supplementary information

Visible-light driven p-n heterojunction formed between α-Bi_2O_3 and $Bi_2O_2CO_3$ for efficient photocatalytic degradation of tetracycline

Baikang Zhu[abd†], Qinbing Dong[a†], Jianghua Huang[a†], Debin Song[a], Lihui Chen[a], Qingguo Chen[a], Chunyang Zhai[c], Bohong Wang [a*], Jiří Jaromír Klemeš[e*], Hengcong Tao[adf*]

a School of Petrochemical Engineering & Environment, Zhejiang Ocean University, Zhoushan, 316022, China.

b United National-Local Engineering Laboratory of Oil & Gas Storage and Transportation Technology, Zhoushan, Zhejiang, 316022, China.

c School of Materials Science and Chemical Engineering, Ningbo University, Ningbo 315211, China.

d Zhejiang Provincial Key Laboratory of Petrochemical Environmental Pollution Control, Zhoushan, Zhejiang, 316022, China.

e Sustainable Process Integration Laboratory – SPIL, NETME Centre, Faculty of Mechanical Engineering, Brno University of Technology - VUT Brno, Technická 2896/2, 616 69, Brno, Czech Republic.

f College of Chemical and Biological Engineering, Zhejiang University, Hangzhou, 310058, China.

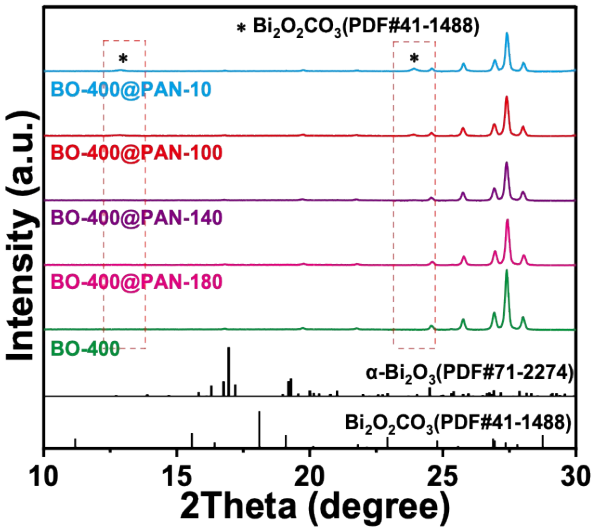

Figure S1. Polymer-modified $Bi_2O_2CO_3$ with various molar ratios (polymer/$Bi_2O_2CO_3$) calcined at 400 ℃.

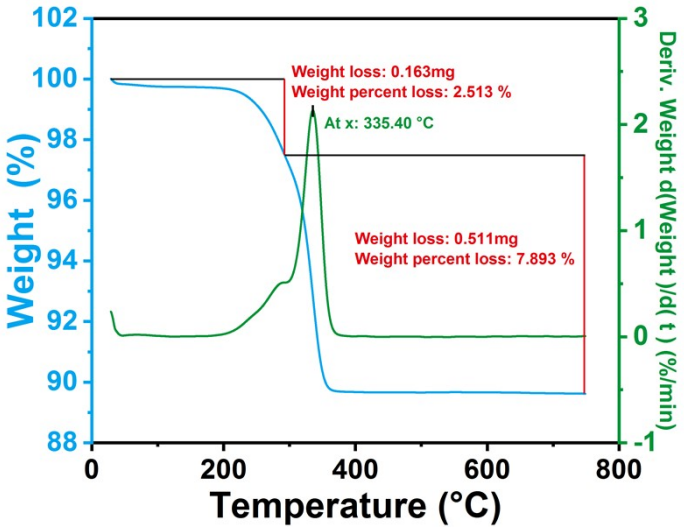

Figure S2. Thermogravimetric analysis curve of the precures

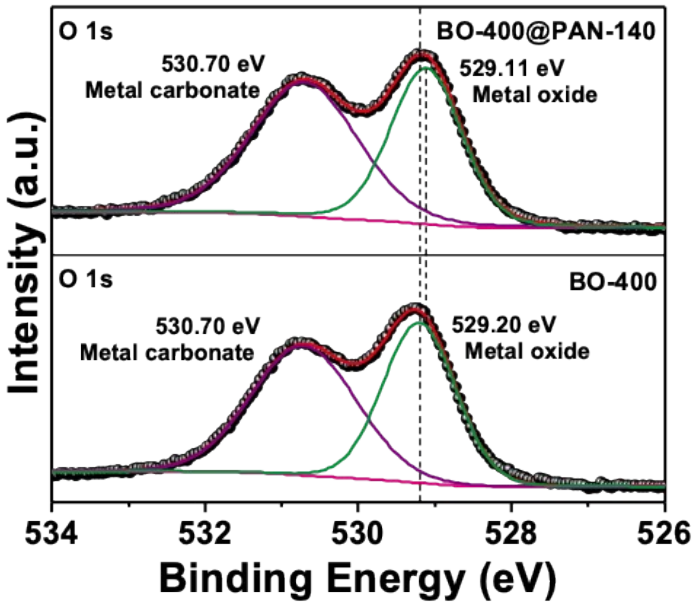

Figure S3. O 1s high resolution XPS spectrum of BO-400 and BOC@PAN-140

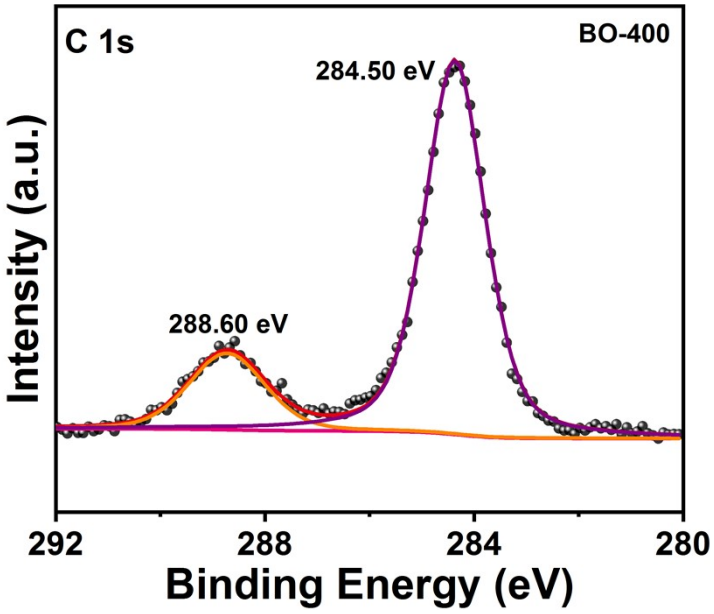

Figure S4. C 1s high resolution XPS spectrum of BO-400

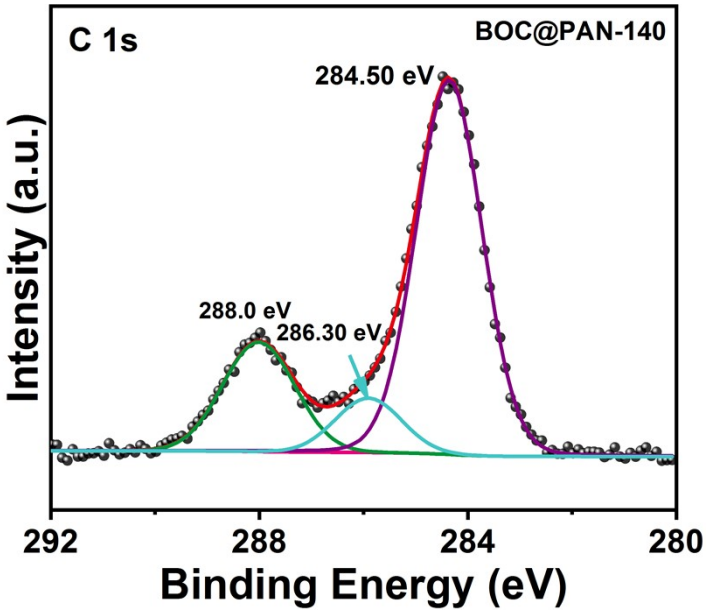

Figure S5. C 1s high resolution XPS spectrum of BOC@PAN-140

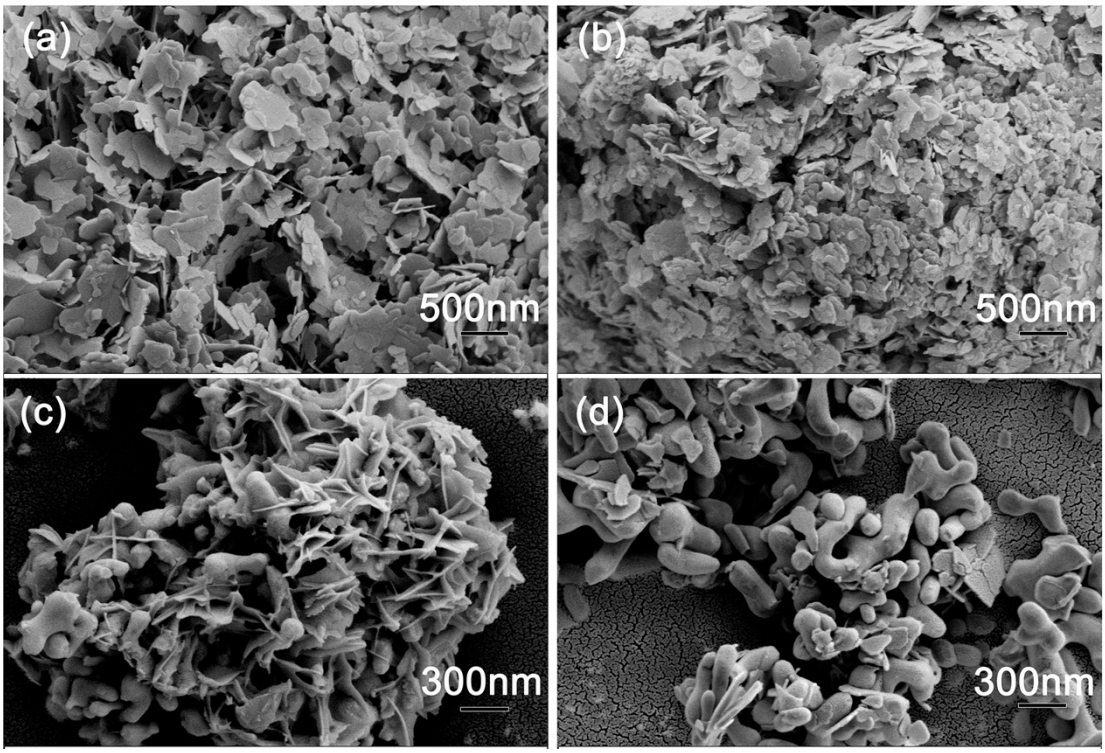

Figure S6. SEM images of (a) BO-300, (b) BO-300@PAN-140, (c) BO-400@PAN-100, (d) BO-400@PAN-180

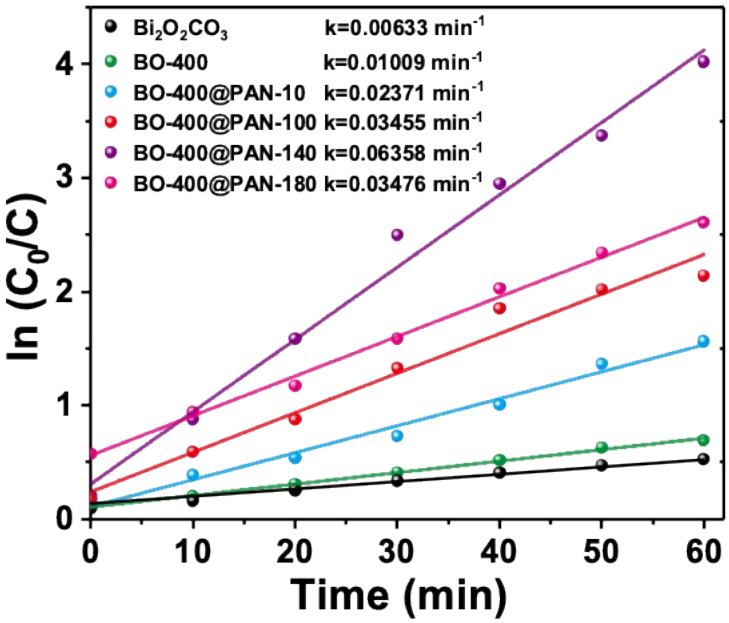

Figure S7. Kinetic fitting curves of $Bi_2O_2CO_3$, BO-400, BO-400@PAN-10, BO-400@PAN-100, BO-400@PAN-140 and BO-400@PAN-180 degradation TC.

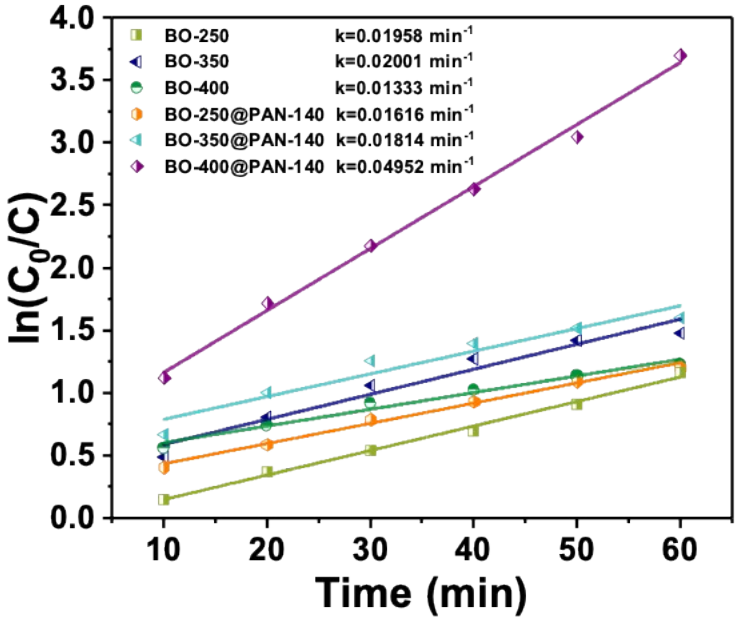

Figure S8. Kinetic fitting curves of $Bi_2O_2CO_3$, BO-250, BO-350, BO-400, BO-250@PAN-140, BO-350@PAN-140 and BO-350@PAN-140 degradation TC.

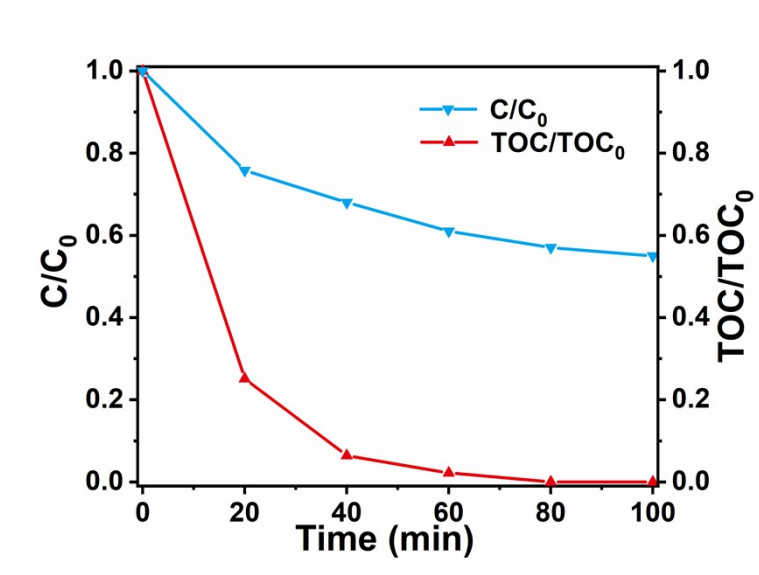

Figure S9. TOC measurement of TC solution degraded by BO-400@PAN-140 at fixed time intervals.

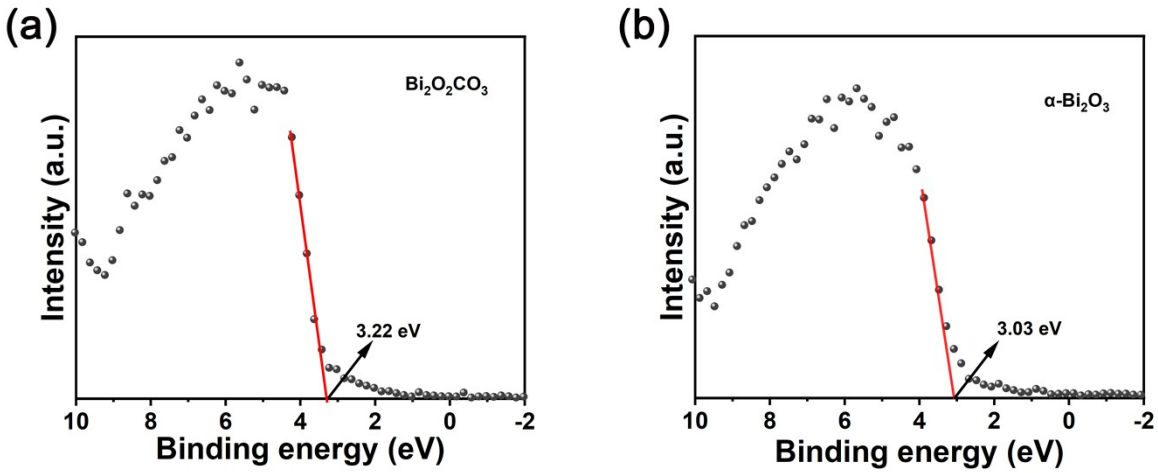

Figure S10. VB-XPS spectra of $Bi_2O_2CO_3$ (a) and α-Bi_2O_3 (b).

Table S1. Band positions and band gaps of $Bi_2O_2CO_3$ and α-Bi_2O_3

Samples	Calculated VB position E_{VB} (eV)	Calculated CB position E_{CB} (eV)	Band gap Eg (eV)
$Bi_2O_2CO_3$	3.22	0.26	2.96
α-Bi_2O_3	3.03	0.38	2.65

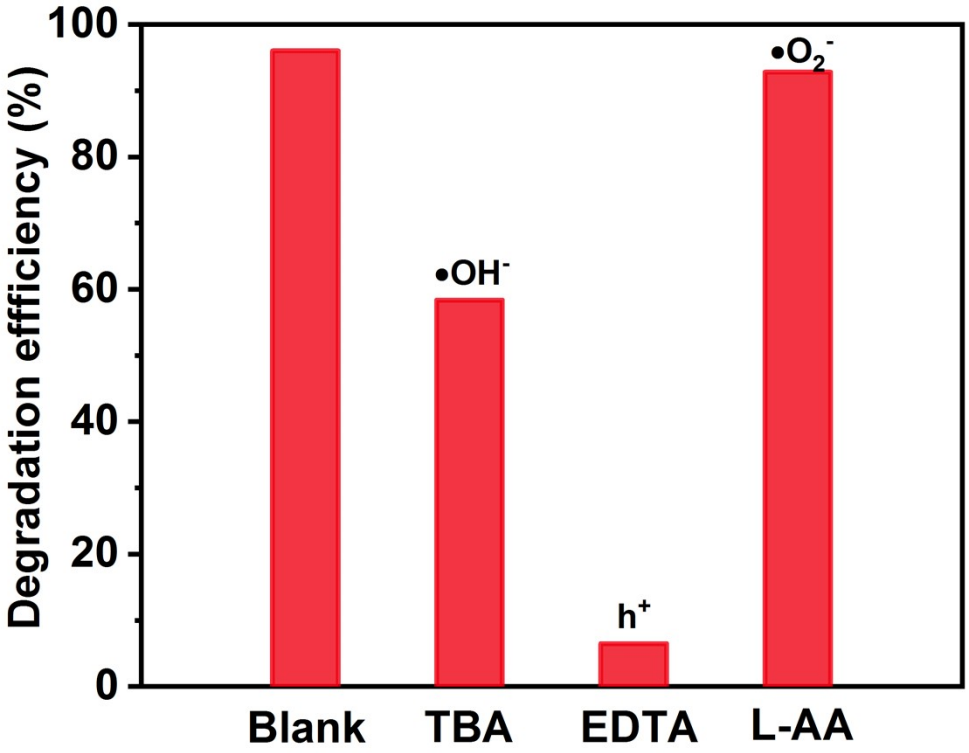

Figure S11. Effect of different quench agents on photocatalytic degradation of TC by photocatalytic composites.

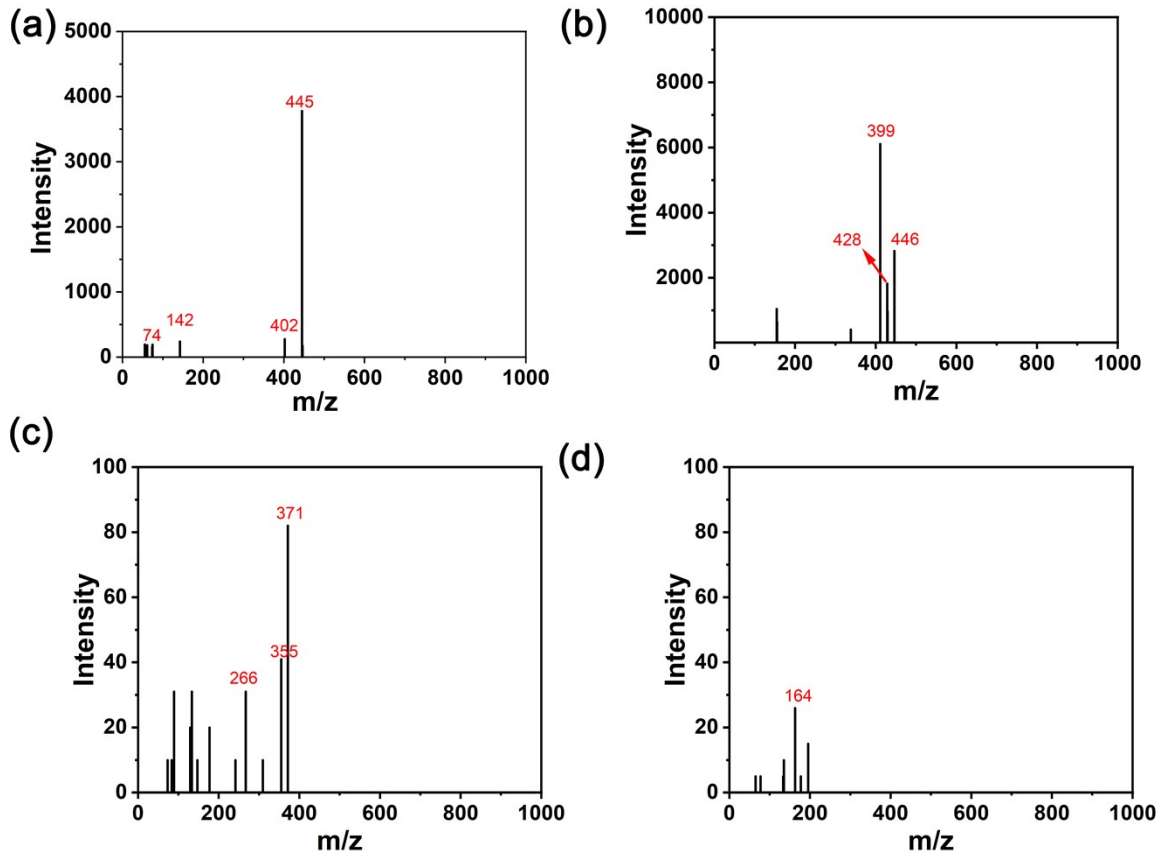

Figure S12. ESI-MS signals of the intermediates with BO-400@PAN-140 composite as photocatalyst.