Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Insights into the solar light driven thermocatalytic oxidation of VOCs over tunnel structured manganese oxides

Yali Zheng, [a,b] Wenzhong Wang*, Dong Jiang, [a,b] Ling Zhang, Xiaoman Li, [a,b] and Zhong Wang [a,b]

[a] State Key Laboratory of High Performance Ceramics and Superfine Microstructures, Shanghai Institute of Ceramics, Chinese Academy of Sciences 1295 Dingxi Road, Shanghai 200050, P. R. China

[b] University of Chinese Academy of Sciences, Beijing 100049, China.

*Corresponding author (W. Wang) Fax: +86-21-5241-3122, E-mail: wzwang@mail.sic.ac.cn

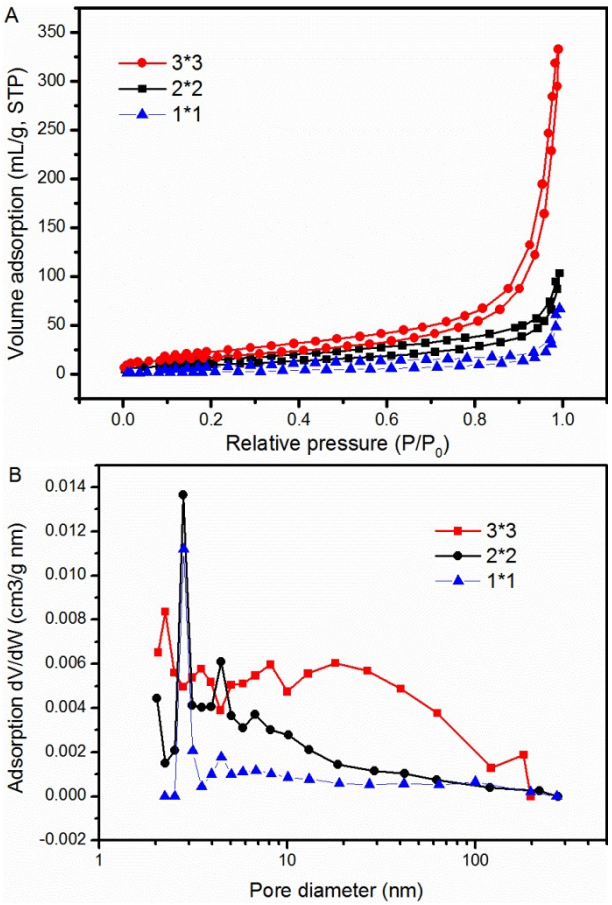

Fig. S1 (A) N_2 adsorption–desorption isotherms and (B) BJH desorption pore size distribution plots of the manganese oxides.

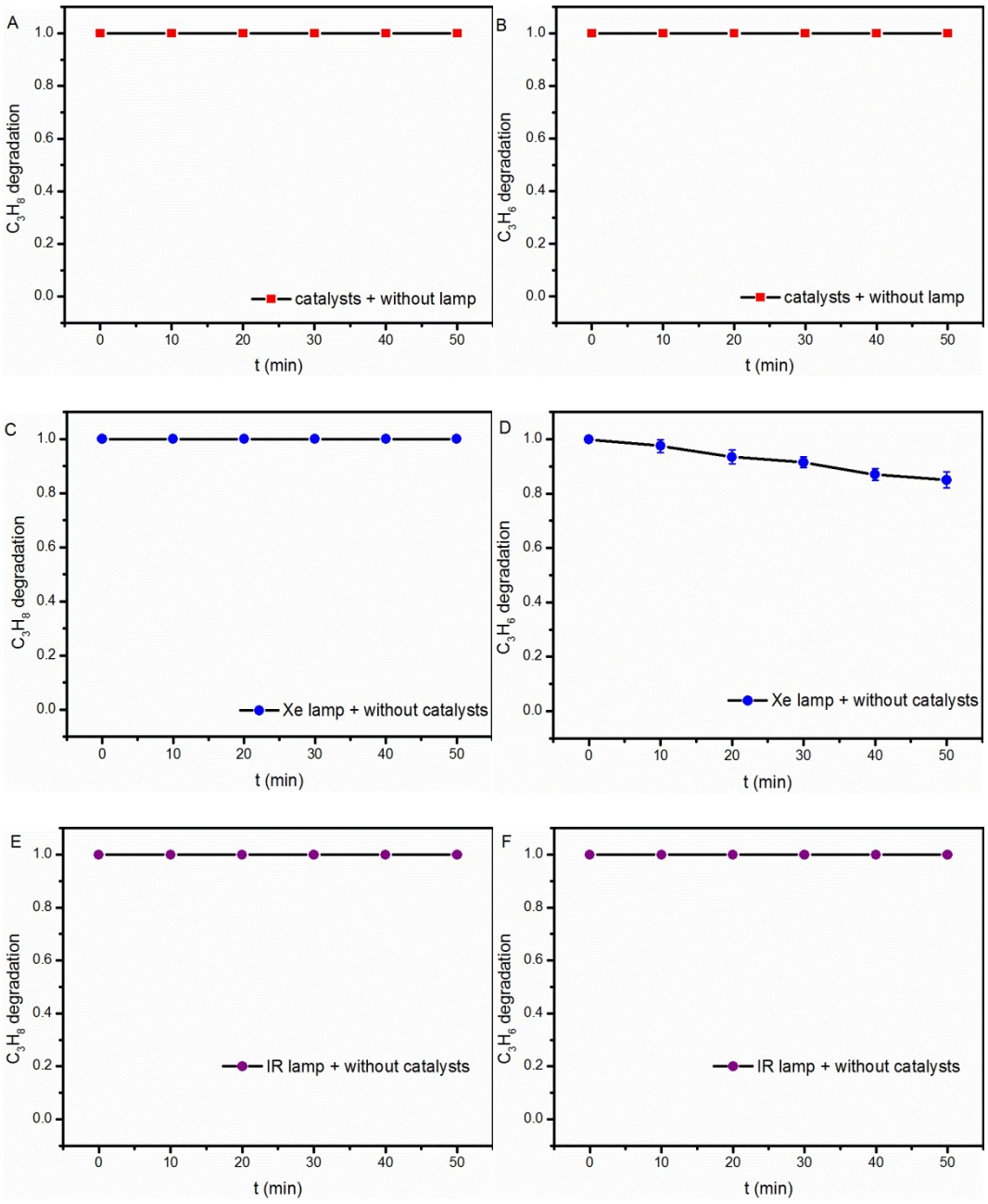

Fig. S2 Blank experiments for C_3H_8 and C_3H_6 oxidation.

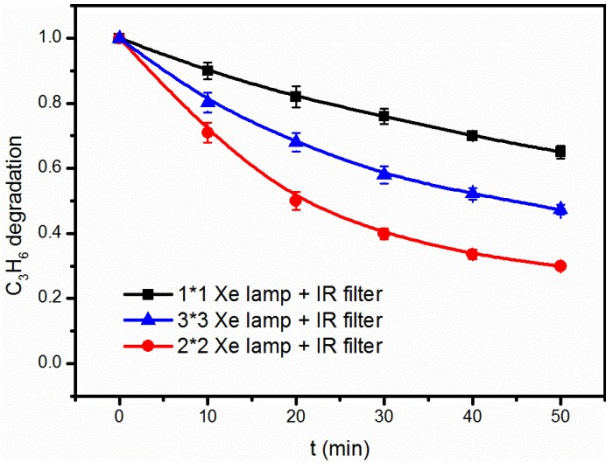

Fig. S3 C_3H_6 oxidation over 1*1, 2*2, and 3*3under the infrared irradiation of the Xe lamp (cutoff filter, > 690 nm).

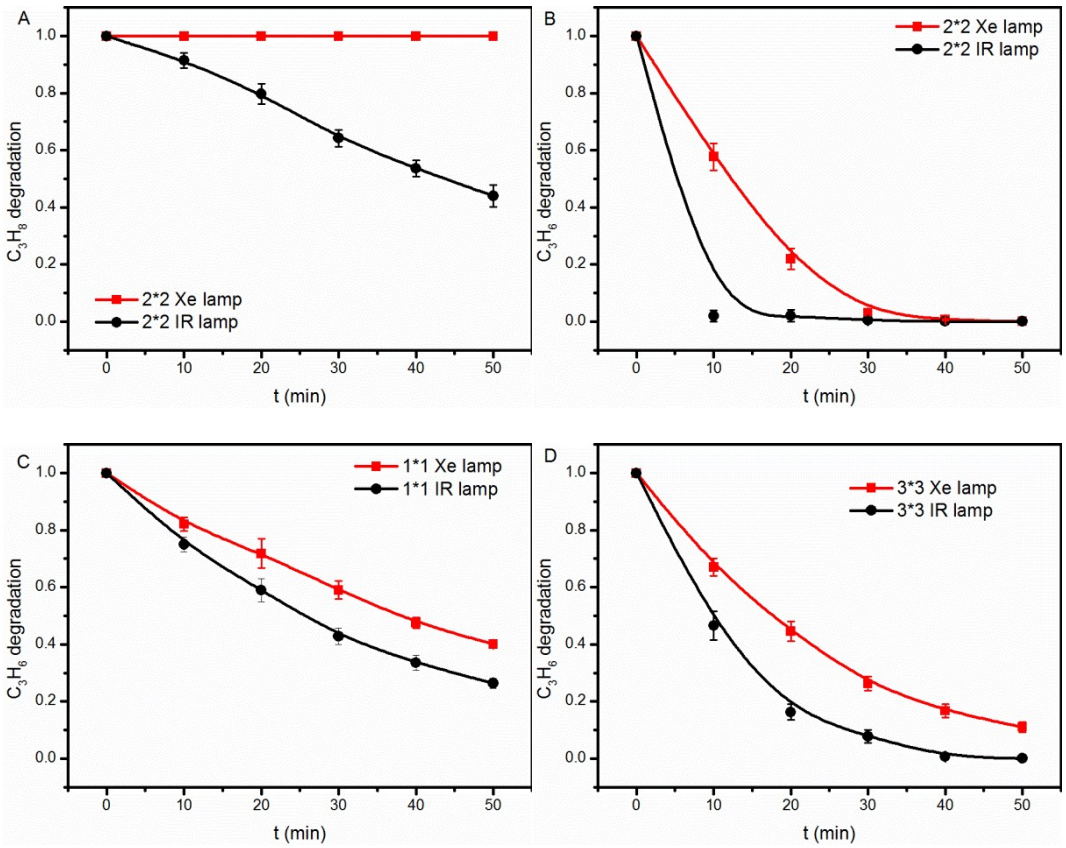

Fig. S4 (A)(B) C_3H_8 and C_3H_6 oxidation over 2*2 under Xe lamp and IR lamp irradiation. (C)(D) C_3H_6 oxidation over 1*1, and 3*3 under Xe lamp and IR lamp irradiation.

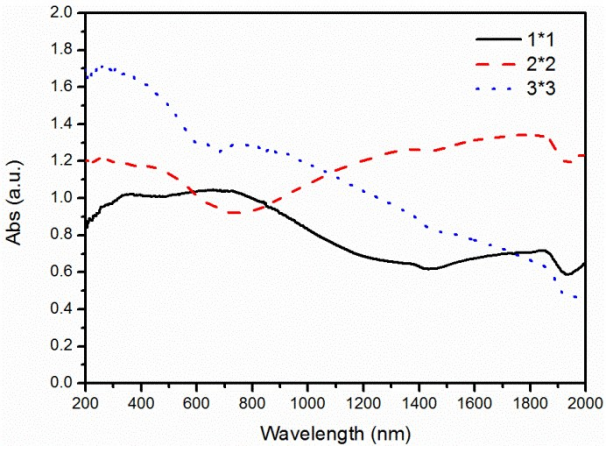

Fig. S5 UV-Vis-IR spectra of the manganese oxides.

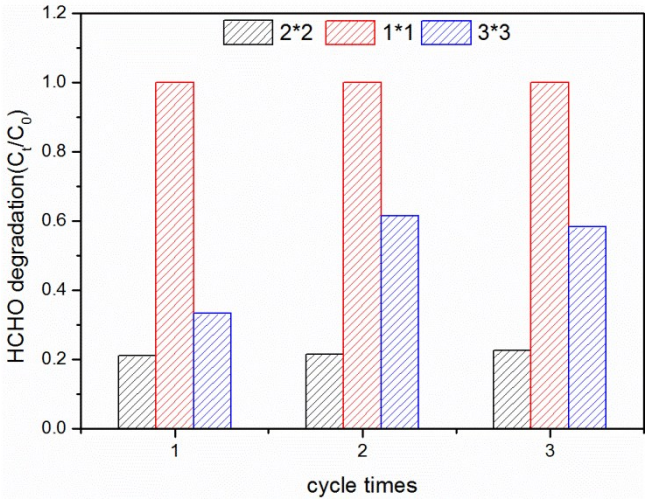

Fig. S6 HCHO degradation rates ($C_{1\ h}/C_0$) for the 1*1, 2*2, and 3*3 catalysts during the three cycles.

The catalytic oxidation of HCHO without light or heat source was selected as probe reaction to explore the low temperature catalytic activity of the three catalysts.The results are presented in Fig. S5. Each sample was measured for three cycles. As can be seen from the diagram, the 2*2 catalyst showed the highest catalytic activity for HCHO oxidation, which can eliminate 80% HCHO in 60 min, and the eliminate efficiency remained the same for the three cycles. 1*1 showed no catalytic or absorption ability towards HCHO, while the degradation rate of 3*3 for the HCHO oxidation was 67%, 38.4%, and 41.7%, respectively.