Supporting Information

Steered Polymorphic Nanodomains in TiO_2 to Boost Visible-Light Photocatalytic Oxidation

Zeju Zhang[1 †], Mang Niu[1 †], Wei Li[1], Chenfeng Ding[2, 5*], Peitao Xie[1], Yongxin Li[1], Lili Chen[1], Xiaopeng Lan[1], Chunlei Liu[1], Xiaodong Yan[3], Xuewei Fu[4], Yaochun Liu[5], Yuan Liu[1,5*], Dapeng Cao[6], Jingjie Dai[7], Xiaofen Hong[8], Chunzhao Liu[1*]

[1] *State Key Laboratory of Bio-fibers and Eco-textiles, Institute of Biochemical Engineering, The Affiliated Qingdao Central Hospital of Qingdao University, College of Materials Science and Engineering, Qingdao University, Qingdao 266071, China*

[2] *Energy Materials and Surface Sciences Unit (EMSSU), Okinawa Institute of Science and Technology Graduate University (OIST), 1919-1 Tancha Kunigami-gun, Onna-son, Okinawa 904-0495, Japan*

[3] *Key Laboratory of Synthetic and Biological Colloids, Ministry of Education, School of Chemical and Material Engineering, Jiangnan University, Wuxi 214122, China*

[4] *College of Polymer Science and Engineering, State Key Laboratory of Polymer Materials Engineering, Sichuan University, Chengdu 610065, Sichuan, China*

[5] *Foshan (Southern China) Institute for New Materials, Foshan 528200, China*

[6] *Beijing Advanced Innovation Center for Soft Matter Science and Engineering, Beijing University of Chemical Technology, Beijing 100029, China.*

[7] *School of Mechanical and Electronic Engineering, Qingdao Binhai University, Qingdao 266555, Shandong, China.*

[8] *Zhejiang Rich Environmental Protection Technology Co., Ltd., Hangzhou 310000, China.*

† *These authors contributed equally.*

Corresponding e-mail: chenfeng.ding@oist.jp; liuyuan@qdu.edu.cn; czliu@qdu.edu.cn

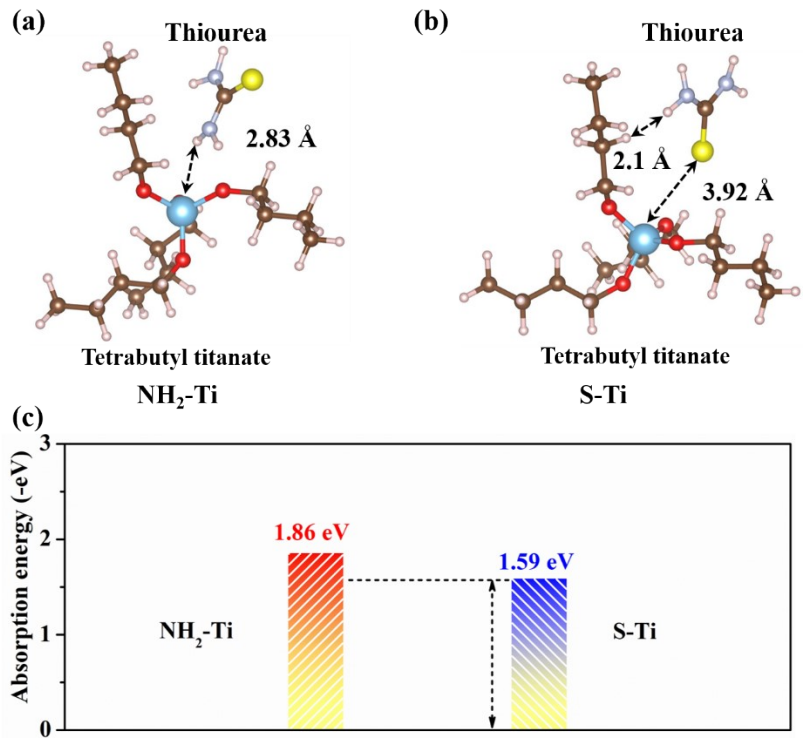

Figure S1. The simulated absorption structure of (a) NH_2-Ti and (b) S-Ti sites. (c) The comparison of absorption energy between NH_2-Ti and S-Ti sites.

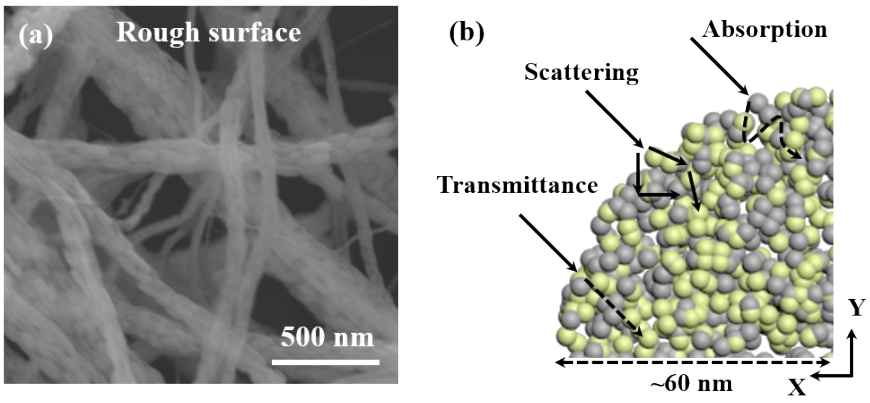

Figure S2. (a) SEM image of C_3N_4-induced TiO_2 nanofibers. (b) Schematic mechanism of enhanced light harvesting of C_3N_4-induced TiO_2 nanofibers.

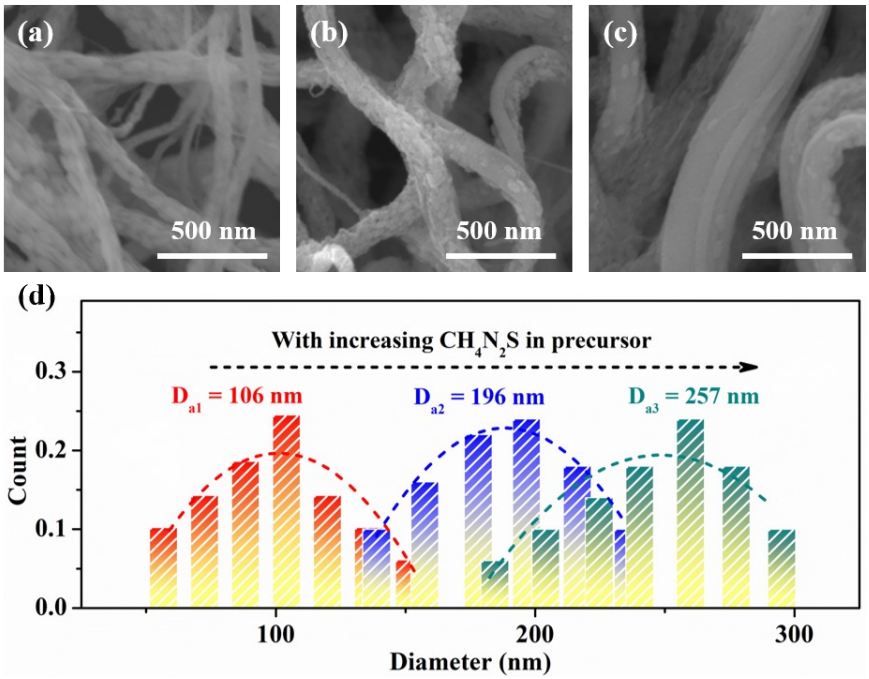

Figure S3. (a)-(c) SEM images of C_3N_4-induced TiO_2 nanofibers with introduction various amount of thiourea into precursor. (d) Diameter distribution of nanofibers with increasing thiourea in precursor.

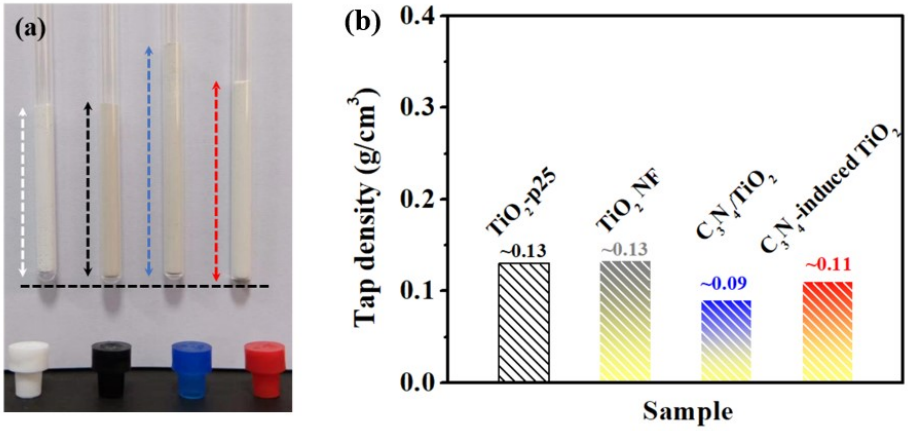

Figure S4. (a) Optical image and (b) tap densities of TiO_2-P25, TiO_2 NF, C_3N_4/TiO_2, C_3N_4-induced TiO_2.

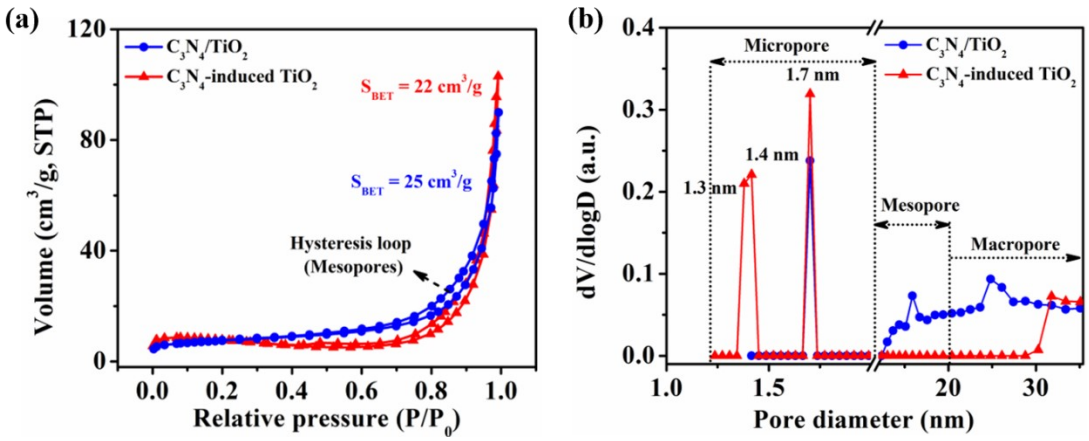

Figure S5. (a) Nitrogen adsorption/desorption curves and (b) pore size distribution of C_3N_4/TiO_2 and C_3N_4-induced TiO_2.

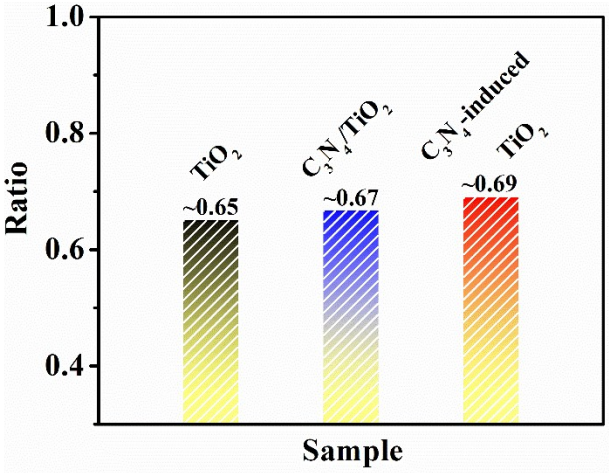

Figure S6. The relative intensity ratio of TiO_2 (004) peak to TiO_2 (200) peak according to the XRD patterns.

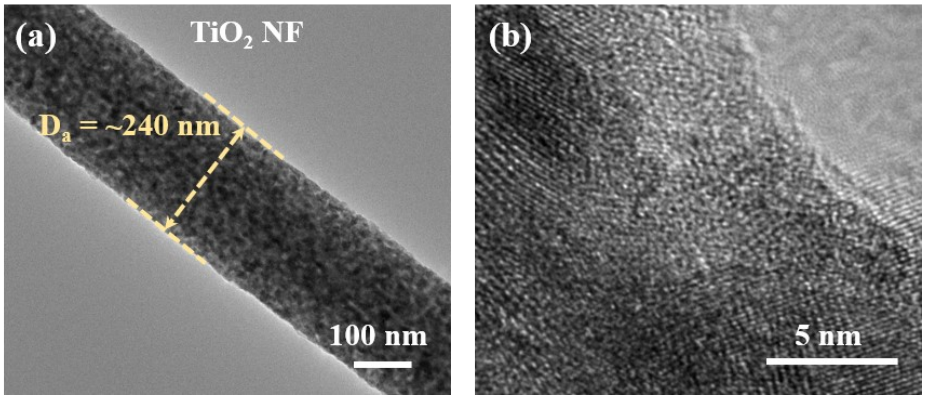

Figure S7. (a) TEM image and (b) HR-TEM image of TiO_2 nanofiber.

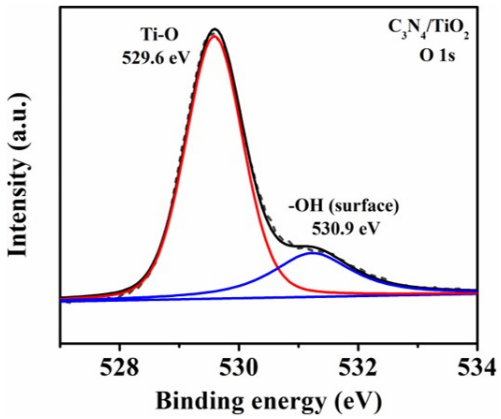

Figure S8. Gaussian fitted XPS curves of oxygen atoms in C_3N_4/TiO_2.

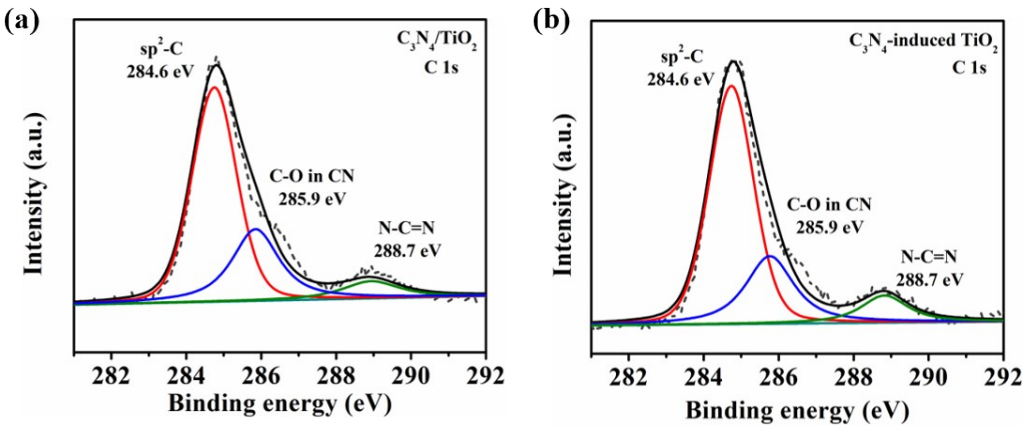

Figure S9. Gaussian fitted XPS curves of carbon atoms in (a) C_3N_4/TiO_2 and (b) C_3N_4-induced TiO_2.

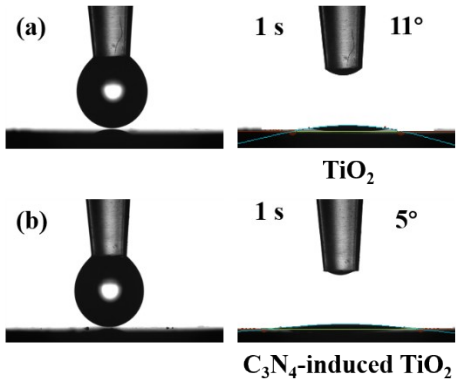

Figure S10. Contacting angle of water on the surface of (a) TiO_2 and (b) C_3N_4-induced TiO_2.

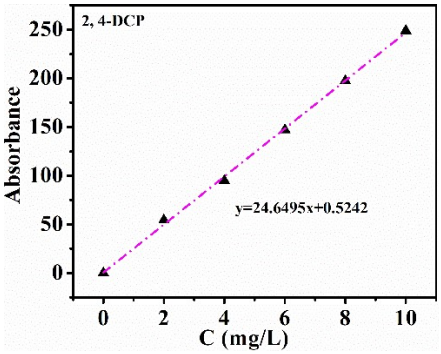

Figure S11. Standard curve of absorbance as a function of 2, 4-DCP concentration.

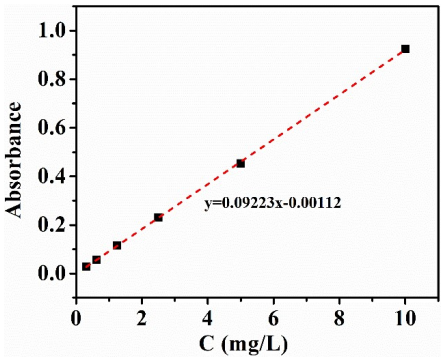

Figure S12. Standard curve of absorbance as a function of Rh-b concentration.

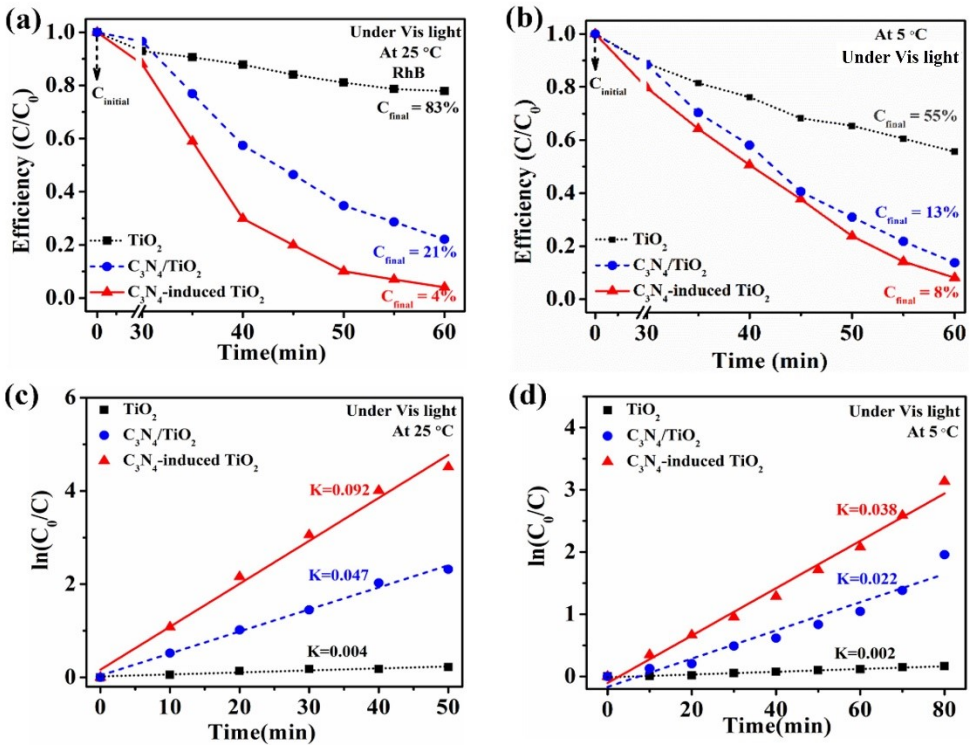

Figure S13. Photocatalytic degradation curves at (a) 25 and (b) 5 ºC, and kinetic curves at (c) 25 and (d) 5 ºC of TiO_2, C_3N_4/TiO_2 and C_3N_4-induced TiO_2 on Rh-b.

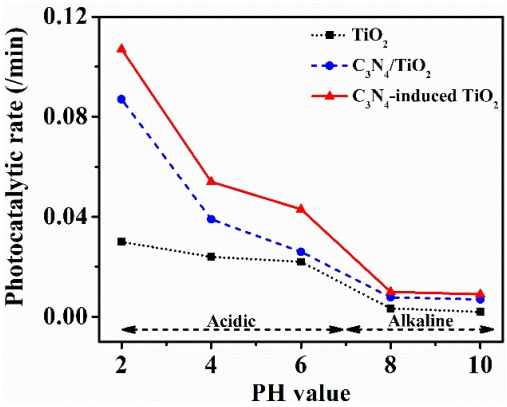

Figure S14. Photocatalytic degradation rate of TiO_2, C_3N_4/TiO_2 and C_3N_4-induced TiO_2 under different PH values.

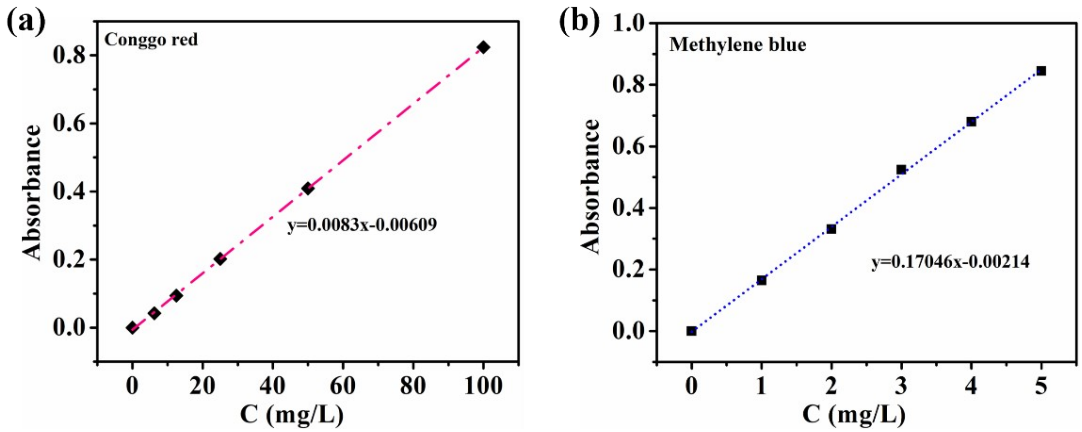

Figure S15. Standard curves of absorbance as a function of CR and MB concentration.

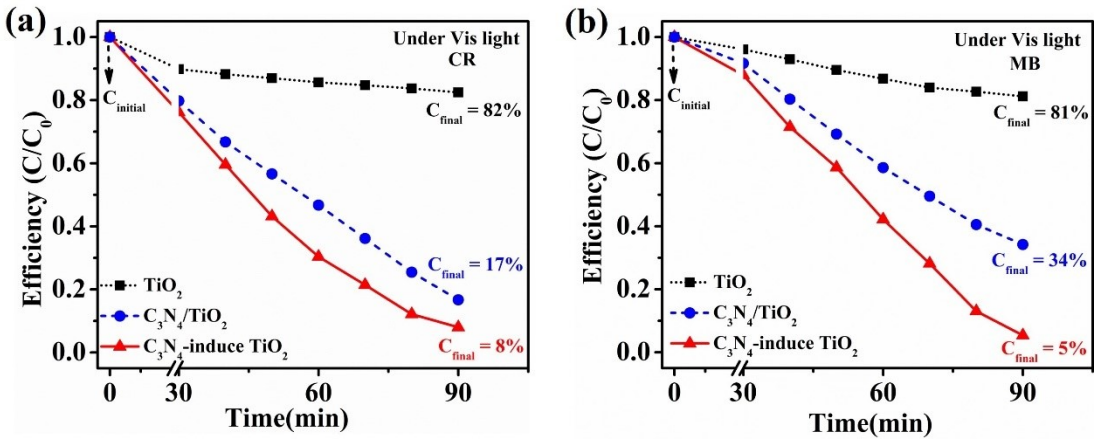

Figure S16. Photocatalytic degradation of (a) CR and (b) MB.

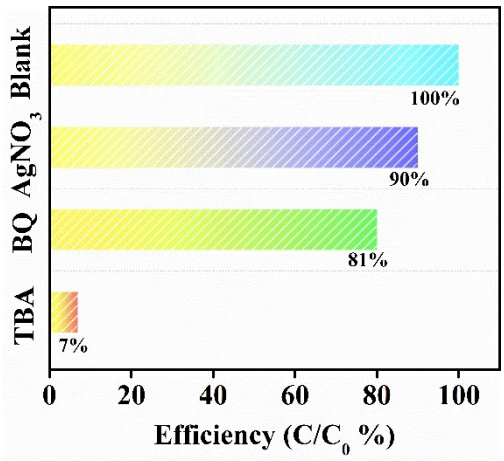

Figure S17. Photocatalytic degradation efficiency with the introduction of TBA (·OH), $AgNO_3$ (e^-) and BQ (O_2^-) as scavengers during the degradation of Rh-b.

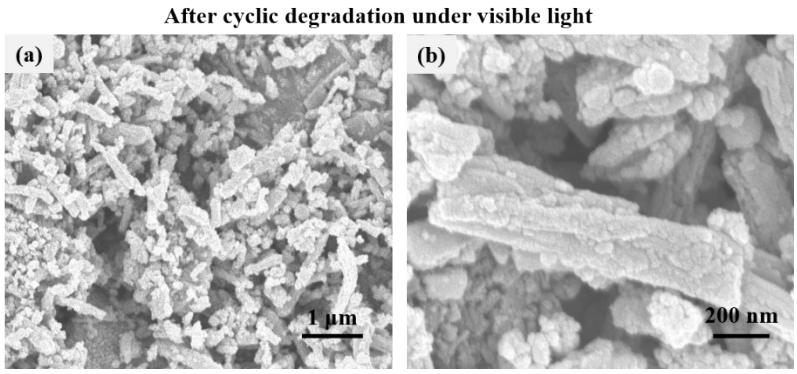

Figure S18. (a) SEM image and (b) magnified image of C_3N_4-induced TiO_2 after cyclic degradation under visible light.

Table S1. Comparison of average crystallite size of TiO_2 in C_3N_4-induced TiO_2 as compared with other counterparts.

Sample	Phase	Average crystallite size (nm)
TiO_2	**Anatase**	**12.1**
C_3N_4/TiO_2	**Anatase**	**18.9**
C_3N_4-induced TiO_2	**Anatase**	**9.5**