

Supporting Information

Synthesis of novel MgAl layered double oxides grafted TiO₂ cuboids and their photocatalytic activity on CO₂ reduction with water vapor

Cunyu Zhao^a, Lianjun Liu^a, Huilei Zhao^b, Guiying Rao^a, Luhui Wang^c, Jinye Xu^a, Ying Li^{b*}

^a University of Wisconsin-Milwaukee, Mechanical Engineering Department, Milwaukee, WI 53211, USA

^b Texas A&M University, Department of Mechanical Engineering, College Station, TX 77843, USA

^c Zhejiang Ocean University, Chemical Engineering Department, Zhejiang, P.R. China

*Corresponding Author:

Prof. Ying Li
Tel: 1-979-882-4465
Fax: 1-979-845-3081
Email: yingli@tamu.edu

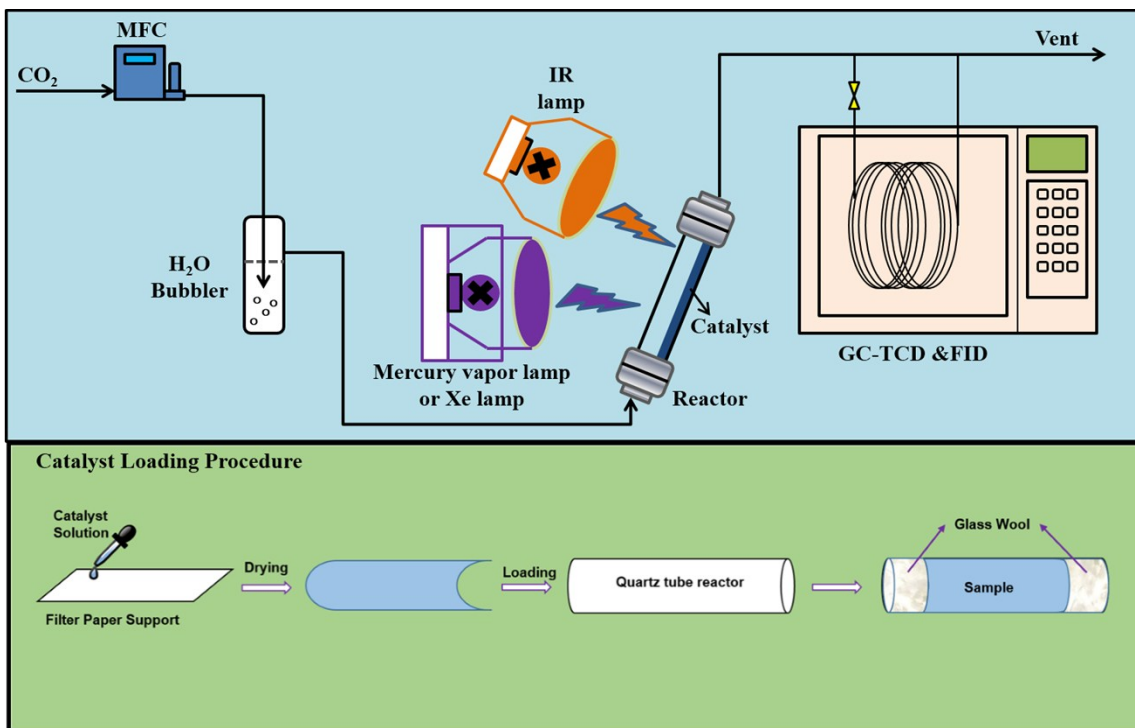


Figure S1. Experimental setup for photocatalytic CO₂ reduction with water vapor and catalyst loading procedure.

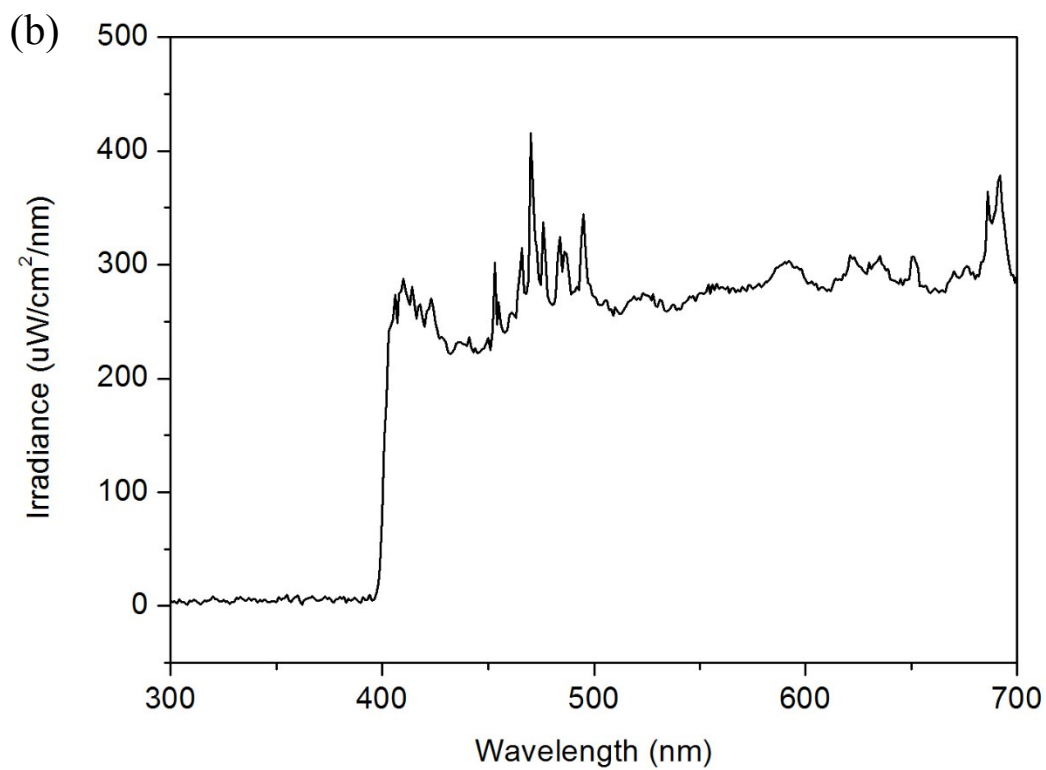
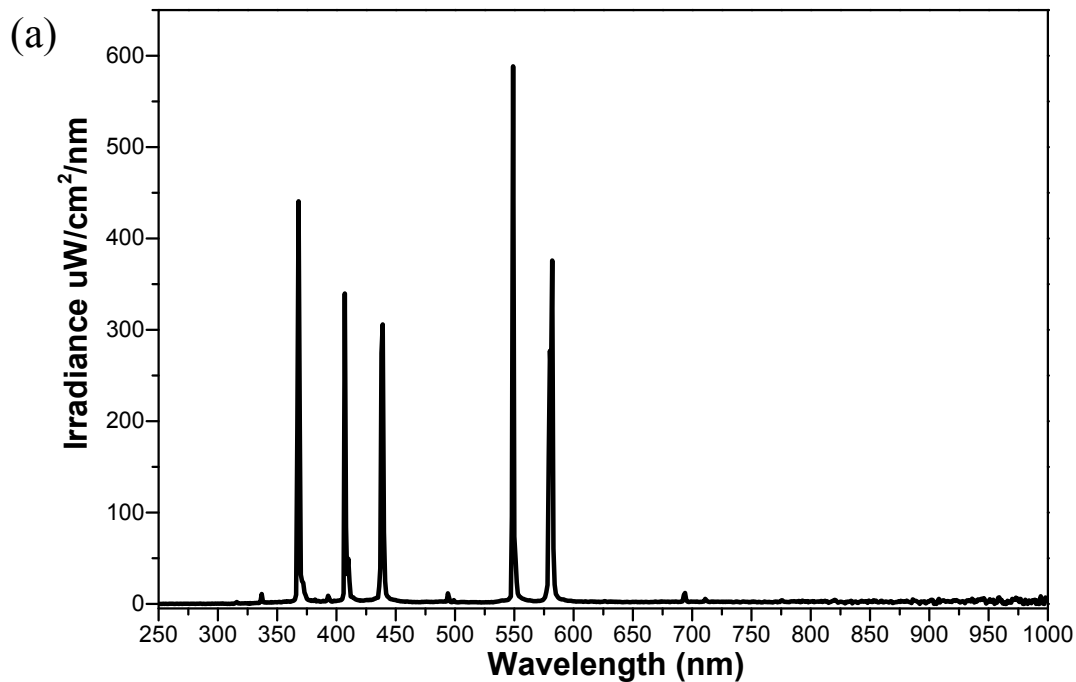


Figure S2. The spectra of (a) 100 W mercury vapor lamp and (b) 450 W Xe lamp with 400 nm UV cut-off filter used for photocatalytic experiments.

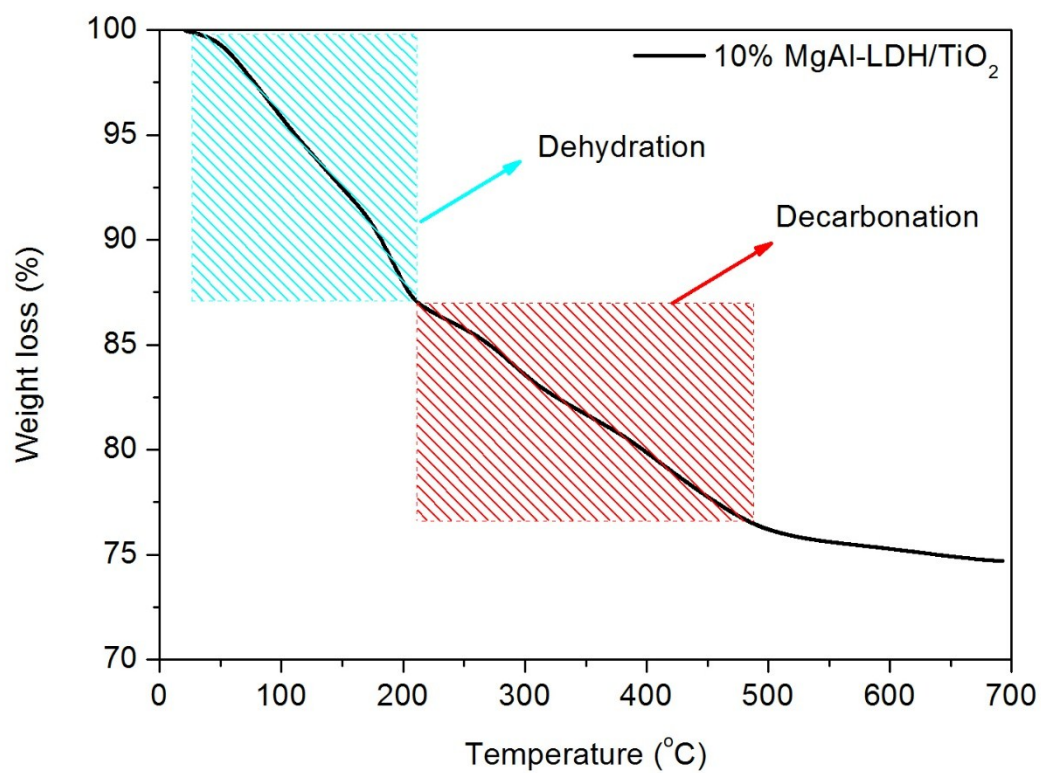


Figure S3. Thermogravimetric analysis (TGA) result of 10%MgAl-LDH/TiO₂.

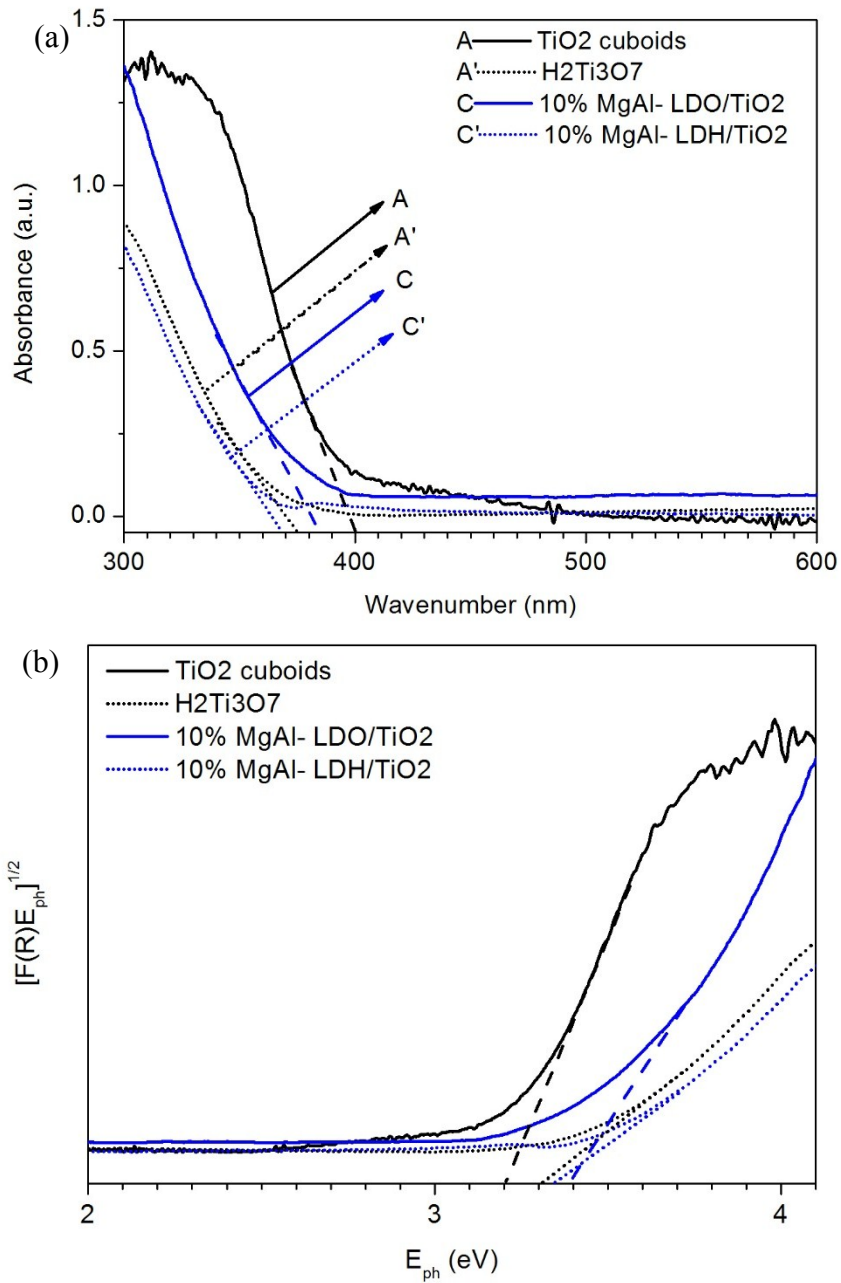


Figure S4. (a) UV-vis diffuse reflectance spectra and (b) plots of the square root of Kubelka-Munk function versus the photon energy for TiO₂ cuboids, H₂Ti₃O₇, 10%MgAl-LDH/TiO₂ and 10%MgAl-LDO/TiO₂ samples.

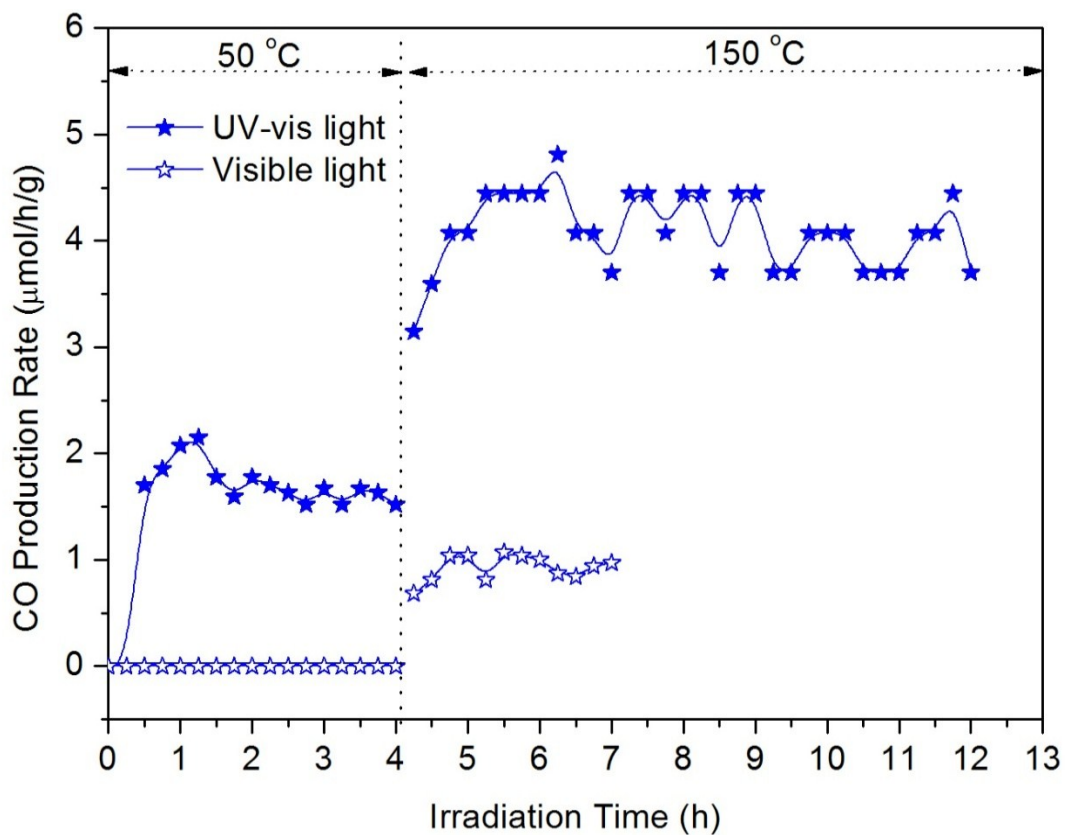


Figure S5. The rate of CO production from CO₂ photoreduction by 10%MgAl-LDO/TiO₂ under the 100 W mercury vapor lamp (UV-vis light) and under the 450 W Xe lamp with 400 nm UV filter (visible light).

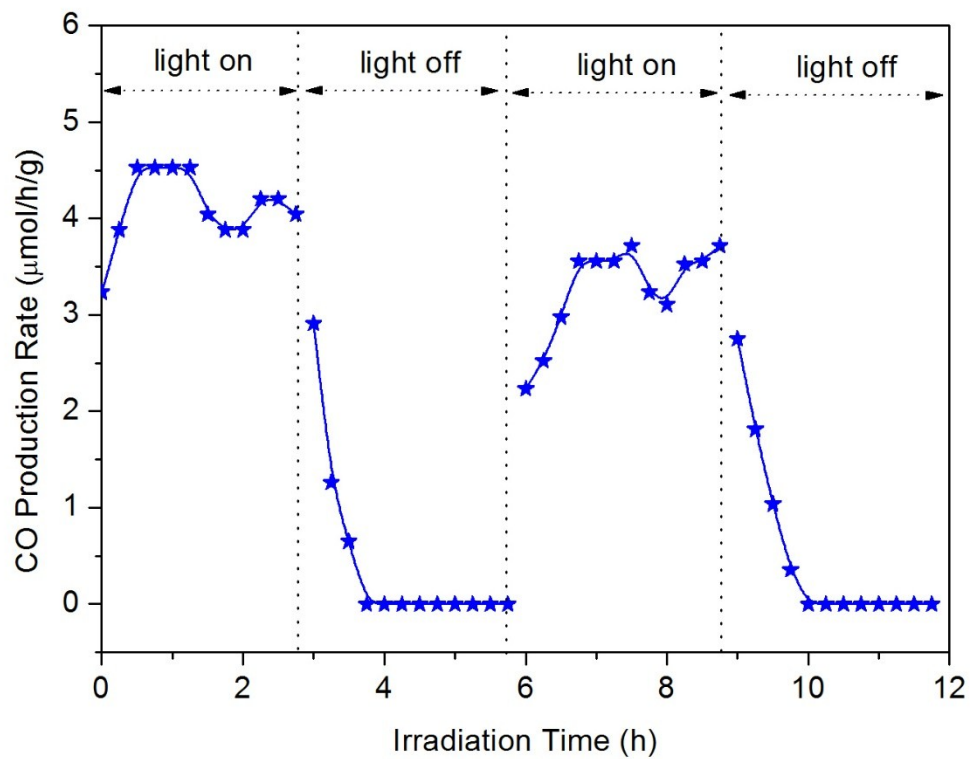


Figure S6. The rate of CO production from CO₂ photoreduction by 10%MgAl-LDO/TiO₂ under mercury vapor lamp irradiation at 150 °C for two light on/off cycles.

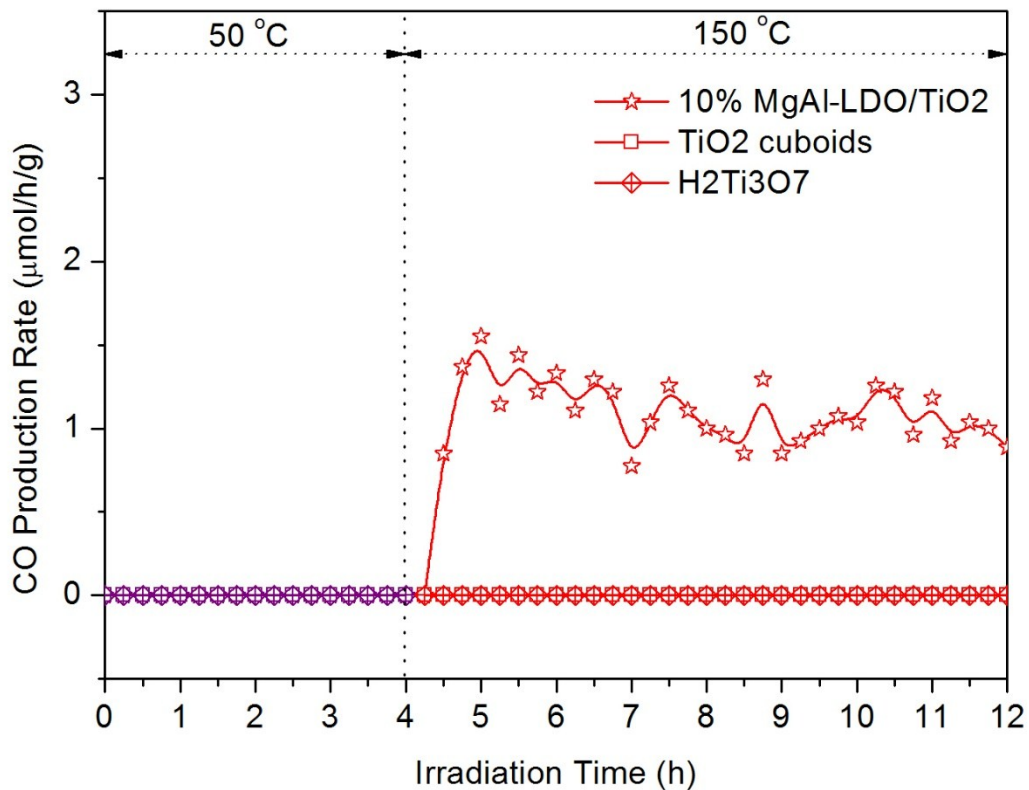


Figure S7. The rate of CO production from CO₂ photoreduction under UV light irradiation at 50 °C for 4 h and subsequently at 150 °C for 8 h using H₂Ti₃O₇, TiO₂ cuboids and 10%MgAl-LDO/TiO₂ in He+H₂O vapor atmosphere.