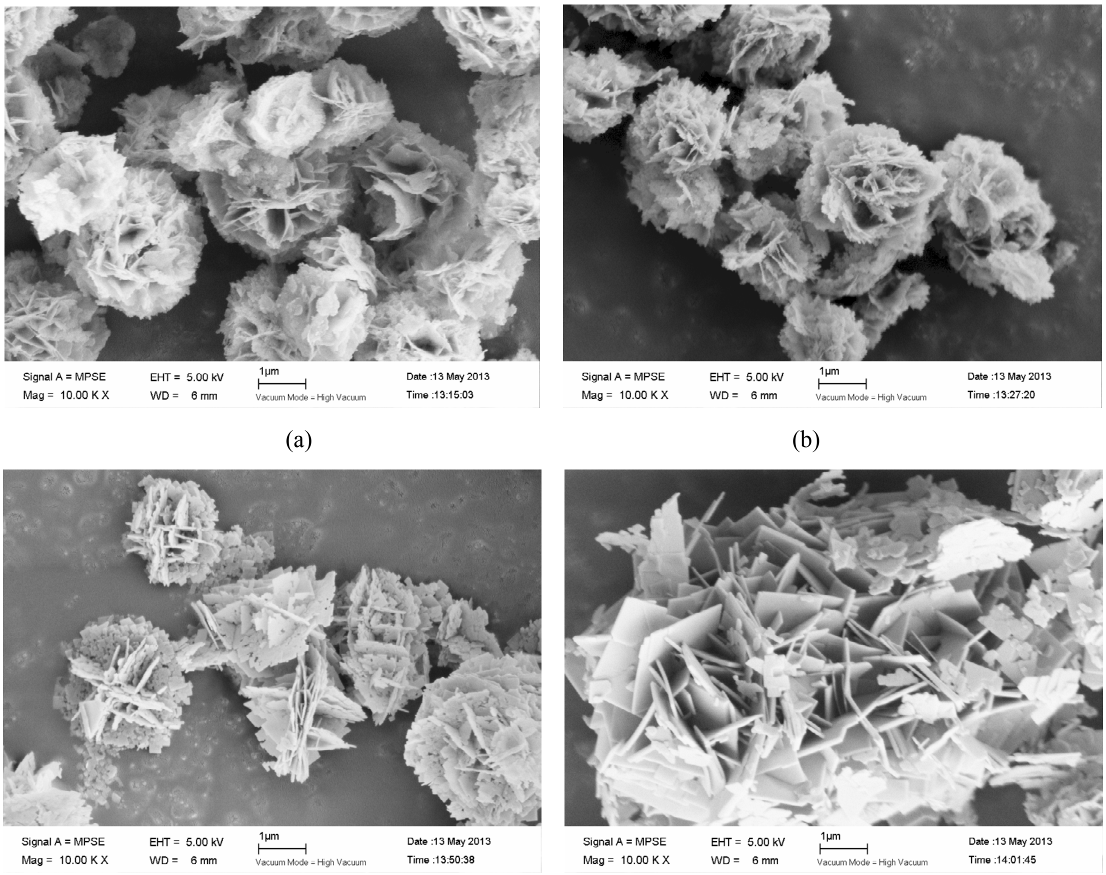
Supporting information

The SEM images of the prepared Bi_2WO_6 at different pH values (Fig. S1). The N_2 adsorption-desorption isotherms and pore size distributions of the prepared materials BWO-1(Fig. S2). Adsorption of TC on the as prepared Bi_2WO_6 and TiO_2 (Fig. S3). Photocurrent responses of the prepared Bi_2WO_6 at different pH values (Fig. S4). Degradation kinetics of TC by Bi_2WO_6 prepared at different hydrothermal pHs under visible light irradiation (Fig. S5). Intermediates of TC identified by GC/MS after 2 h irradiation (Table S1).



(a) (b)

(c) (d)

Fig. S1 SEM images of the prepared Bi_2WO_6 at different pH values. a, pH=1; b, pH=4; c, pH=7; d, pH=9

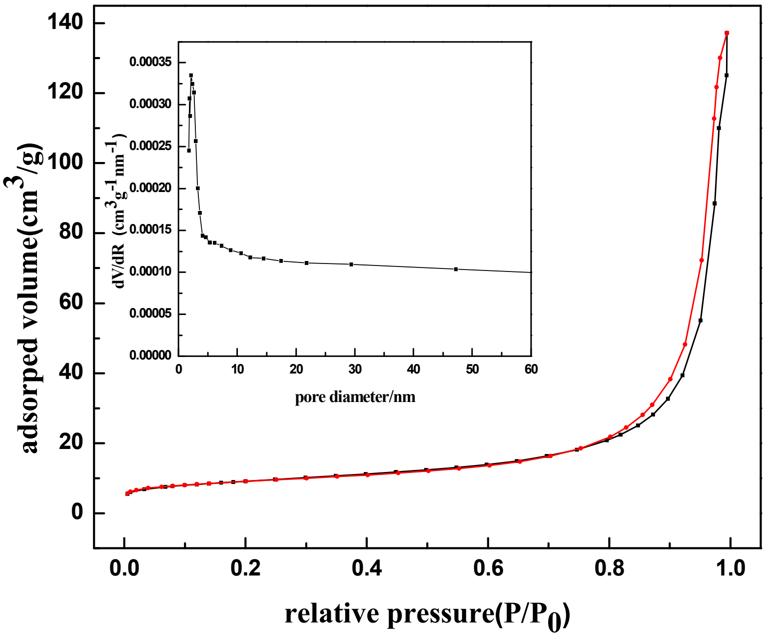


Fig. S2 Nitrogen adsorption-desorption isotherms and the corresponding pore size distribution curve calculated from adsorption branch of the nitrogen isotherm (inset) of Bi_2WO_6 prepared at pH 1

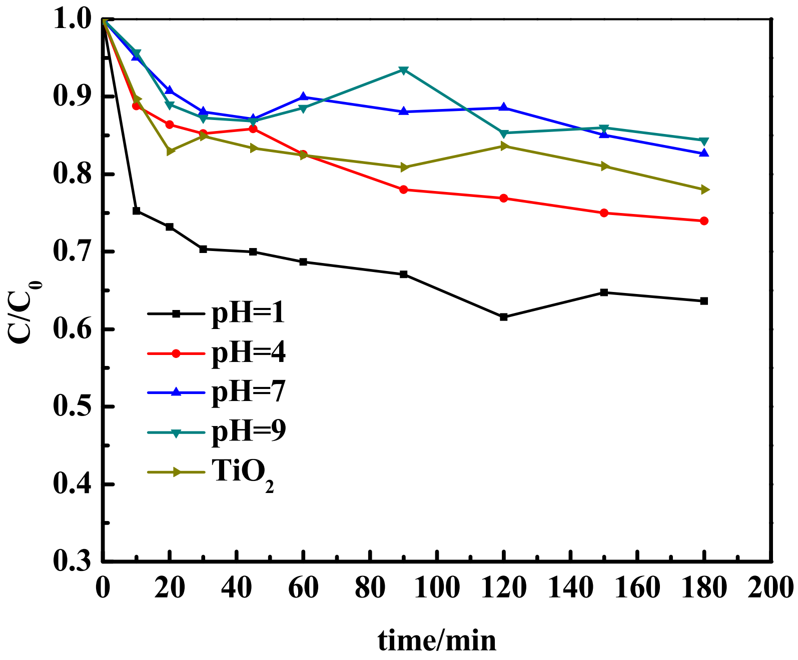


Fig. S3 Adsorption of TC on the as prepared Bi_2WO_6 and TiO_2

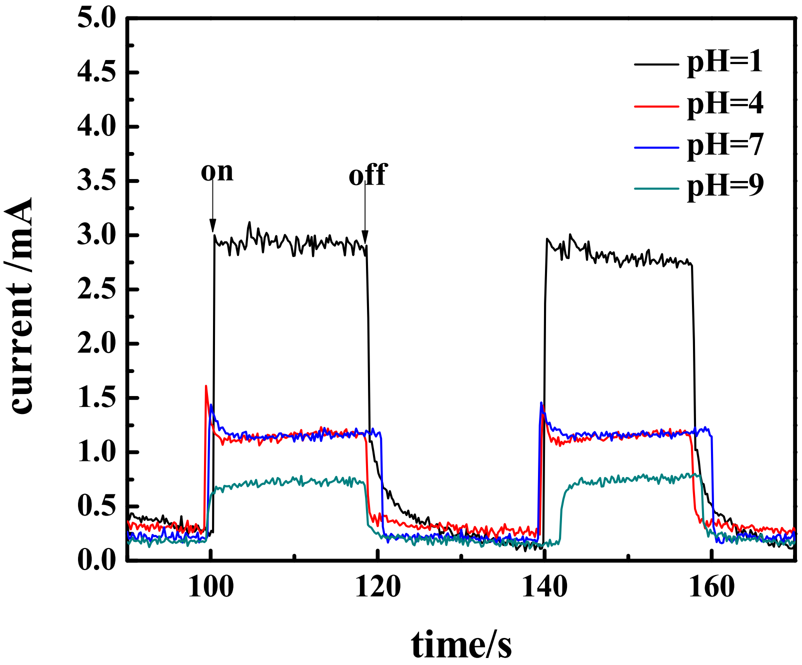


Fig. S4 Photocurrent of Bi_2WO_6 prepared at different pHs

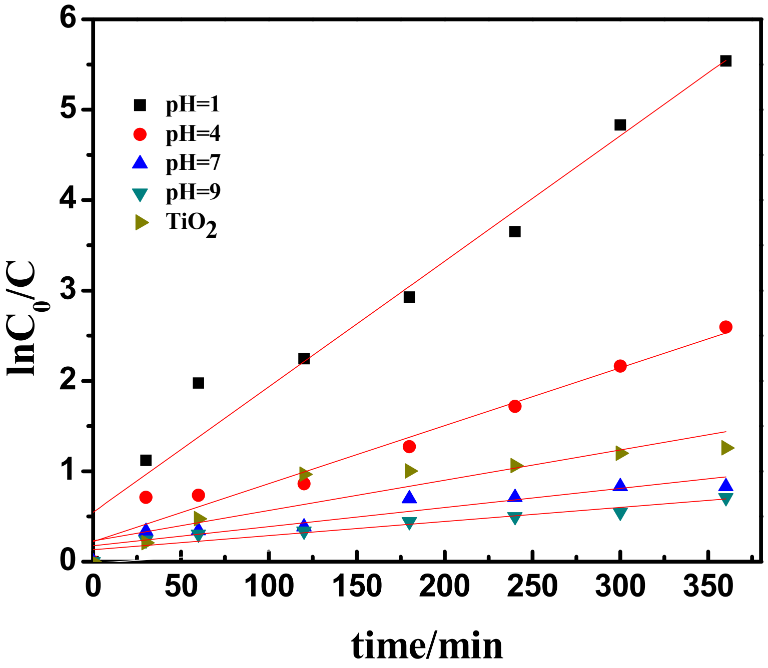
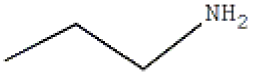
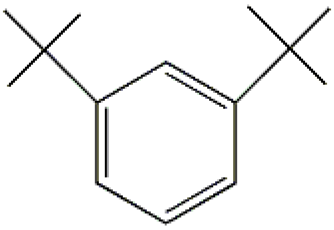
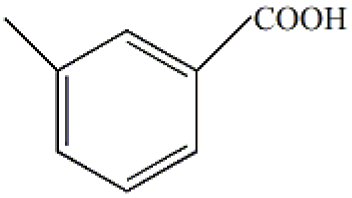
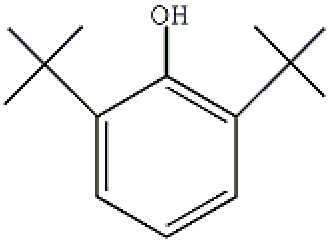


Fig. S5 Degradation kinetics of TC by Bi_2WO_6 prepared at different hydrothermal pHs and TiO_2 under visible light irradiation. (k =1.39, 0.64, 0.21 and 0.16 × 10^{-2} min^{-1} for BWO-1, -4, -7 and -9, respectively, k =0.33 × 10^{-2} min^{-1} for TiO_2)

Table S1 Intermediates of TC identified by GC/MS after 2 hours irradiation

retention time / min	structural formula
9.244	HN=C=NH
11.071	$H_2N\text{-}CH_2CH_2OH$
14.777	
16.797	
19.726	
24.336	

Analytic methods for reaction intermediates

During the photocatalytic reaction, high performance liquid chromatography (HPLC) coupled with ESI-Q-TOF-MS/MS (Waters 2695XE, USA) and gas chromatography coupled with mass spectrometry (GC-MS, Agilent 5975GC-7890MS, USA) were used to identify the intermediates. For LC-MS, the ion mode was set on positive mode and ion scanning range was *m/z* 50-800. Before GC-MS analysis, the samples should be derivatized. 40 ml reaction solution was centrifuged to remove photocatalysts and adjusted to pH 2.5 with 10 % HCl, extracted with 15 mL of dichloromethane three times and then dehydrated using anhydrous sodium sulfate. Afterwards, the dehydrated samples were blown down to one mL under a nitrogen stream. 0.5 mL of *N,O*-bis (trimethylsilyl) trifluoroacetamide (BSTFA) was added and the mixed solution was kept at 50 ℃ for 30 min. One μl of the solution was injected into GC (equipped with Thermal TR-5 column). The column temperature was programmed as follows: 50 ℃ holding 3 min, increased from 50 ℃ to 300 ℃ at 5 $℃\cdot min^{-1}$, and kept for 2 min. The temperatures of the transfer line, ion source and MS detector were 280℃, 230℃ and 150 ℃, respectively. The MS detector was operated in an electron impact mode with 70 eV of ionization energy and the mass spectra were acquired in the full scan mode with m/z ranging from 40 to 1000.