

## Supplementary materials

# Carbon-modified bismuth titanate nanorods with enhanced visible-light-driven photocatalytic property

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## 1. Experimental Section

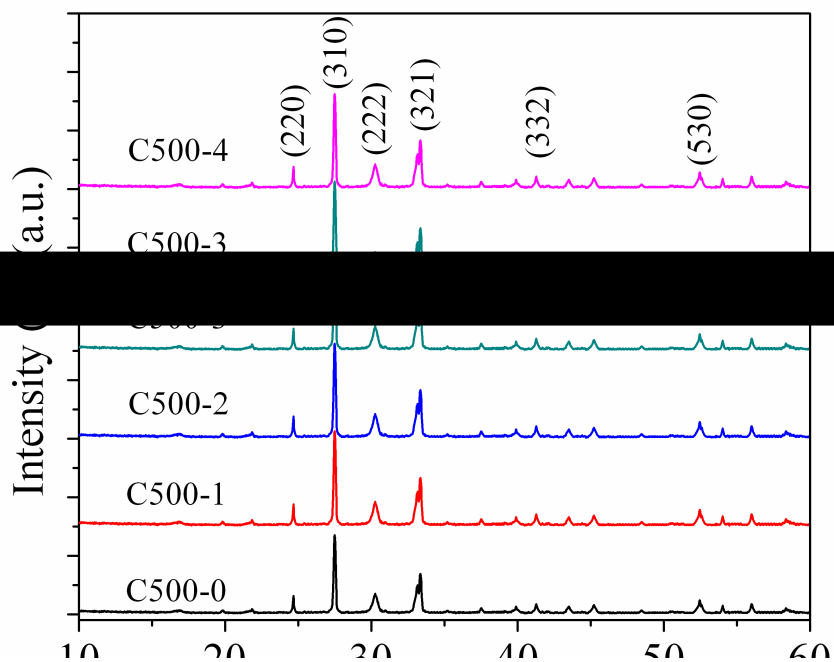
All chemicals were of analytical and were directly used without any treatment. In this work, a C-Bi<sub>12</sub>TiO<sub>20</sub> nanorods was synthesized by a two-step process. The first step was carried out to fabricate the precursor of C-Bi<sub>12</sub>TiO<sub>20</sub> by a facile hydrothermal route in aqueous solution containing glucose at 180 °C for 24 h. In a typical procedure, stoichiometric amounts of Bi(NO<sub>3</sub>)<sub>3</sub>·5H<sub>2</sub>O and Ti(OC<sub>3</sub>H<sub>7</sub>)<sub>4</sub> with an appropriate ratio of Bi : Ti and PVA, a certain amount of glucose were dissolved in 10 mL of deionized water under vigorous stirring. The pH value of the alkali solution was fixed at 14 using potassium hydroxide. Before being transferred to a Teflon-lined stainless autoclave (23 mL capacity), the solution mixture was prepared under an ultrasonic water bath for 30 min and kept at a filling ratio of 80 % (v/v). The hydrothermal synthesis was conducted at 180 °C for 24 h in an electric oven. The system was then cooled to ambient temperature naturally. After the reaction, the product were collected and washed with distilled water and absolute alcohol several times, then vacuum-dried. The second step was calcination: C-Bi<sub>12</sub>TiO<sub>20</sub> nanorods were achieved by calcining the hydrothermal product at 500 °C for 0.5 h in Ar flow in a tube furnace. These products prepared with different amounts of glucose (0 g, 0.01 g, 0.03 g, 0.05 g, 0.10 g) after calcination were denoted as C500-0, C500-1, C500-2, C500-3, C500-4, respectively. Experimental details and more information on the products are listed in Table 1.

Bulk Bi<sub>12</sub>TiO<sub>20</sub> powder used Bi<sub>2</sub>O<sub>3</sub> (Aldrich, 99.99) and TiO<sub>2</sub> (Aldrich, 99.99) as starting materials in the right stoichiometric ratio and then calcined at 600 °C for 2 hours was also prepared by a traditional solid-state reaction in comparison with the C-Bi<sub>12</sub>TiO<sub>20</sub> nanorods.

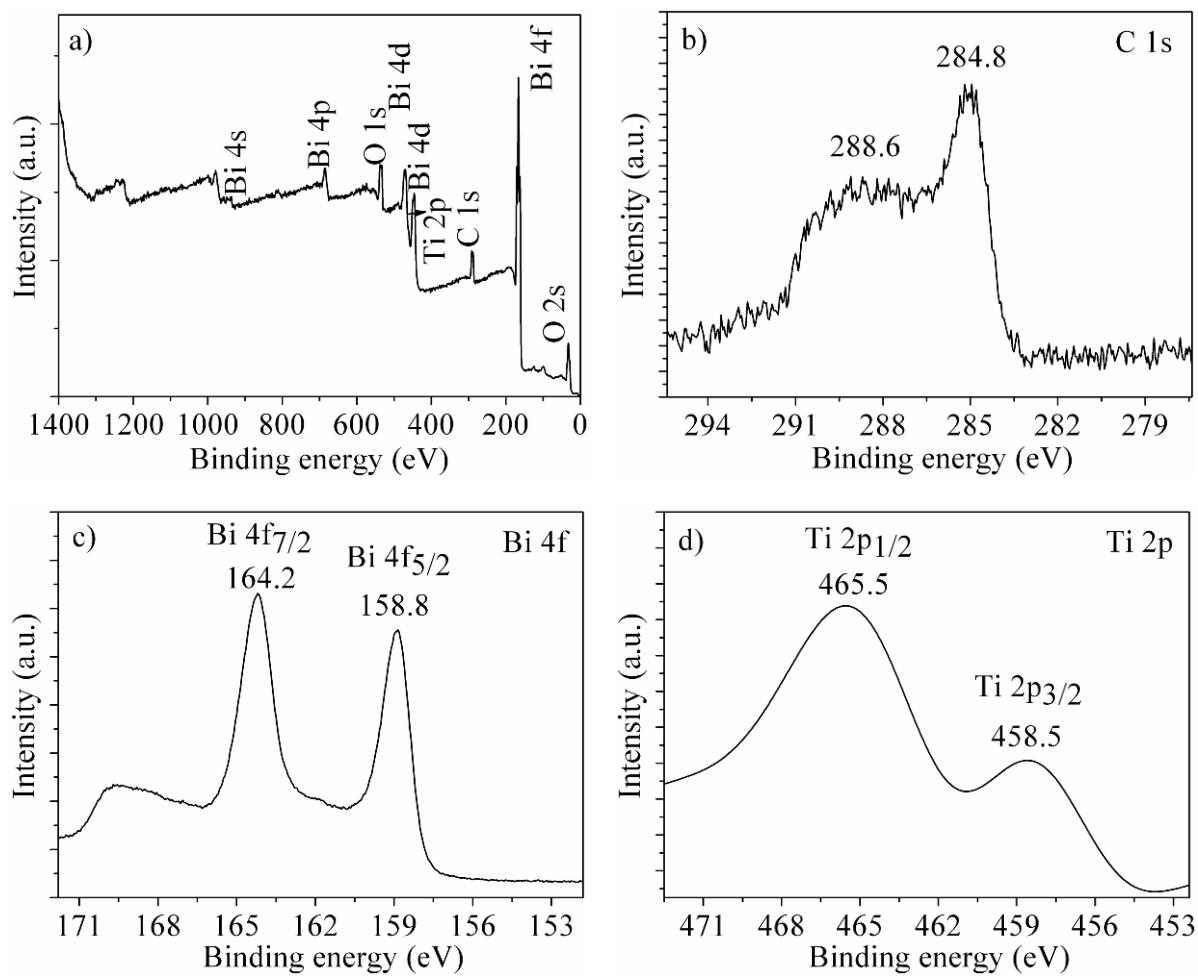
**Table 1.** Experimental details about the synthesis of C-Bi<sub>12</sub>TiO<sub>20</sub> samples

No.	Mass of glucose/g	Colors of hydrothermal samples	Sample names after calcination	Colors of C500 samples
1	0	Light yellow	C500-0	Light yellow
2	0.01	Light yellow	C500-1	Light grey
3	0.03	Light yellow	C500-2	Grey
4	0.05	Light yellow	C500-3	Grey
5	0.10	Light yellow	C500-4	Brown-grey

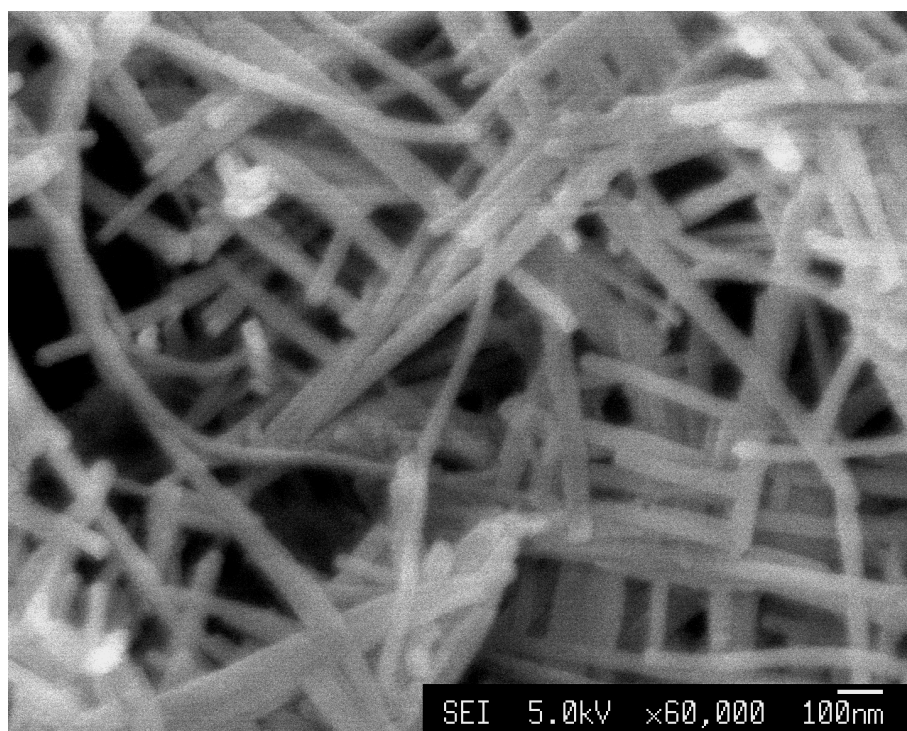
## 2. Supporting Results



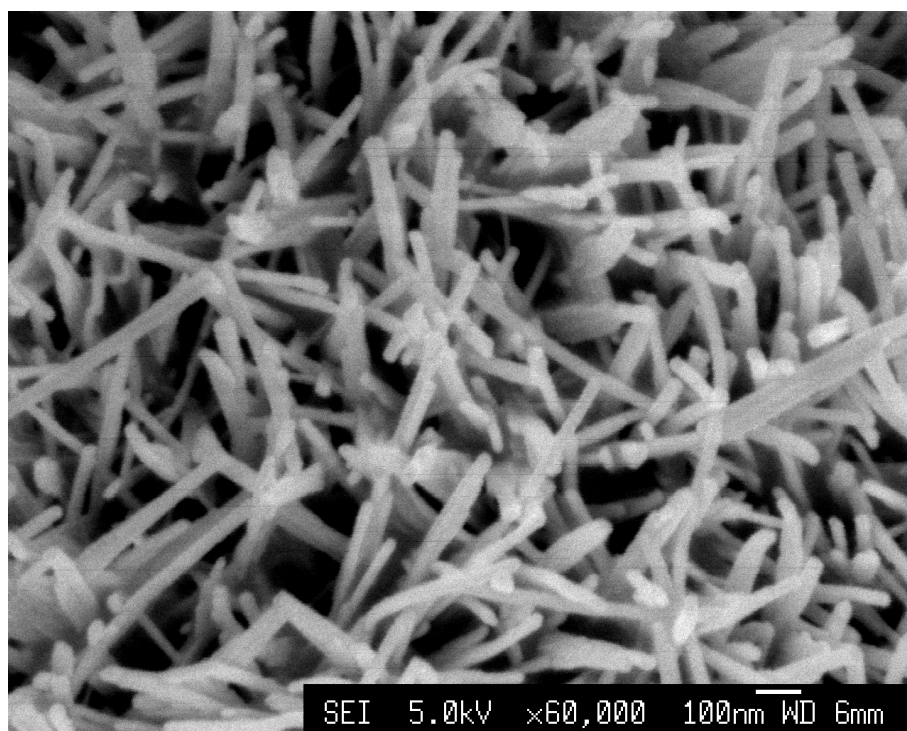
**Fig. S1.** XRD pattern of as-prepared carbon modified  $\text{Bi}_{12}\text{TiO}_{20}$  samples after photodegradation of RhB in aqueous solution.



**Fig. S2.** XPS spectra of a) survey spectrum, b) C 1s, c) Bi 4f and Ti 2p for the C500-3 sample.

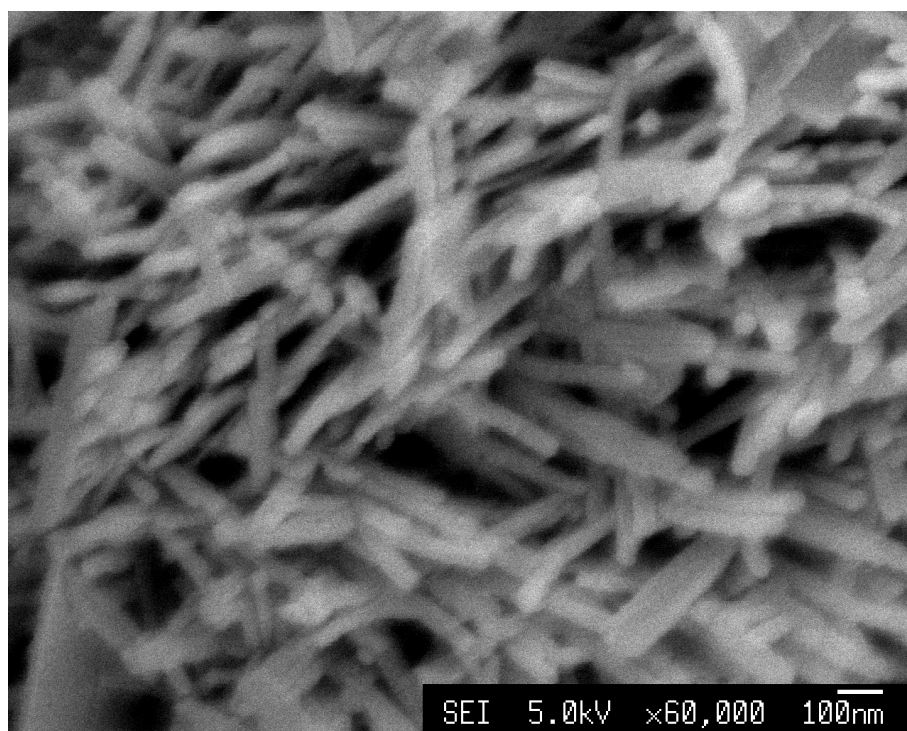


**Fig. S3.** SEM image of as-prepared  $\text{Bi}_{12}\text{TiO}_{20}$  samples without glucose as the C500-0.



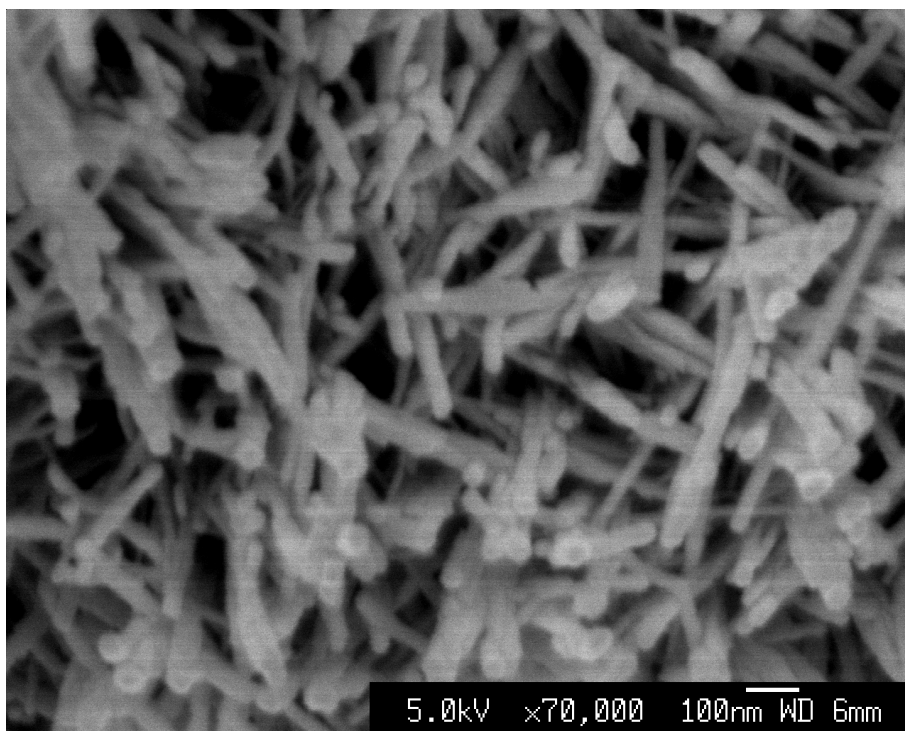
**Fig. S4.** SEM image of as-prepared carbon modified  $\text{Bi}_{12}\text{TiO}_{20}$  samples with more content of carbon, 0.01 g as the sample of C500-1.



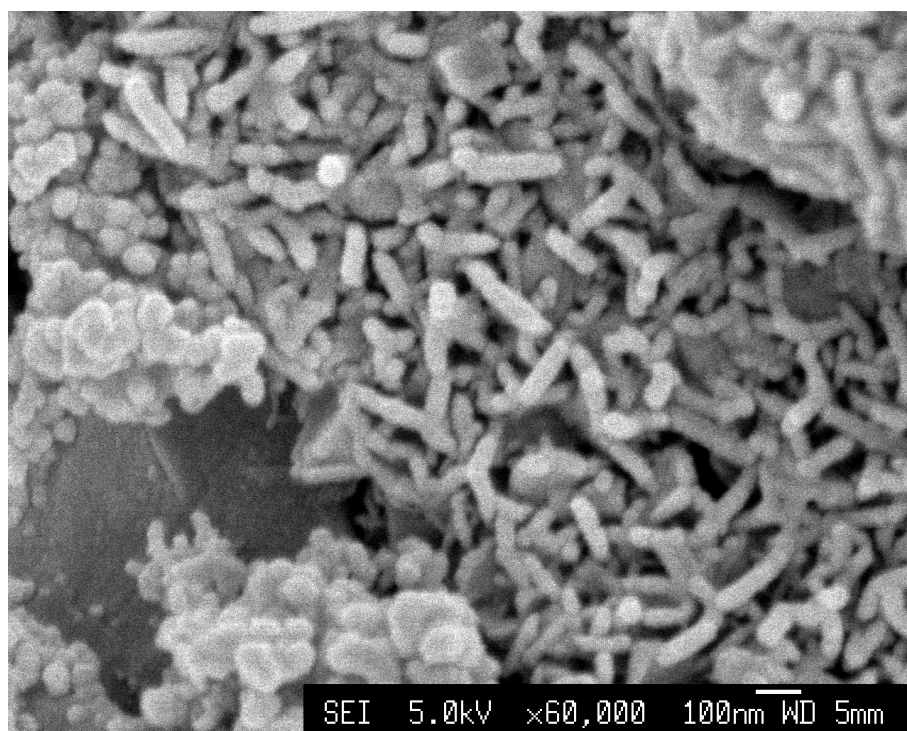


**Fig. S5.** SEM image of as-prepared carbon modified  $\text{Bi}_{12}\text{TiO}_{20}$  samples with more content of carbon, 0.03 g as the sample of C500-2.

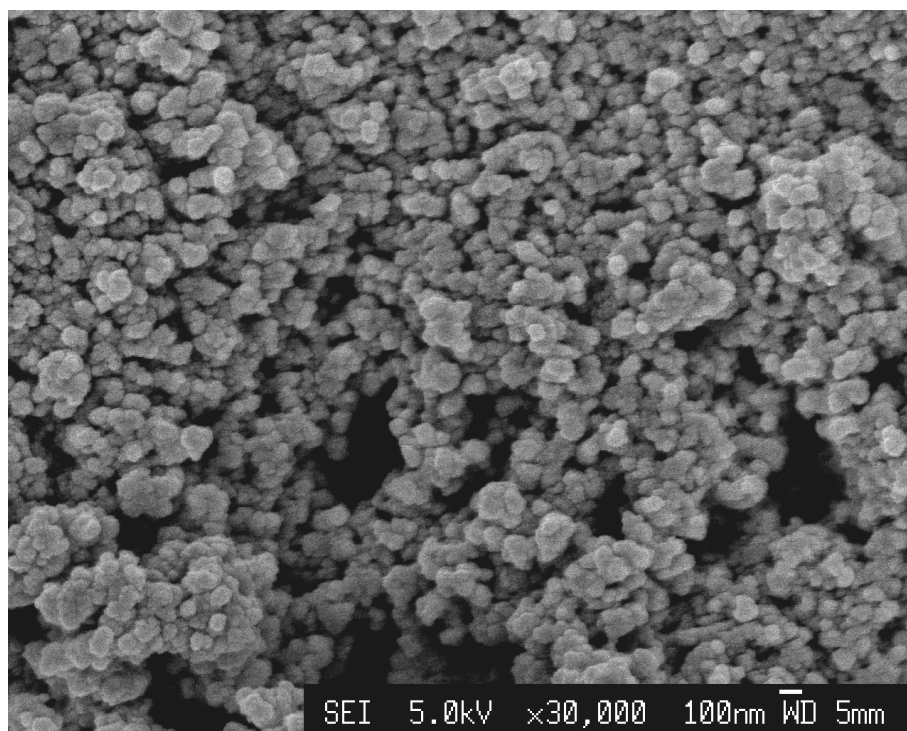




**Fig. S6.** SEM image of as-prepared carbon modified  $\text{Bi}_{12}\text{TiO}_{20}$  samples with more content of carbon, 0.05 g as the sample of C500-3.



**Fig. S7.** SEM image of as-prepared carbon modified  $\text{Bi}_{12}\text{TiO}_{20}$  samples with more content of carbon, 0.10 g as the sample of C500-4.



**Fig. S8.** SEM image of as-prepared carbon modified Bi<sub>12</sub>TiO<sub>20</sub> samples with more content of carbon, 0.50 g.