

## Supplementary information for

# Interference effect of alcohol on Nessler's reagent in photocatalytic nitrogen fixation

*Xiang Gao, ‡† Yuanjing Wen, § Dan Qu, § Li An, § Shiliang Luan, § Wenshuai Jiang, § Xupeng Zong, ‡† Xingyuan Liu, ‡ Zaicheng Sun§\*.*

‡ State Key Laboratory of Luminescence and Applications, Changchun Institute of Optics,  
Fine Mechanics and Physics, Changchun 130033, Jilin, P. R. China

† Graduate School, University of Chinese Academy of Sciences, 19A Yuquan Road,  
Shijingshan District, Beijing 100049, P. R. China.

§ Beijing Key Lab for Green Catalysis and Separation, Department of Chemistry and  
Chemical Engineering, Beijing University of Technology, 100 Pingleyuan Chaoyang District,  
Beijing, 100124, P. R. China. Email: [sunzc@bjut.edu.cn](mailto:sunzc@bjut.edu.cn)

KEYWORDS: N<sub>2</sub> fixation, sacrificial agent, Nessler's reagent, interference effect,  
photocatalyst.

**Figure S1..... 3**

**Figure S2..... 3**

**Figure S3..... 4**

**Figure S4..... 4**

**Figure S5..... 5**

**Figure S6..... 5**

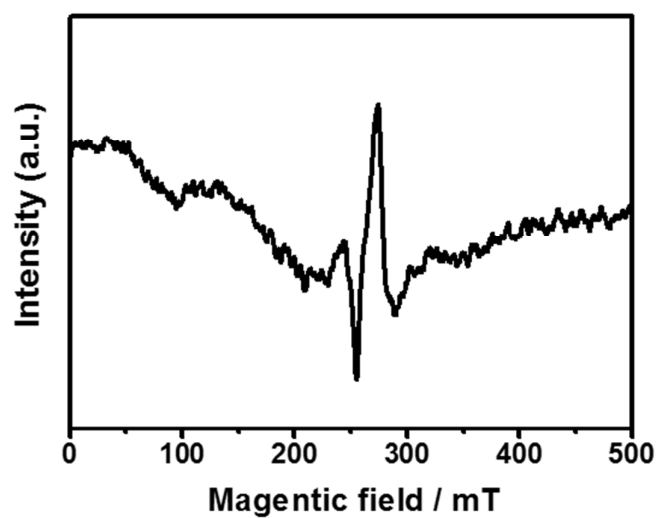
**Figure S7..... 6**

**Figure S8..... 7**

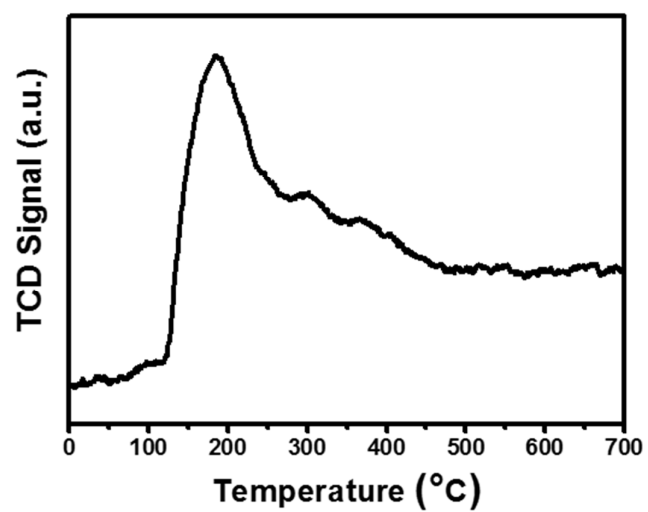
**Figure S9..... 7**

**Figure S10..... 8**

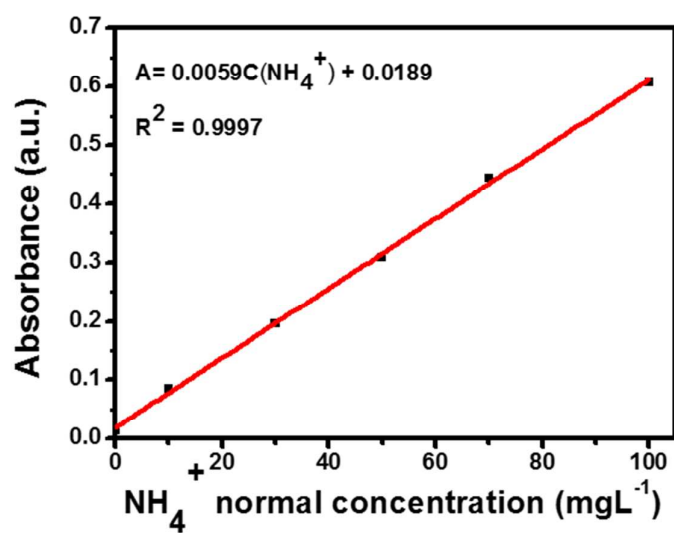
**Figure S11..... 8**



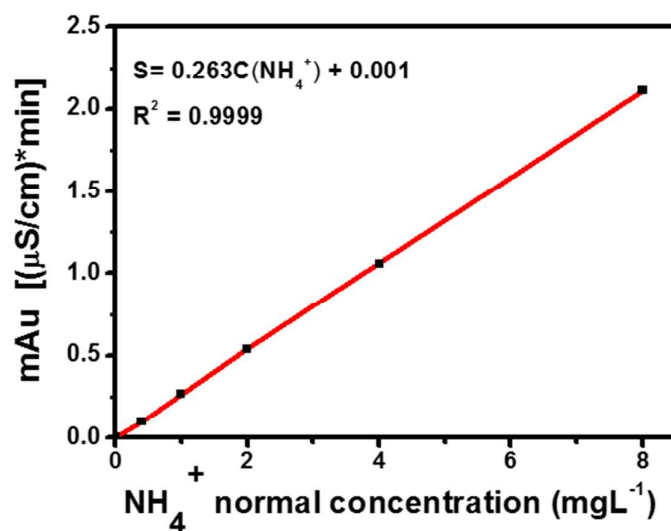
**Figure S1.** EPR spectrum of P25 TiO<sub>2</sub>



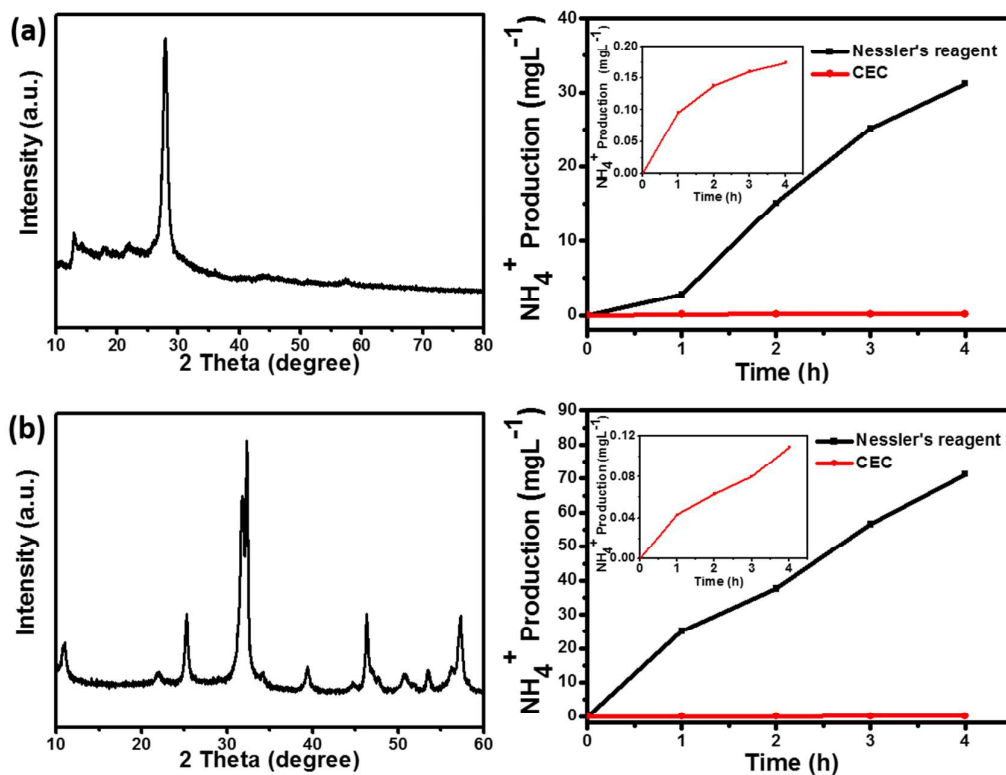
**Figure S2.** Thermal programmed desorption spectrum of P25 TiO<sub>2</sub>



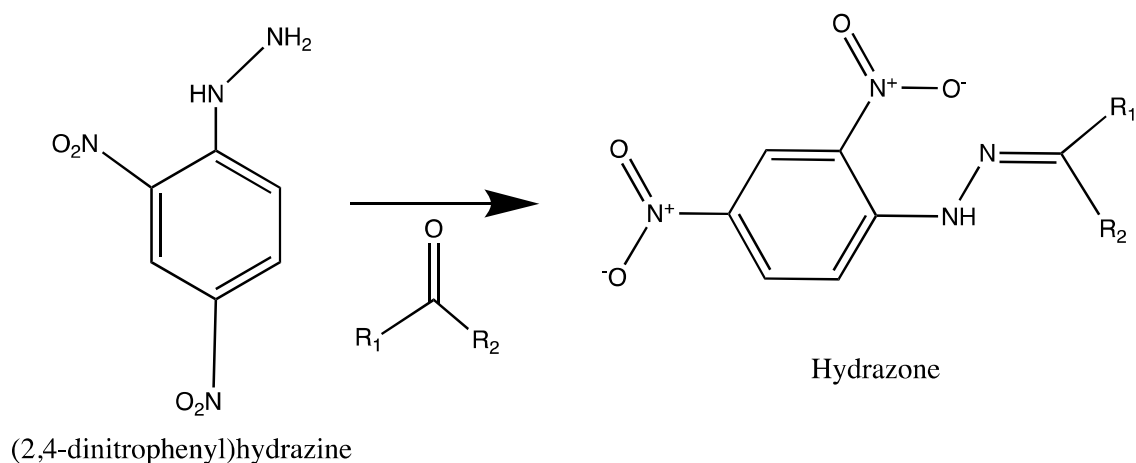
**Figure S3.** The calibration curve of ammonia amount detected with Nessler's reagent



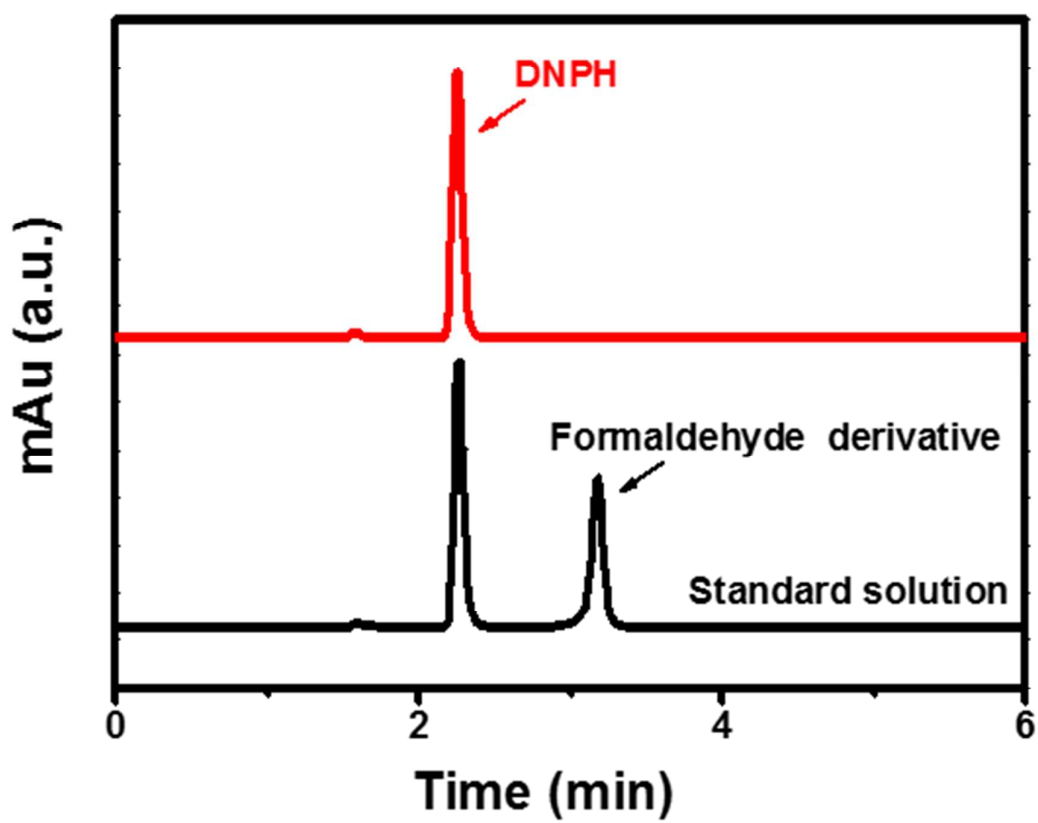
**Figure S4.** The calibration curve of NH<sub>4</sub><sup>+</sup> amount detected by cation exchange chromatography



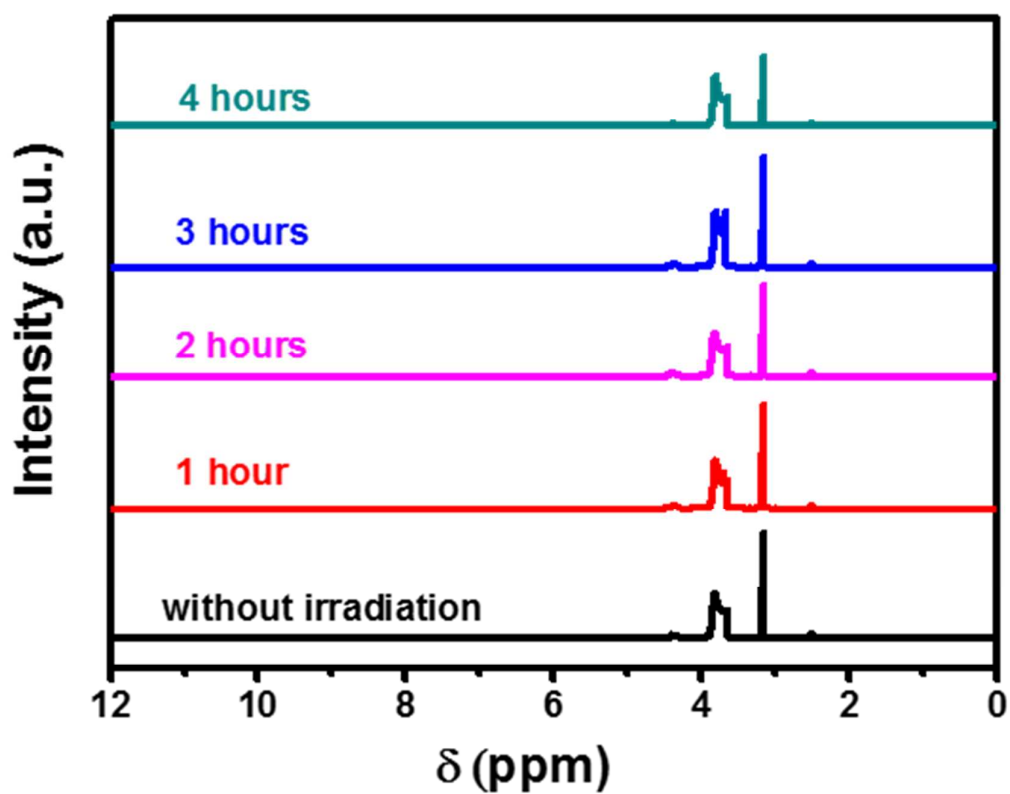
**Figure S5.** The XRD pattern and ammonia production of different photocatalyst (a)  $g\text{-C}_3\text{N}_4$ , (b)  $\text{BiOBr}$  under 300 W Xe lamp and detected with Nessler's reagent (black line) and CEC (red line) method. The insets are the results from CEC detection methods.



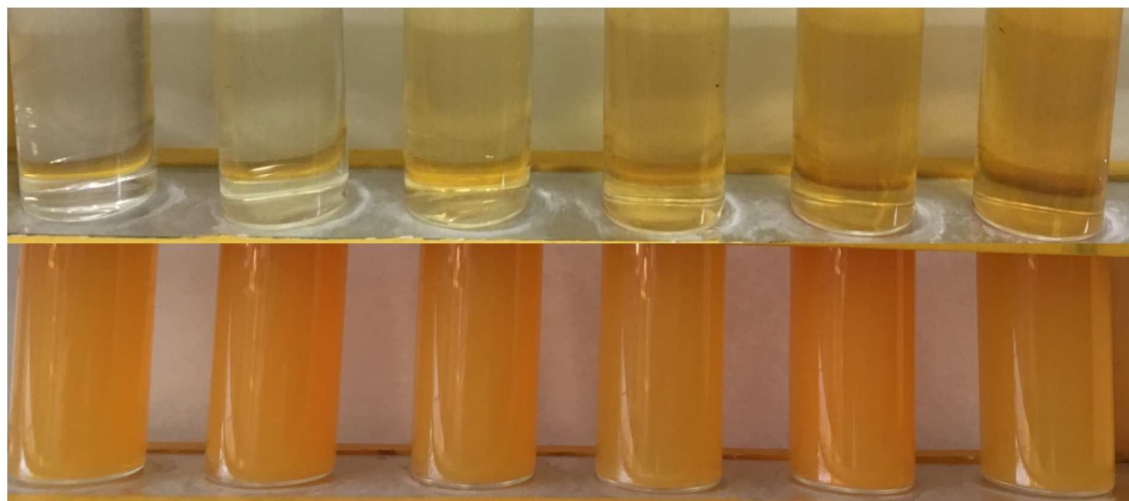
**Figure S6.** The derivations of carbonyl compounds with 2,4-dinitrophenylhydrazine.



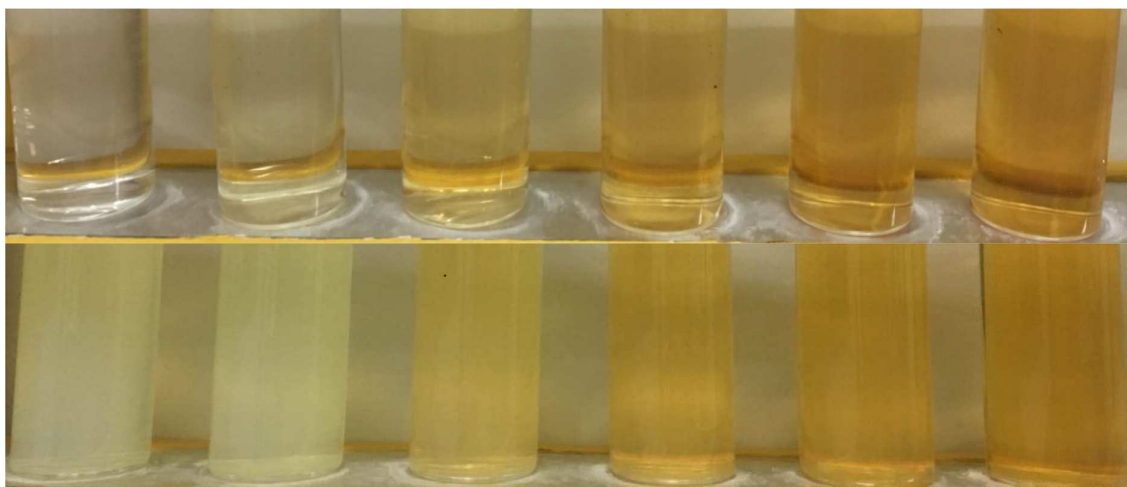
**Figure S7.** High performance liquid chromatography of DNPH and formaldehyde derived with DNPH



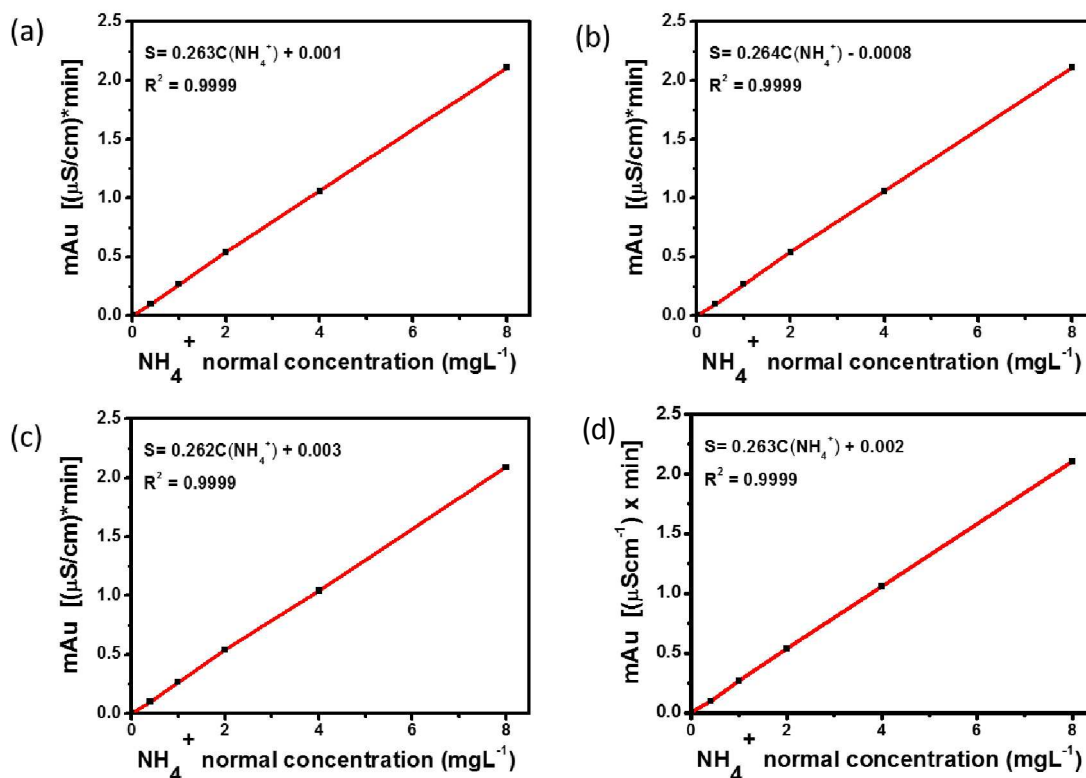
**Figure S8.**  $^1\text{H}$  NMR spectra of photocatalytic reaction solution for different reaction time in the presence of methanol.



**Figure S9.** Photographies of standard ammonia solution mixed with Nessler's reagent (top) and standard solution with 500  $\mu\text{gL}^{-1}$  acetaldehyde mixed with Nessler's reagent (bottom).



**Figure S10.** Photographies of standard ammonia solution mixed with Nessler's reagent (top) and standard solution with 80  $\mu\text{gL}^{-1}$  acetone mixed with Nessler's reagent (bottom).



**Figure S11.** CEC chromatograms of the standard ammonia solution (a) and HCHO (b);  $\text{CH}_3\text{CHO}$  (c); acetone (d).