

Electronic Supplementary Information

Constructing hydrogen bond based melam/WO₃ heterojunction with enhanced visible-light photocatalytic activity

Zhengyuan Jin,^{a,b} Qitao Zhang,^b Liang Hu,^a Jiaqi Chen,^a Xing Cheng,^c Yu-Jia Zeng,^{a,d,*}

Shuangchen Ruan,^{a,**} and Teruhisa Ohno^b

^a Shenzhen Key Laboratory of Laser Engineering, College of Optoelectronic Engineering,
Shenzhen University, Shenzhen, 518060, P. R. China

^b Department of Applied Chemistry, Faculty of Engineering, Kyushu Institute of Technology,
1-1 Sensuicho, Tobata, Kitakyushu 804-8550, Japan

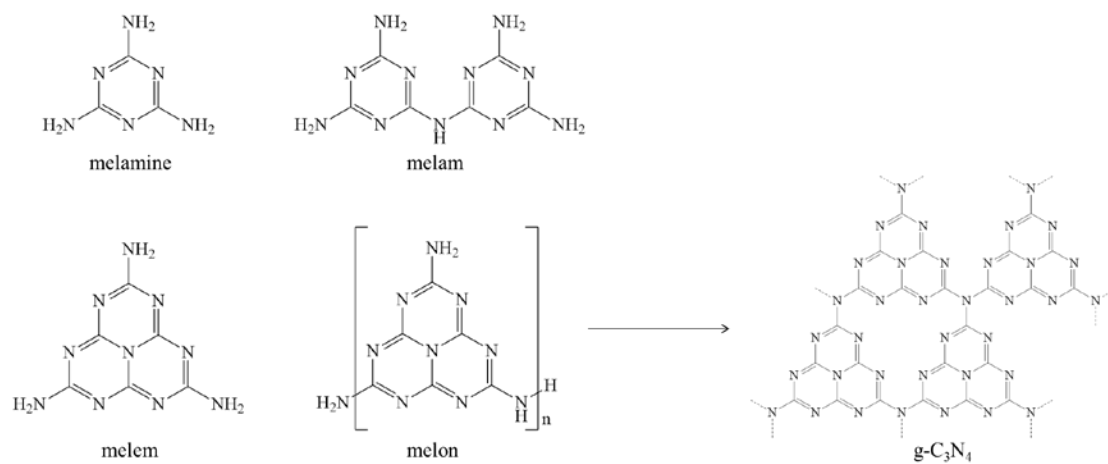
^c Department of Materials Science and Engineering, South University of Science and
Technology of China (SUSTC)

^d State Key Laboratory of Silicon Materials, Department of Materials Science and
Engineering, Zhejiang University, Hangzhou 310027, P. R. China.

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SUPPORTING DATA



Scheme S1 The structures of the carbon nitride family, such as melamine, melam, melem, melon, and $\text{g-C}_3\text{N}_4$. Scheme adapted from Lau et al [1].

Figure data

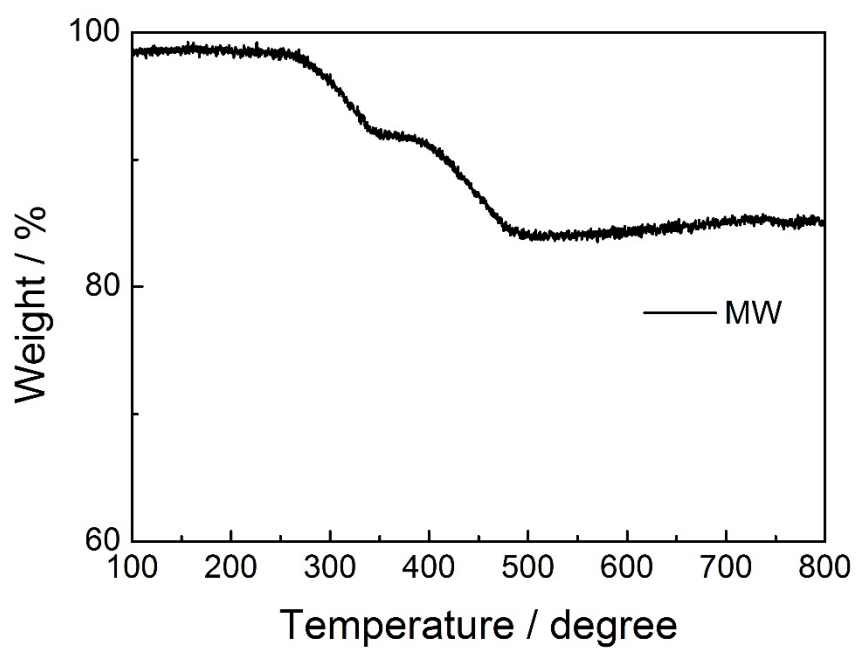


Figure S1 TG analysis of MW (10 mg) between 100 °C and 800 °C at a heating rate of 10 °C min⁻¹.

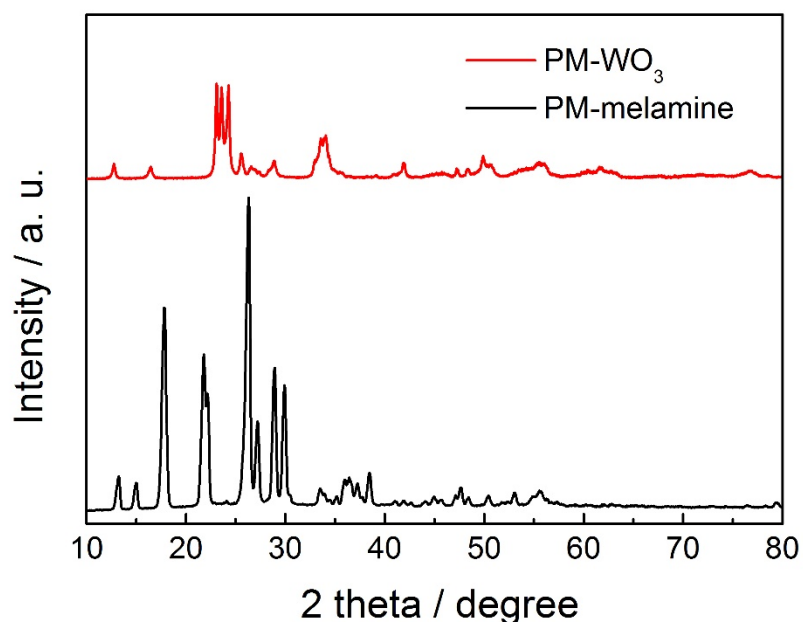


Figure S2 XRD patterns of melamine and WO₃ after planetary milling treatment.

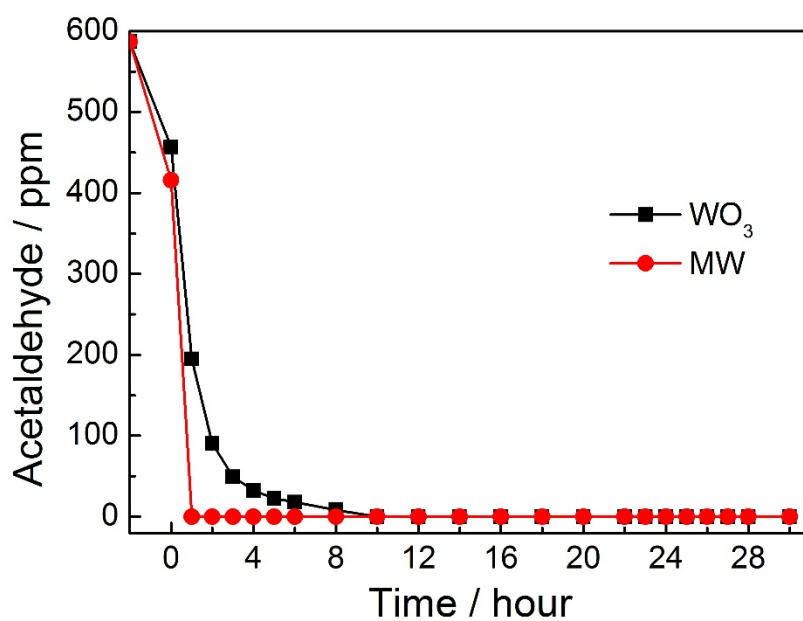


Figure S3 Time courses of acetaldehyde from acetaldehyde photodecomposition.

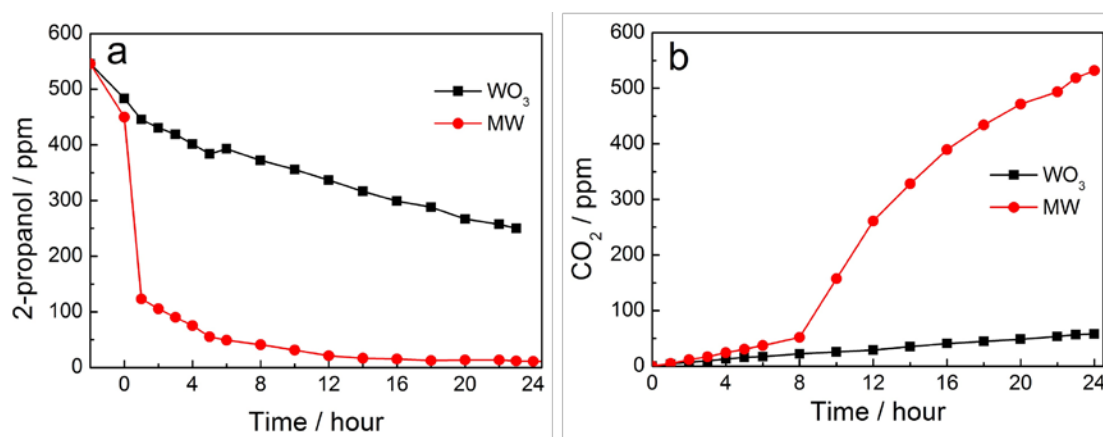


Figure S4 Time courses of 2-propanol (a) and CO₂ (b) from 2-propanol photodecomposition.

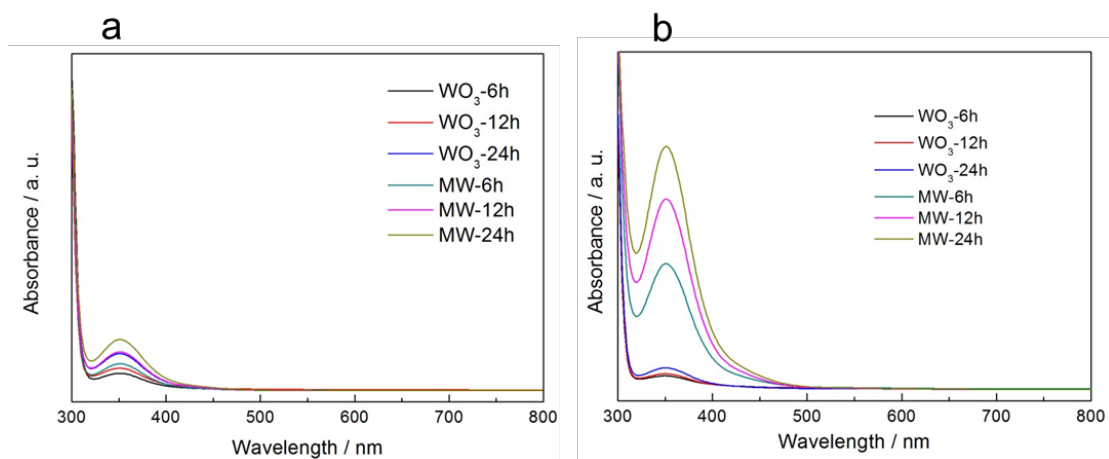


Figure S5 UV-vis absorption spectrum changes of H_2O_2 generation in acetic acid solution and pure H_2O under visible light irradiation (435 nm, 3 mW cm^{-2}).

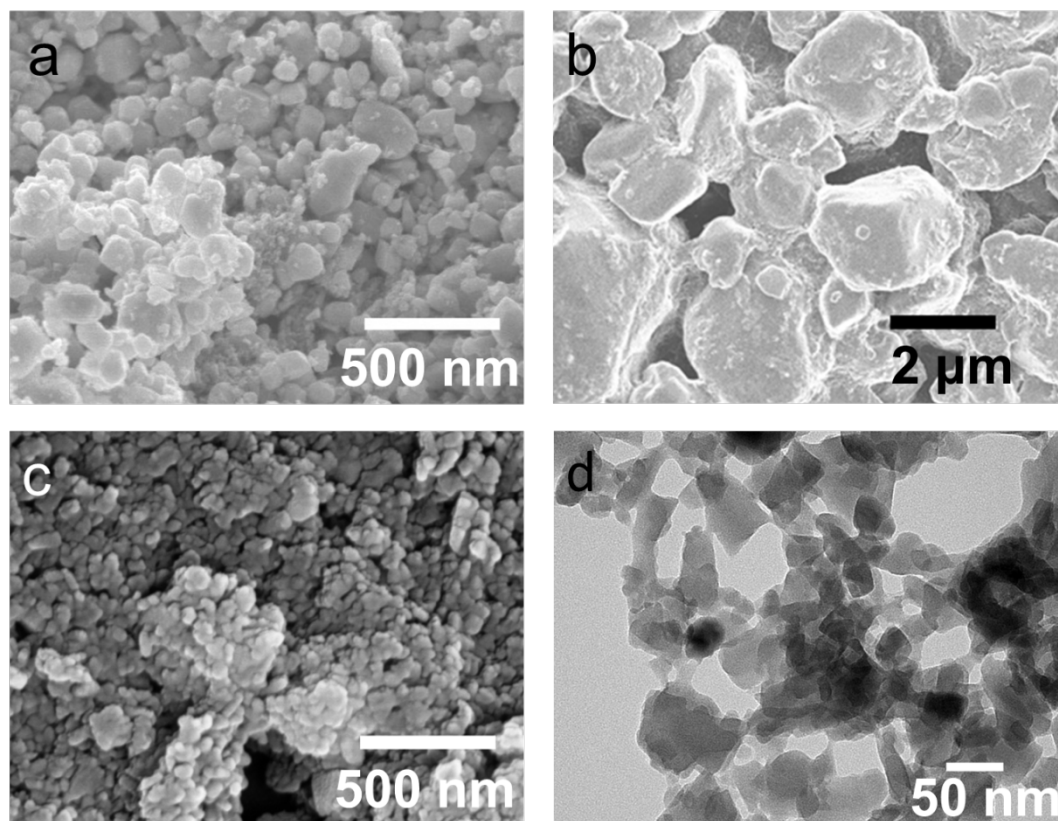


Figure S6 SEM images of WO_3 (a), melamine (b), and MW (c); (d) TEM image of MW.

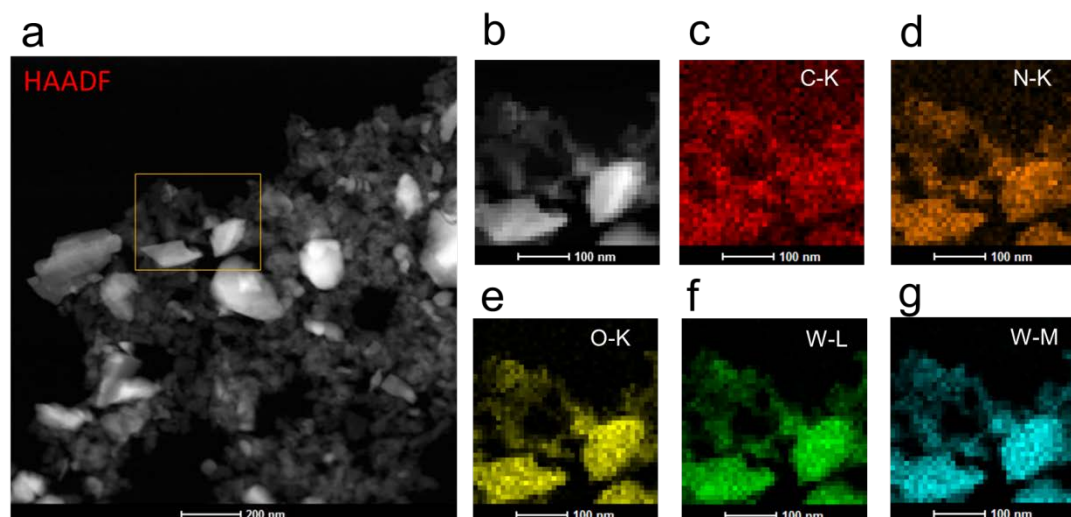
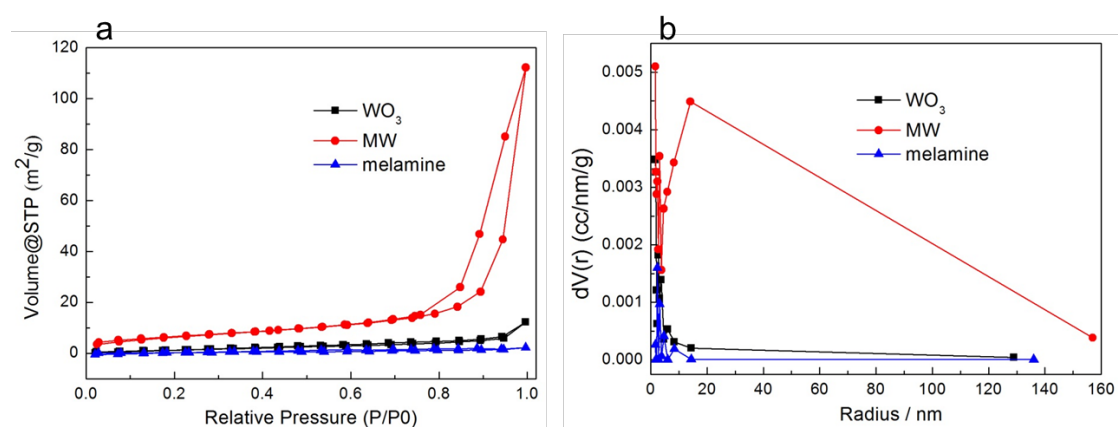


Figure S7 HAADF-STEM and EDS mapping images of MW.



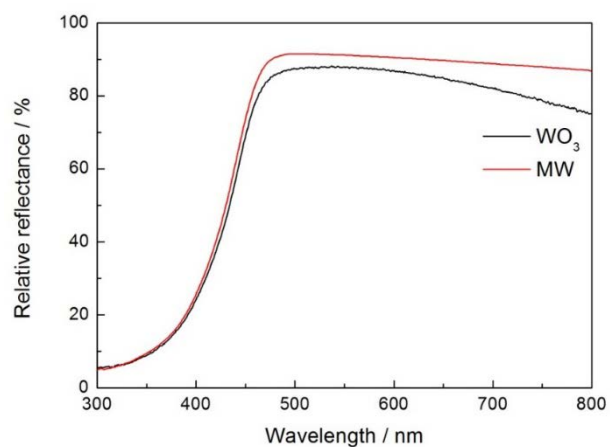


Figure S9 UV-vis diffuse reflectance spectra of WO_3 and MW.

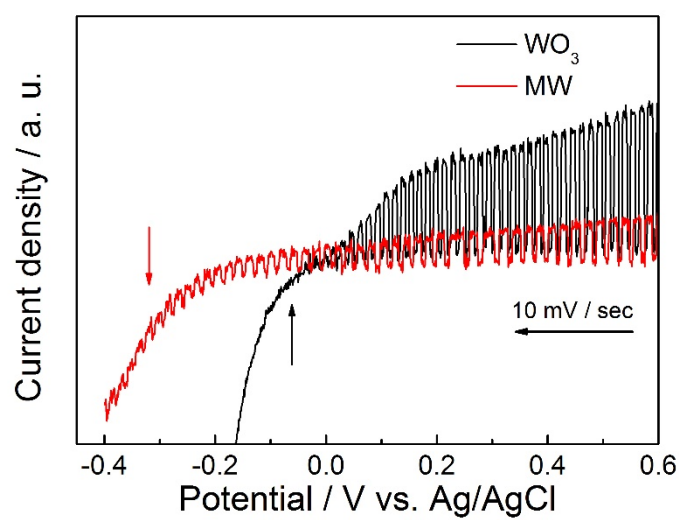


Figure S10 Linear sweep voltammetry of WO_3 and MW electrodes.



Figure S11 The WO_3 and MW fabricated onto electrode on a FTO by electrophoresis method.

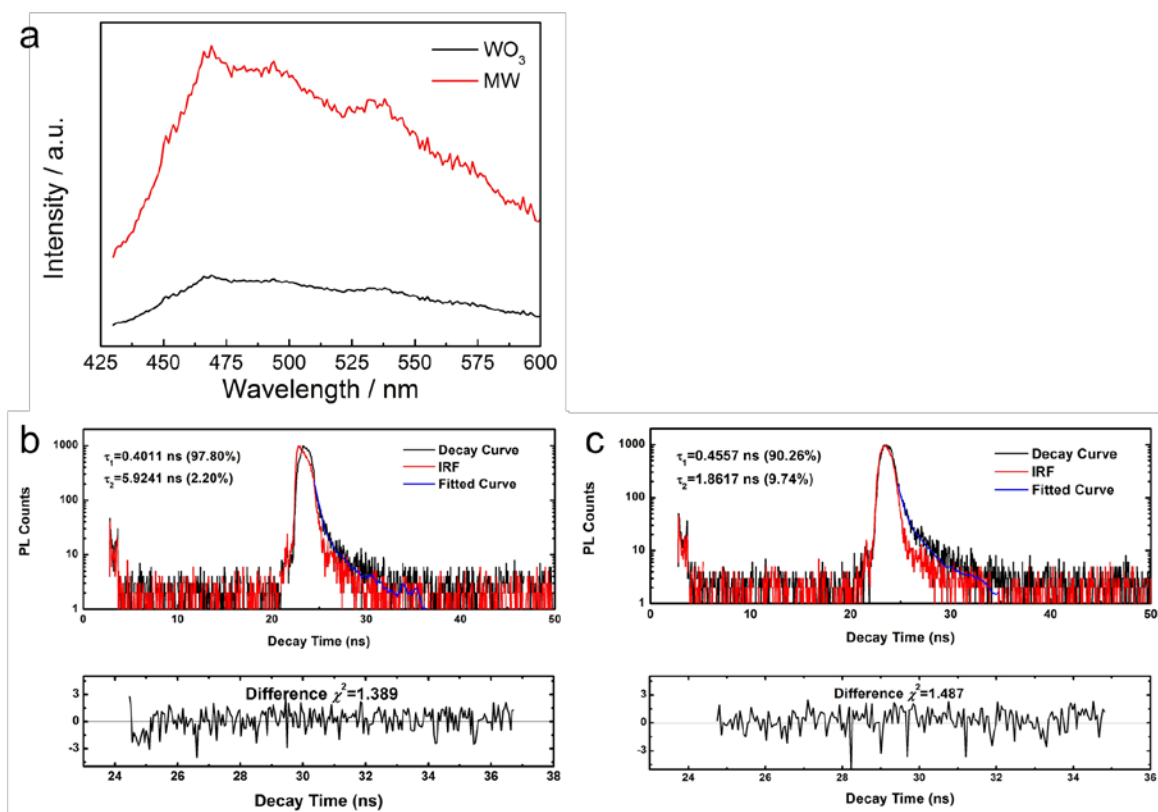


Figure S12 (a) Photoluminescence spectra of samples, the time-resolved fluorescence decay spectra of (b) WO_3 and (c) MW.

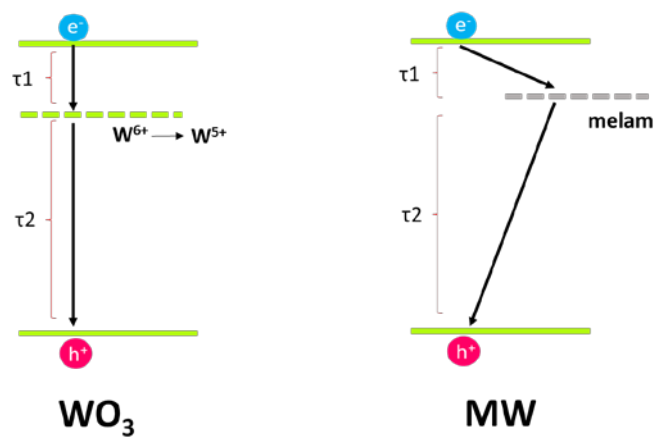


Figure S13 The behavior of photo-excited charge carriers [2-3].

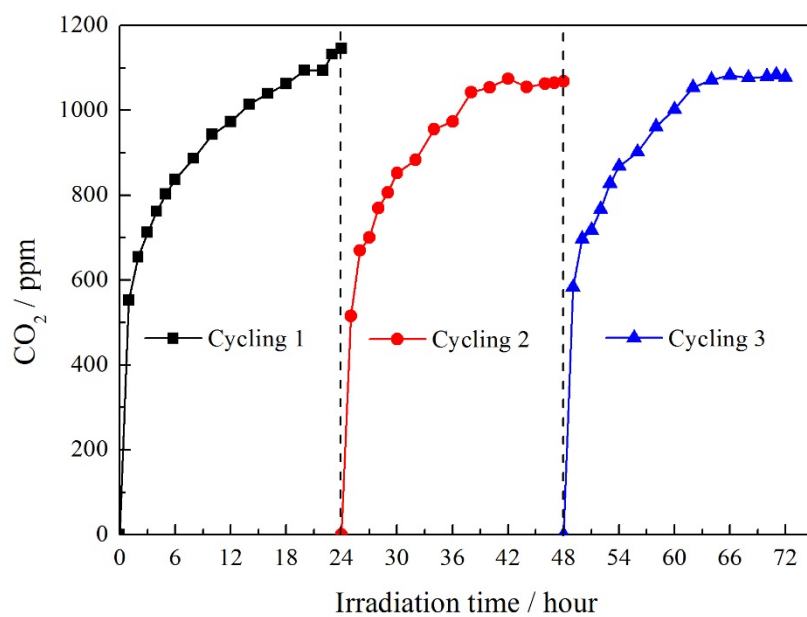


Figure S14 The photocatalytic activity results of acetaldehyde degradation. Three-cycle test by MW.

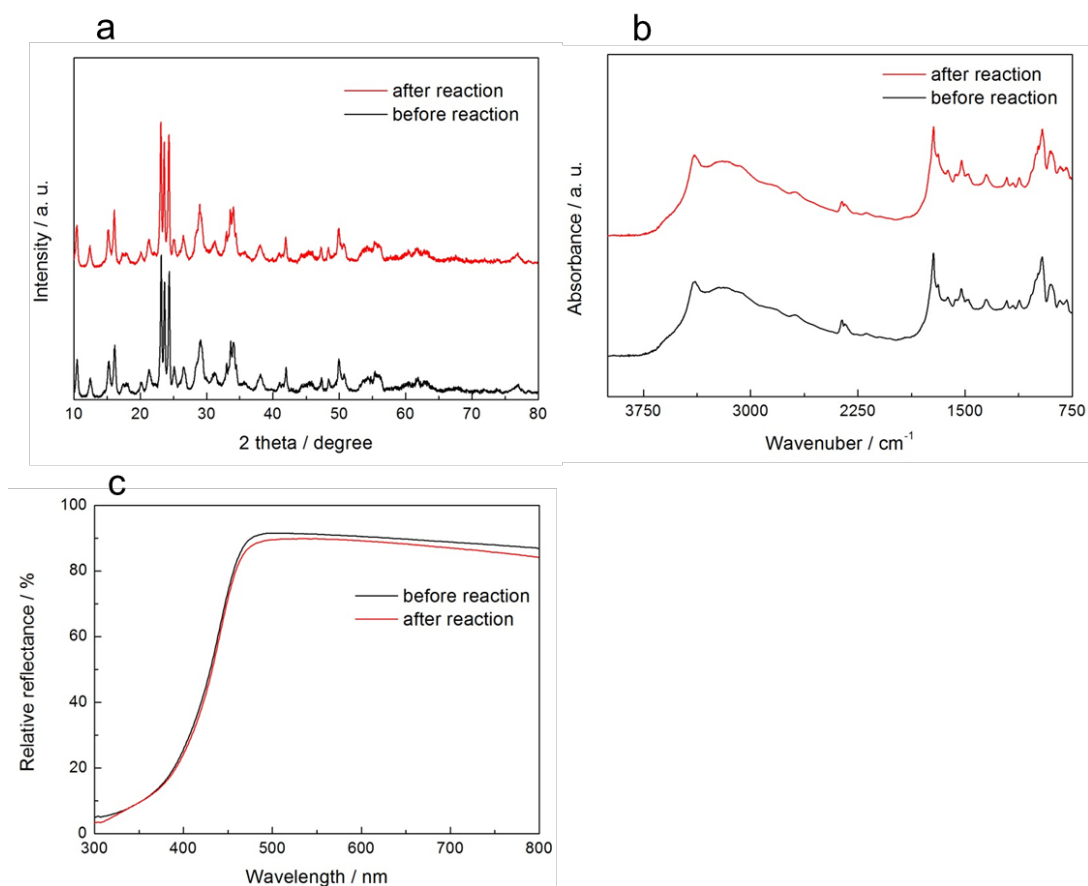


Figure S15 (a) XRD, (b) FTIR, and (c) UV-vis DRS of MW before and after photocatalytic reaction.

Reference

- [1] A. van Dijken, E.A. Meulenkamp, D. Vanmaekelbergh, A. Meijerink, J. Phys. Chem. B, 104 (2000) 1715-1723.
- [2] L. Hu, J. Huang, H. He, L. Zhu, S. Liu, Y. Jin, L. Sun, Z. Ye, Nanoscale, 5 (2013) 3918-3930.
- [3] B.V. Lotsch, M. Döblinger, J. Sehnert, L. Seyfarth, J. Senker, O. Oeckler, W. Schnick, Chem. Eur. J. 13 (2007) 4969-4980.