Supporting information for

A facile organosilane-based strategy for direct synthesis of thin MWW-type titanosilicate with high catalytic oxidation performance

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Table S1 Different recipes for the synthesis of precursors of thin Ti-MWW materials.

Entry	Gel composition	Hydrothermal condition	Crystallinity
No. 1	1 SiO_2 : 0.035 DEDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K and 423 K each for 1 day, then DEDMS added, further crystallized at 443 K for 5 days	High (Dis-ordered layered precursor)
No. 2	1 SiO_2 : 0.035 DEDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K for 1 day, then DEDMS added, further crystallized at 423 K for 1 day, then at 443 K for 5 days	Very low + Amorphous
No. 3	1 SiO_2 : 0.035 DEDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K, 423 K and 443 K each for 1 day, then DEDMS added, further crystallized at 443 K for 4 days	Very high (Ordered layered precursor)
No. 4	1 SiO_2 : 0.035 DEDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 423 K for 2 days, then DEDMS added, further crystallized at 423 K for 5 days	Low + Amorphous
No. 5	1 SiO_2 : 0.035 DEDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 423 K for 3 days, then DEDMS added, further crystallized at 423 K for 3 days	High (Dis-ordered layered precursor)
No. 6	1 SiO_2 : 0.02 DEDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K and 423 K each for 1 day, then DEDMS added, further crystallized at 443 K for 5 days	Very high (Ordered layered precursor)
No. 7	1 SiO_2 : 0.05 DEDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K and 423 K each for 1 day, then DEDMS added, further crystallized at 443 K for 5 days	Very low + Amorphous
No. 8	1 SiO_2 : 0.035 DCDMS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K and 423 K each for 1 day, then DEDMS added, further crystallized at 443 K for 5 days	High (Dis-ordered layered precursor)
No. 9	1 SiO_2 : 0.035 CDMES : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K and 423 K each for 1 day, then DEDMS added, further crystallized at 443 K for 5 days	Low + Amorphous
No. 10	1 SiO_2 : 0.035 CDMPS : 0.033 TiO_2 : 0.67 B_2O_3 : 1.4 PI : 30 H_2O	Pre-heated at 403 K and 423 K each for 1 day, then DEDMS added, further crystallized at 443 K for 5 days	Very low + Amorphous

DEDMS: diethoxydimethylsilane; DCDMS: dichlorodimethylsilane;

CDMES: chlorodimethylethylsilane; CDMPS: chlorodimethylphenylsilane.

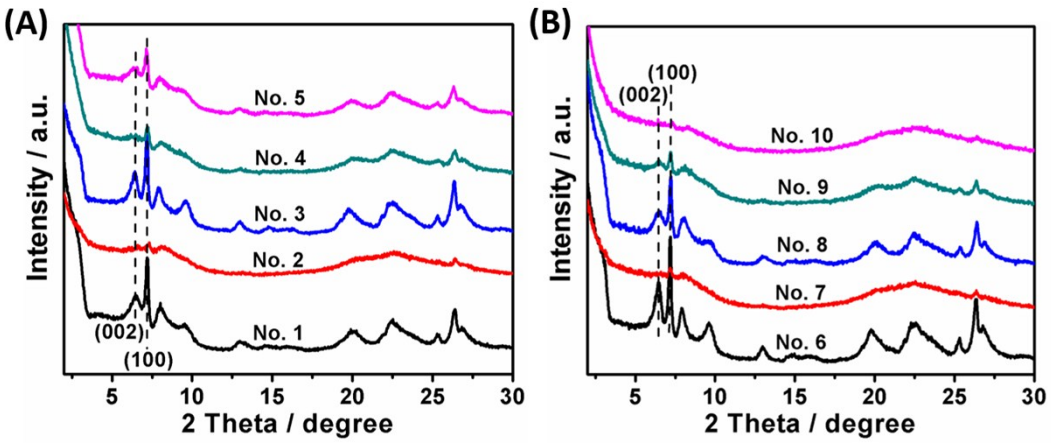

Fig. S1 Powder XRD patterns of samples synthesized with different recipes.

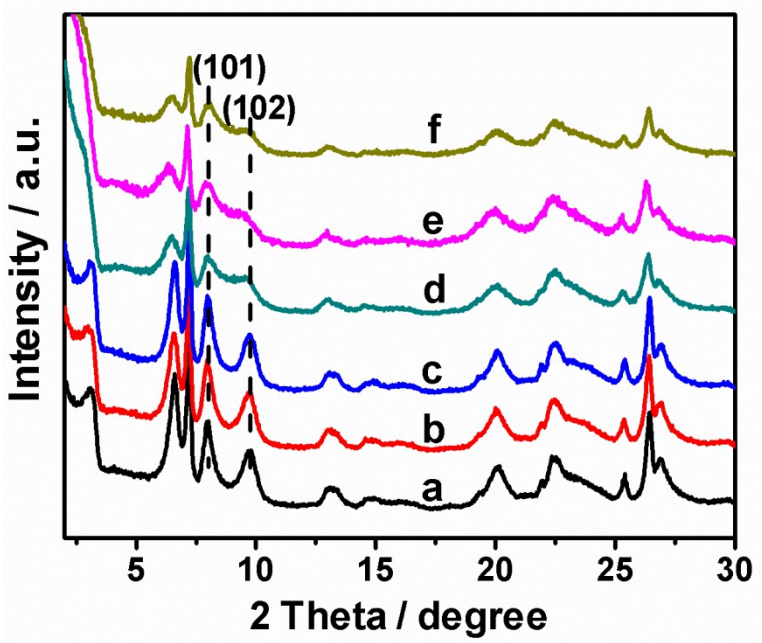

Fig. S2 Powder XRD patterns of as-synthesized Ti-MWW(50) (a), Ti-MWW(20) (b), Ti-MWW(30) (c), O-Ti-MWW(50) (d), O-Ti-MWW(20) (e) and O′-Ti-MWW(30) (f).

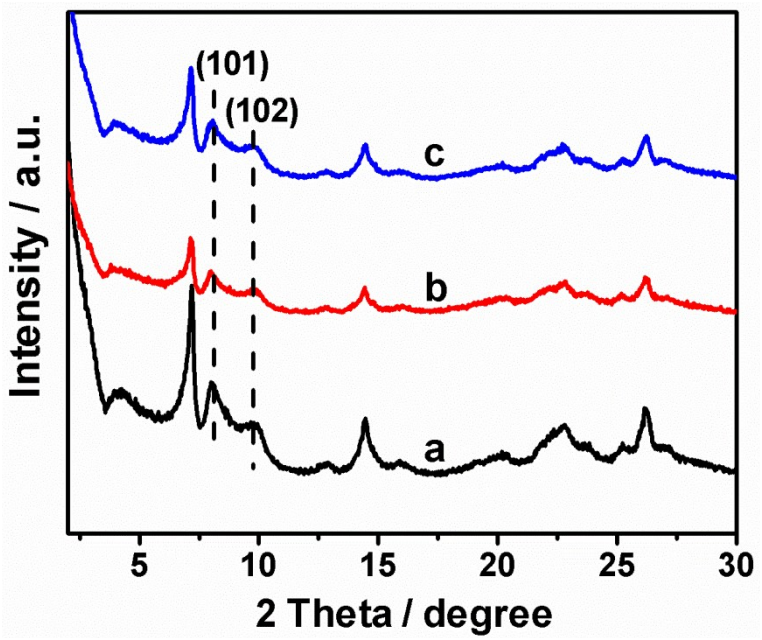

Fig. S3 Powder XRD patterns of O-Ti-MWW(50)-AT-C (a), O-Ti-MWW(20)-AT-C (b) and O′-Ti-MWW(30)-AT-C (c).

Table S2 Physicochemical properties of Ti-MWW(50)-AT-C and O-Ti-MWW(50)-AT-C.

Sample	Specific surface area (SSA) / $m^2\ g^{-1}$			Pore volume / $cm^3\ g^{-1}$	
	S_{total}	$S_{internal}$	$S_{external}$	V_{total}	$V_{micropore}$
Ti-MWW(50)-AT-C	438.8	323.0	115.8	0.596	0.154
O-Ti-MWW(50)-AT-C	482.7	271.5	211.2	1.151	0.129

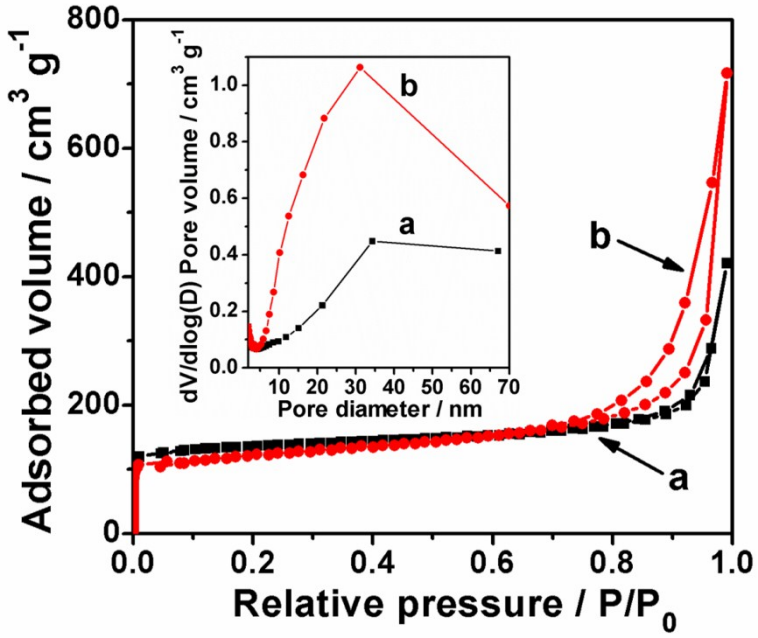

Fig. S4 Nitrogen adsorption-desorption isotherms and pore size distributions (inset) of Ti-MWW(20)-AT-C (a) and O-Ti-MWW(20)-AT-C (b).

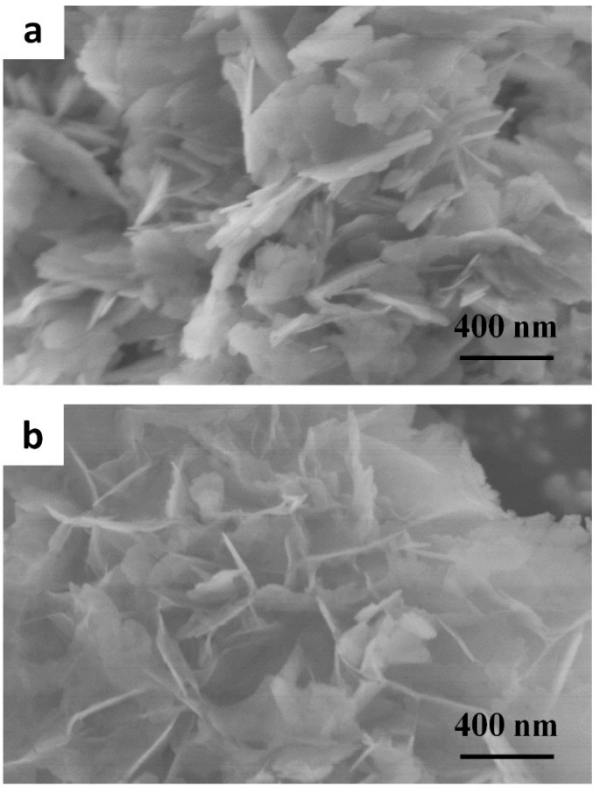

Fig. S5 SEM images of Ti-MWW(50)-AT-C (a) and O-Ti-MWW(50)-AT-C (b).

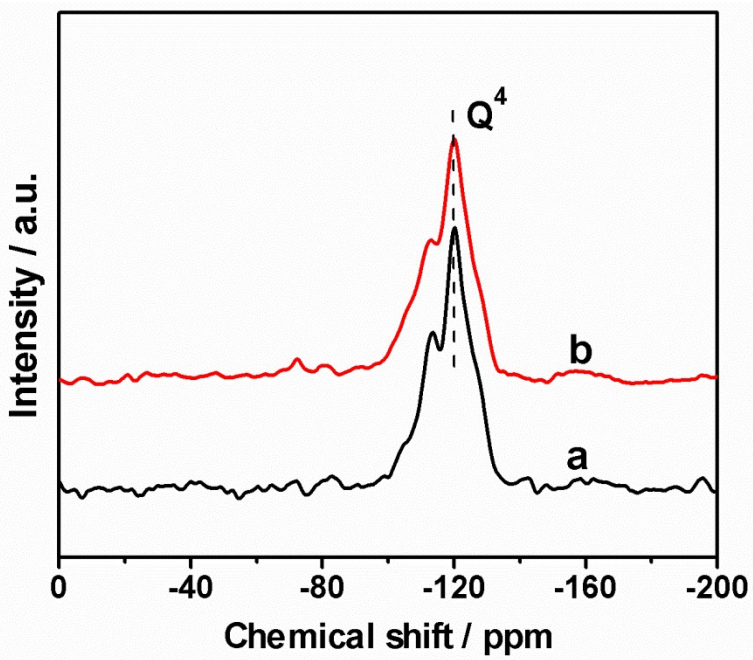

Fig. S6 ^{29}Si NMR spectra of BTM-7d (a) and OBTM-7d (b).

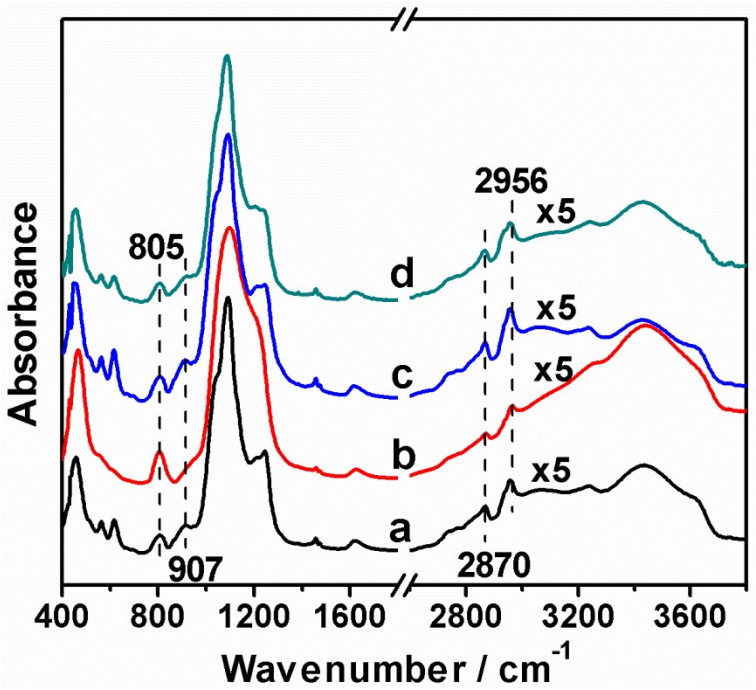

Fig. S7 IR spectra of BTM-4d (a), OBTM-4d (b), BTM-7d (c) and OBTM-7d (d).

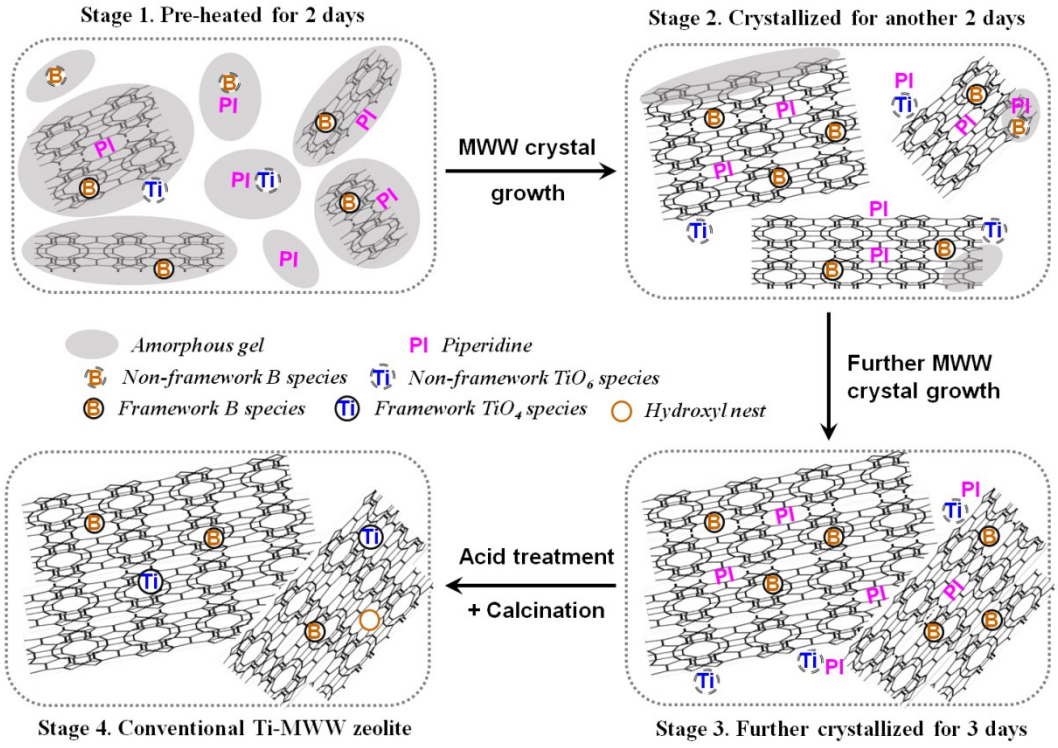

Fig. S8 A schematic diagram for possible formation mechanism of conventional Ti-MWW zeolite.

Table S3 Catalytic performance of Ti-MWW(50)-AT-C and O-Ti-MWW(50)-AT-C for epoxidation of olefins.

Olefin	Catalyst	Si/Ti ratio	Conversion / %	Selectivity / %			TON
				Epoxide	Diol	Others	
Cyclohexene[a]	Ti-MWW(50)-AT-C	113.9	9.4	92	8	/	128
	O-Ti-MWW(50)-AT-C	93.6	12.4	92	8	/	139
1-Hexene[b]	Ti-MWW(50)-AT-C	113.9	15.8	99	1	/	216
	O-Ti-MWW(50)-AT-C	93.6	9.2	99	1	/	103

Reaction conditions: catalyst, 50 mg; olefin, 10 mmol; oxidant, 10 mmol; acetonitrile, 10 mL; temperature, 333 K; time, 2 h.

[a] TBHP (70 wt% in water) as the oxidant, [b] H_2O_2 (30 wt%) as the oxidant.

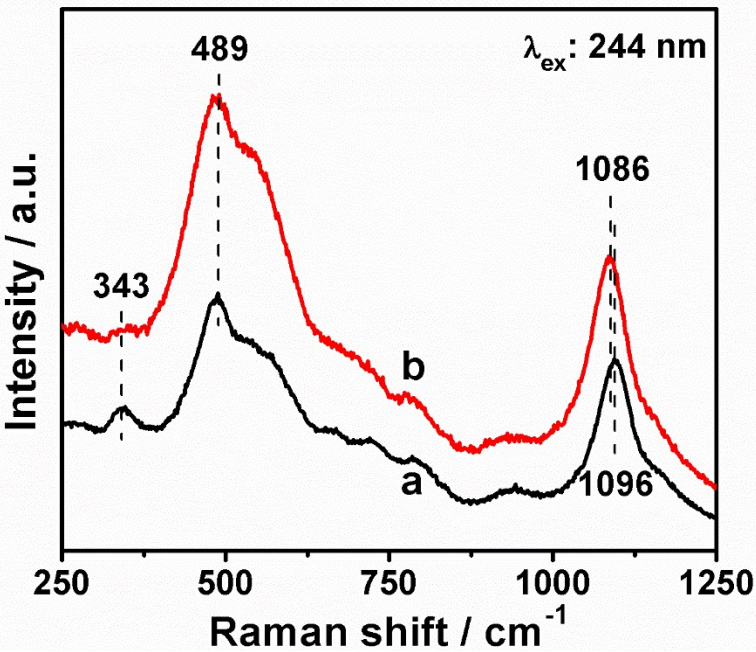

Fig. S9 244 nm excited UV resonance Raman spectra of Ti-MWW(20)-AT-C (a) and O-Ti-MWW(20)-AT-C (b).