

## Supporting Information

### **Polyaniline-decorated {001} facets of Bi<sub>2</sub>O<sub>2</sub>CO<sub>3</sub> nanosheets: in situ oxygen vacancy formation and enhanced visible light photocatalytic activity**

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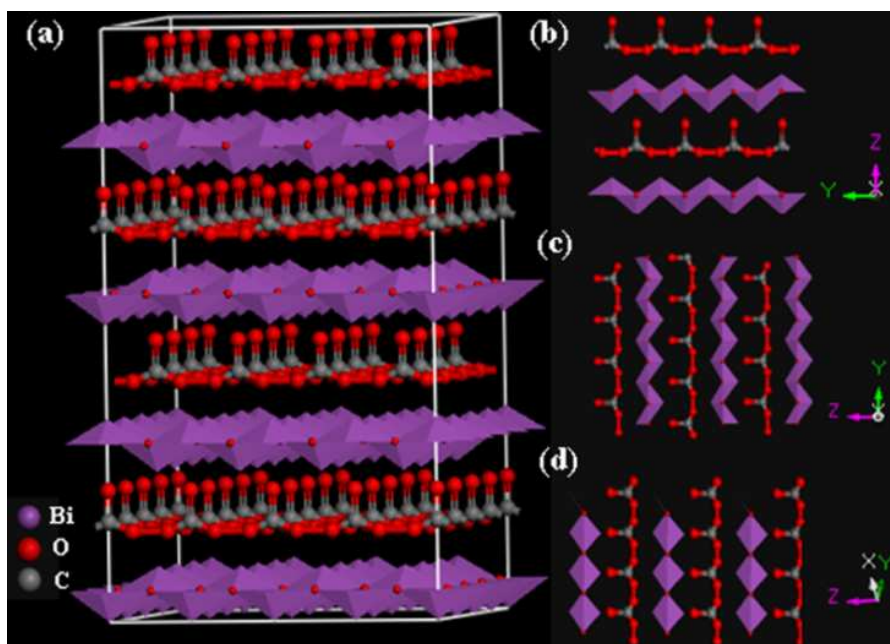
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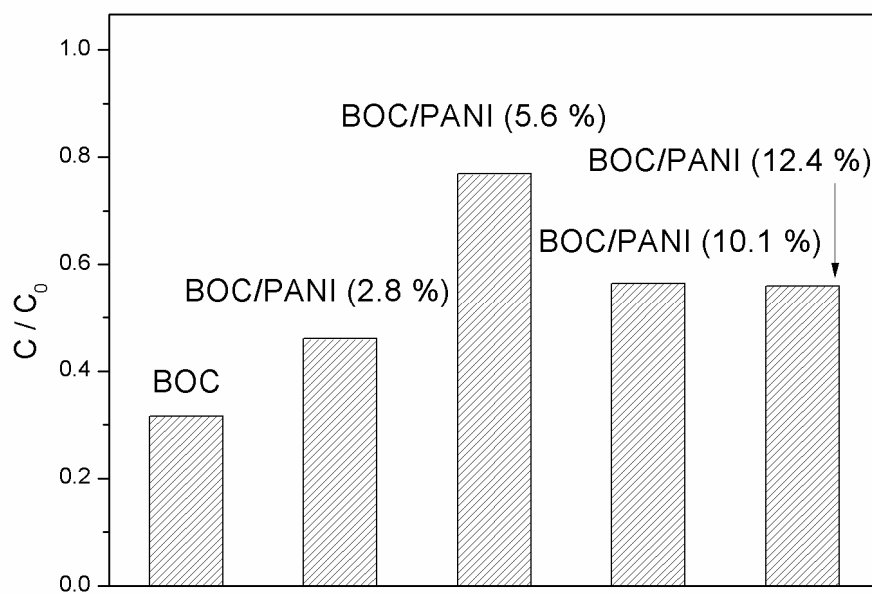
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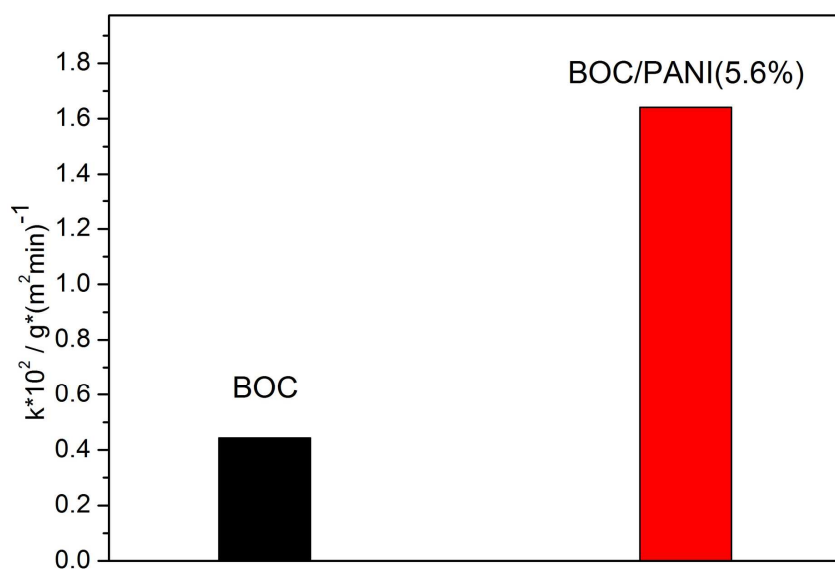
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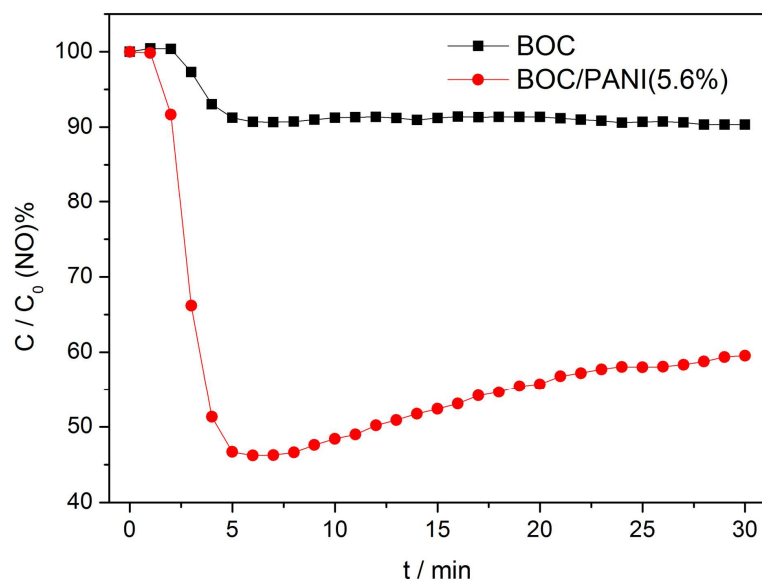
**Figure S1.** Schematic crystal structure of  $\text{Bi}_2\text{O}_2\text{CO}_3$  using Imm2 space group (a); side view of the (001) facet (b), (010) facet (c) and (110) facet (d).



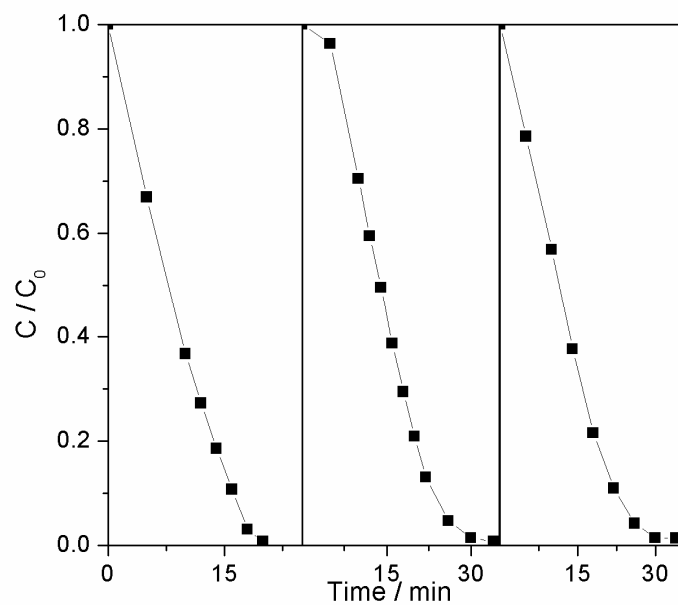
**Figure S2.** The adsorption of RhB over BOC and BOC/PANI samples in the dark.



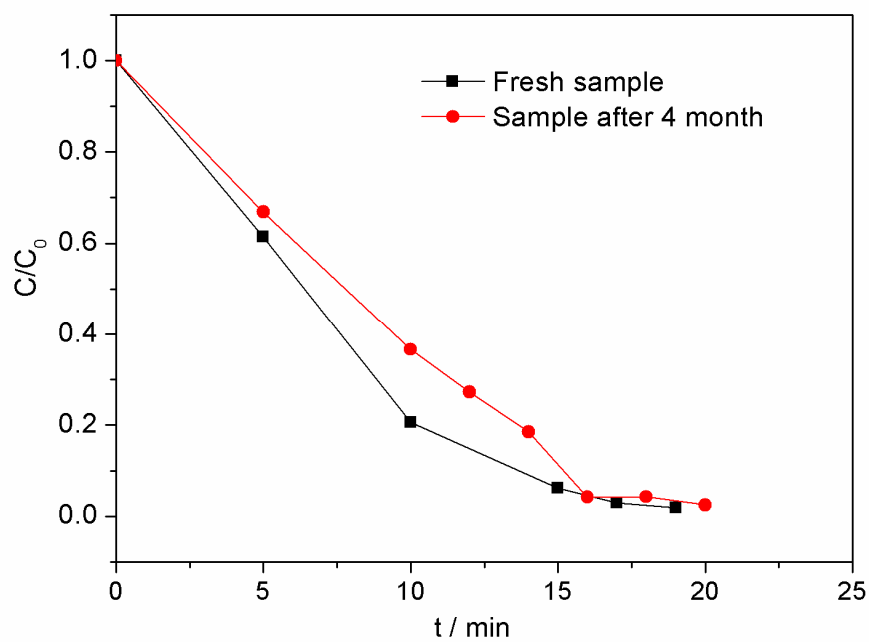
**Figure S3.** The comparison of reaction rate constants which have been normalized to the specific surface area



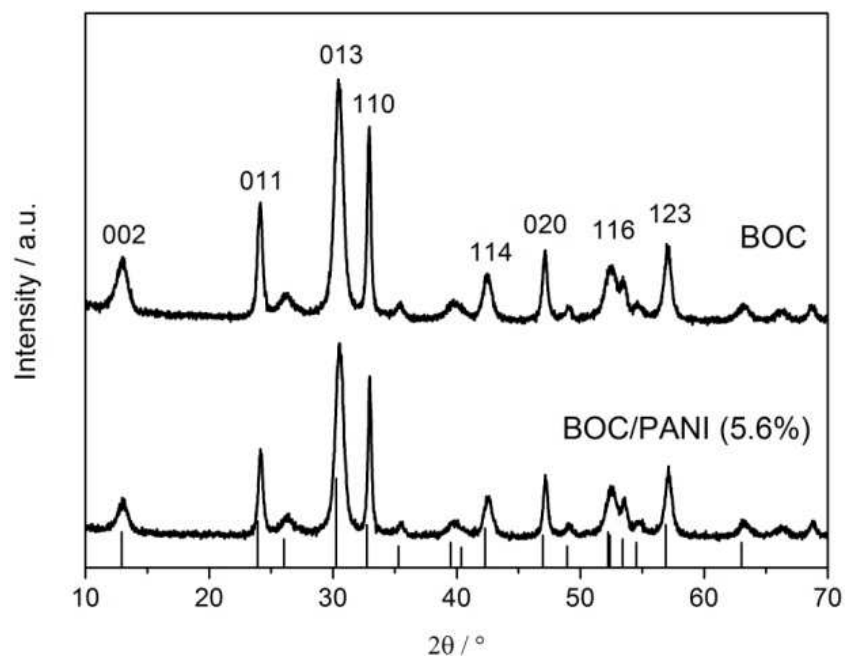
**Figure S4.** The variation of NO concentration ( $C/C_0$  %) with irradiation time over BOC and BOC/PANI (5.6%) under visible light irradiation.



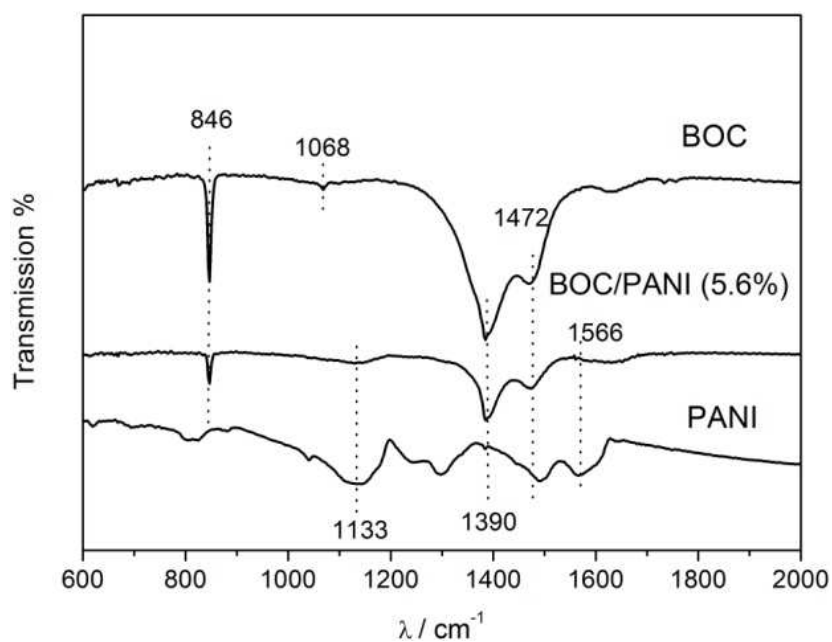
**Figure S5.** Cycling experiments on the photocatalytic degradation of RhB in the presence of BOC/PANI (5.6%) under visible light irradiation



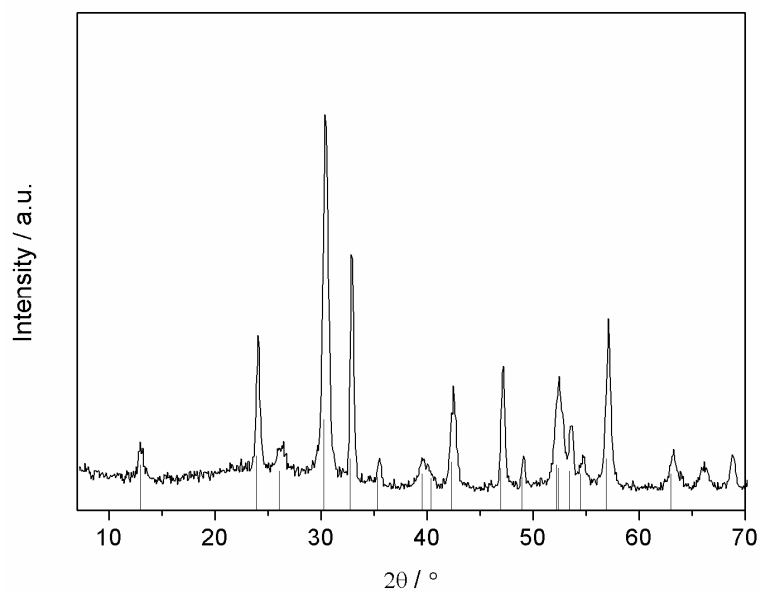
**Figure S6.** The comparison of photodegradation of RhB over fresh sample and sample after exposing in air for four months.



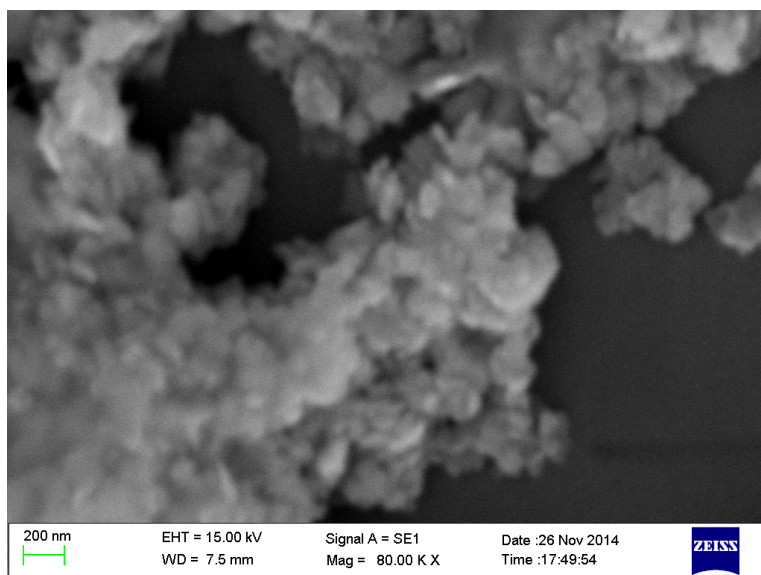
**Figure S7.** PXRD patterns of pristine BOC and BOC/PANI (5.6%) composite. The reference pattern of tetragonal  $\text{Bi}_2\text{O}_2\text{CO}_3$  (JCPDS No. 41-1488) is shown at the bottom.



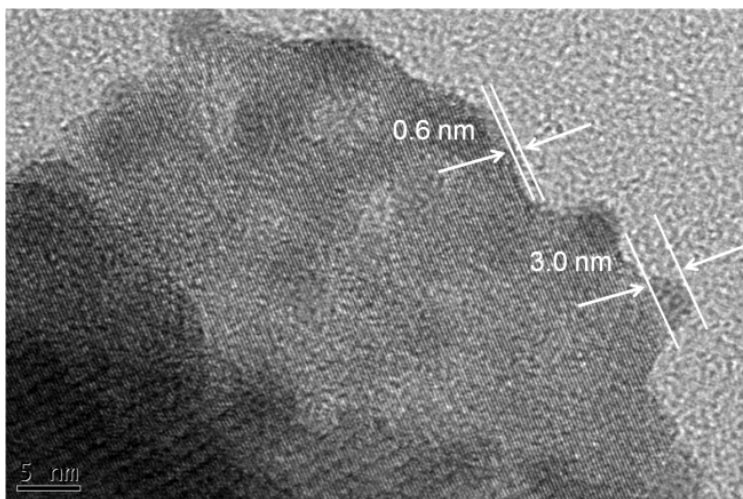
**Figure S8.** FT-IR spectrum of BOC, PANI and BOC/PANI (5.6%).



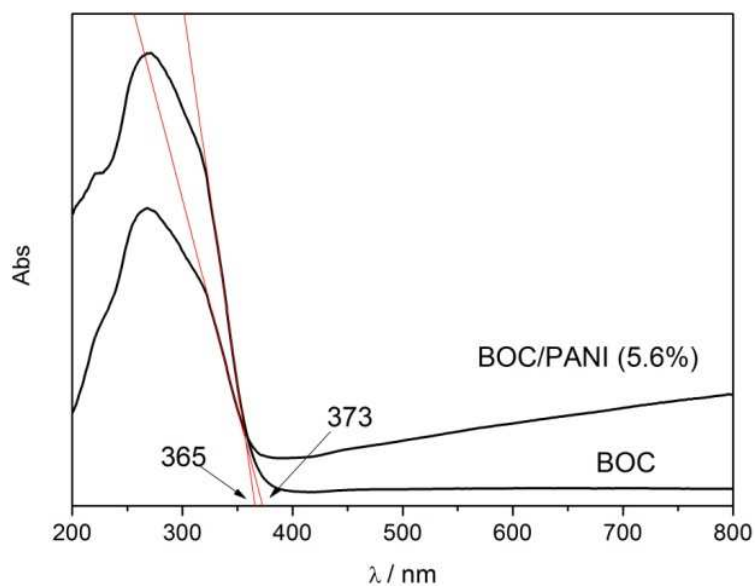
**Figure S9.** PXRD patterns of BOC/PANI (5.6%) after cycling experiments.



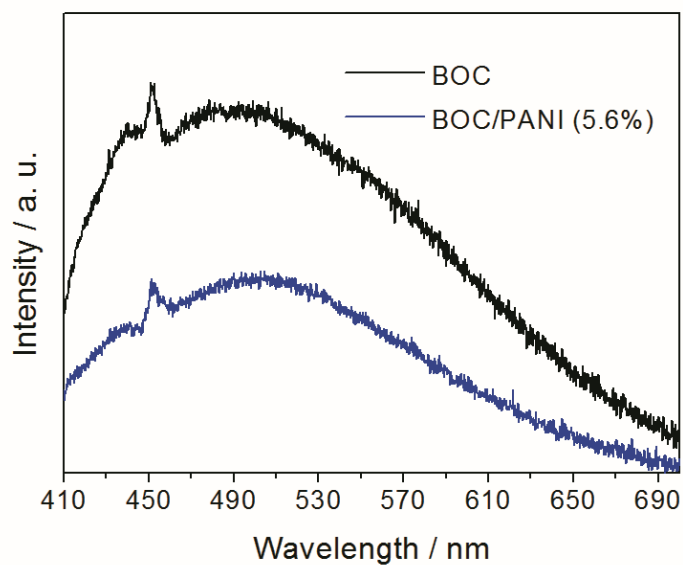
**Figure S10.** SEM image of BOC/PANI (5.6%) after cycling experiments.



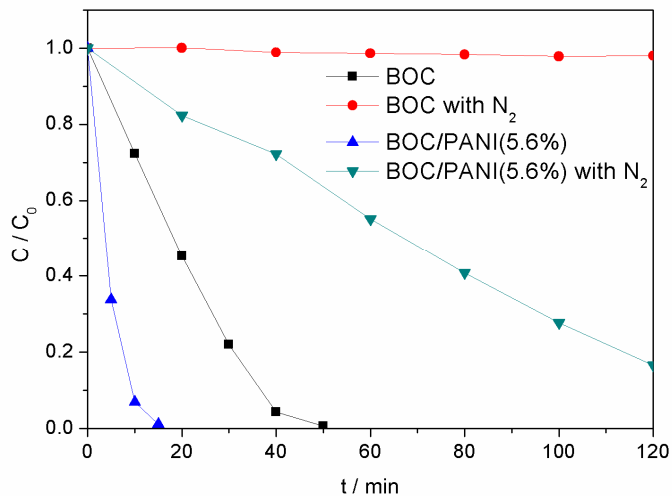
**Figure S11.** HRTEM image of BOC/PANI (5.6%).



**Figure S12.** The UV-Vis diffuse reflectance spectra of BOC and BOC/PANI (5.6%).



**Figure S13.** PL spectra of BOC and BOC/PANI (5.6%).



**Figure S14.** Photodegradation of RhB over BOC and BOC/PANI (5.6%) under conventional condition and with N<sub>2</sub> bubbling into the solution.



**Table S1.** The fitting values from the equivalent circuit model

<b>samples</b>	<b>R<sub>1</sub></b>	<b>C<sub>1</sub></b>	<b>R<sub>2</sub></b>	<b>CPE1-T</b>	<b>CPE1-P</b>	<b>R<sub>3</sub></b>
BOC	63.57	7.7658E-6	36.67	9.9134E-6	0.98	2.5374E7
BOC under irradiation	47.86	8.3521E-6	45.73	1.0268E-5	0.97389	1.9153E6
BOC/PANI (5.6%)	84.04	7.4156E-6	24.56	1.415E-5	0.95989	4.4988E6
BOC/PANI (5.6%) under irradiation	85.57	7.3561E-6	24.45	1.4462E-5	0.95781	1.5298E6

R1: the resistance of the solution;

R2: the resistance of the counter electrode;

C1: the capacitance of the counter electrode;

R3: the resistance of work electrode (BOC or BOC/PANI (5.6%));

CPE1-T/CPE1-P: the deviation of constant phase angle (the value is close to 1 representing a trend to fabricate a double-layer electric)