Electronic Supplementary Information (ESI)

for

Enhancing ethylene epoxidation of MWW-type titanosilicate/H$_2$O$_2$ catalytic system by fluorine implanting

Xinqing Lu,$^a$ Wen-Juan Zhou,$^{a,b}$ Yejun Guan,$^a$ Armin Liebens,$^b$ Peng Wu$^a,*$

$^a$Shanghai Key Laboratory of Green Chemistry and Chemical Processes, School of Chemistry and Molecular Engineering, East China Normal University, Shanghai, 200062, China

$^b$Eco-Efficient Products and Processes Laboratory (E2P2L), UMI 3464CNRS—Solvay, 3066 Jin Du Road, Xin Zhuang Ind. Zone, Shanghai, 201108, China

E-mail: pwu@chem.ecnu.edu.cn (P. Wu)

Fax: +86-21 62232292
Fig. S1. SEM images of Ti-MWW.
Fig. S2. FT-IR spectra of Ti-MWW.
**Fig. S3.** XRD patterns of Ti-MWW and F-Ti-MWW-W samples post-synthesized at different temperatures for 4 h in NH$_4$F/H$_2$O system at a F/Si molar ratio of 0.05.
Fig. S4. XRD patterns of Ti-MWW and F-Ti-MWW-M samples post-synthesized with different NH$_4$F amount in NH$_4$F/MeOH system at 433 K for 4 h (A), and at different temperatures for 4 h in NH$_4$F/MeOH system at a F/Si molar ratio of 0.05 (B).
Fig. S5. The catalytic activity of ethylene epoxidation over F-Ti-MWW-W as a function of fluorination temperature in NH₄F/H₂O system at F/Si = 0.05. The symbol at 273 K stands for Ti-MWW. Reaction conditions: cat., 0.1 g; ethylene, 2.5 MPa; H₂O₂, 10 mmol; MeCN, 10 g; temp., 313 K; time, 2 h.
**Fig. S6.** Kinetics of ethylene epoxidation over Ti-MWW (A), F-Ti-MWW (B) and F-Ti-MWW-cal (C). Reaction conditions: cat., 0.1 g; ethylene, 2.5 MPa; H₂O₂, 10 mmol; MeCN, 10 g. F-Ti-MWW: Ti-MWW was treated in a solution of methanol and NH₄F at 433 K for 4 h at a F/Si molar ratio of 0.05. F-Ti-MWW-cal: F-Ti-MWW was further calcined at 823 K for 6 h.
Fig. S7. UV-vis spectra of the fresh catalysts (a), recovered ones and further calcined at 823 K for 6 h (c).
Scheme S1 Reaction pathways of ethylene epoxidation.