Supplementary Information

Hydrothermal Modification of TS-1 Zeolites with Organic Amines and Salts to Construct Highly Selective Catalysts for Cyclopentene Epoxidation

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Table S1 Comparison catalytic performance of the TS-1 catalyst with literature reported catalysts for epoxidation of cyclopentene[a]

Catalyst	H_2O_2/olefln	Temp/°C	Time/h	Conv./%	Sel. of epoxide/%	TOF/h^{-1}	Ref.
TS-1_R-0.05K	1	40	2	52	98.2	175	this work
SBA-15-ImCl-PF_6-W	2.1	35	3	53	99	87	[1]
Ti-beta	2	40	3	56.8	19.1	49	[2]
TS-1	2	40	3	80.3	20.7	55	[2]
manganese sulfate monohydrated[a]	2.7	5	1	96.4	44.32	34	[3]
$Mg_{0.5}Co_{0.4}Fe_2O_4$	1.5	60	8	95.2	96.3	43	[4]
Ti-beta	1	40	2	9.9	61.1	13	[5]
TS-1	1	40	2	13.3	91.8	29	[5]
Ti-MWW-dry	1	40	2	25.3	92.9	49	[5]
R-Ti-MWW-PI	1	40	2	40	99	80	[6]
Co(III)-SBA-15	1	40	12	40.3	18.1	~1	[7]
$H_3PW_{12}O_{40}$	2	35	4	37.7	14.4	~0.2	[8]
$H_3PMo_{12}O_{40}$	2	35	4	9.4	33.5	~0.1	[8]

[a] Add 0.1 mmol $NaHCO_3$ as a catalytic promoter

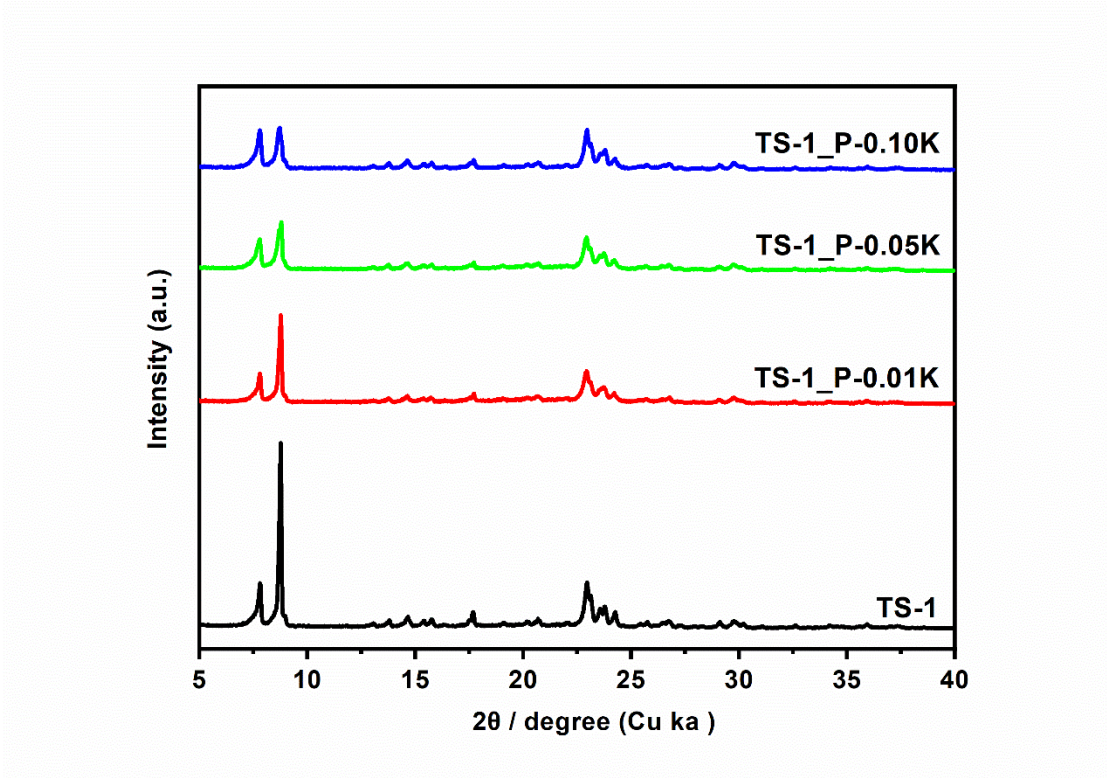

Figure S1 XRD spectra of the TS-1 zeolites and after hydrothermal treatment.

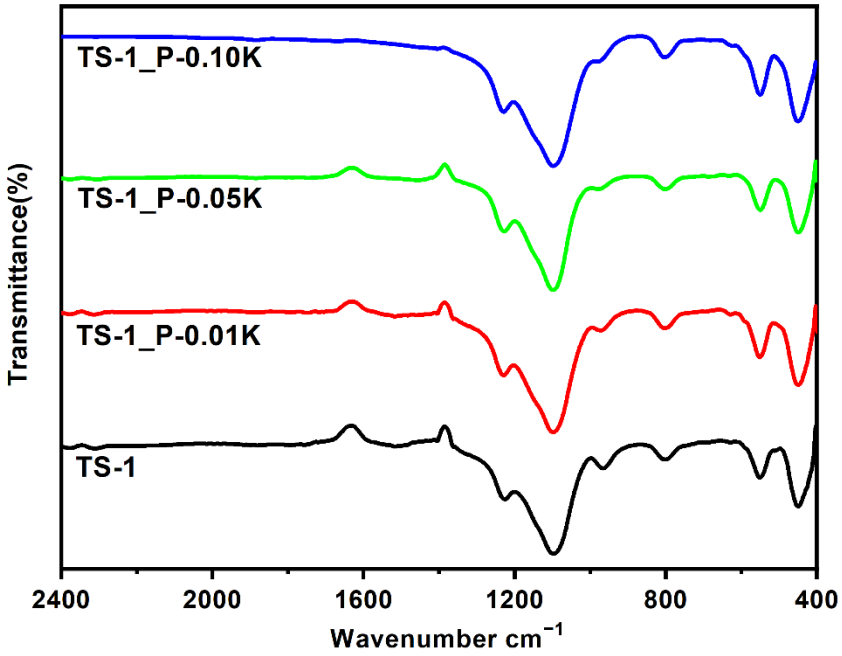

Figure S2 FTIR spectra of various TS-1 samples.

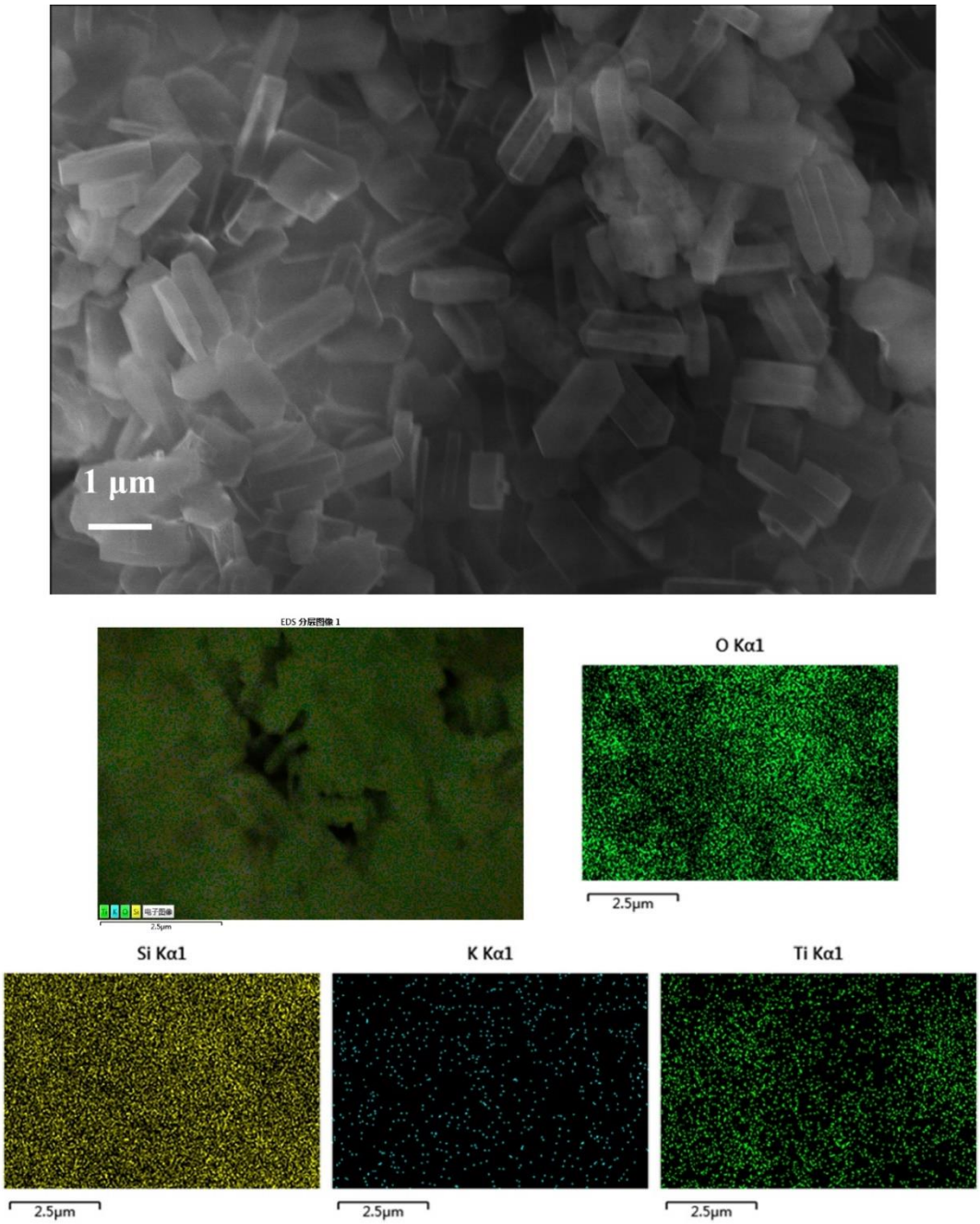

Figure S3 SEM images and elemental mapping of TS-1_P-0.05K.

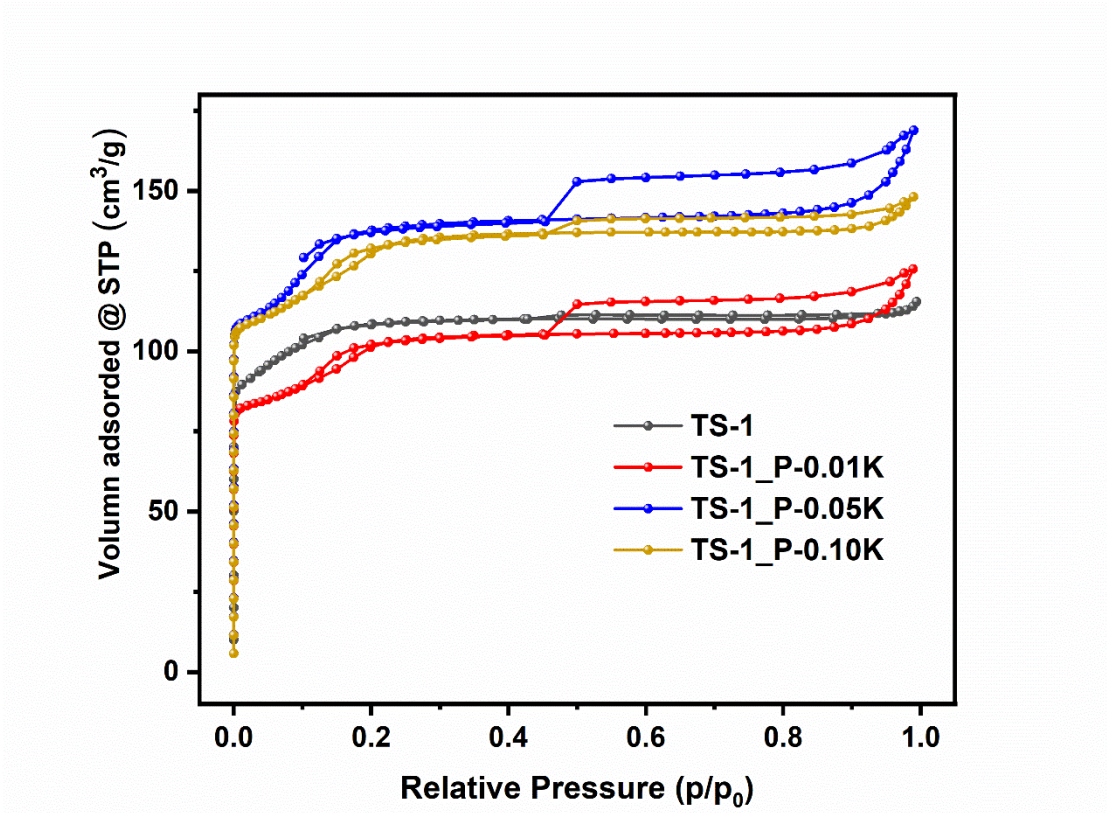

Figure S4 N_2 adsorption/desorption isotherms of the TS-1 samples before and after hydrothermal treatment.

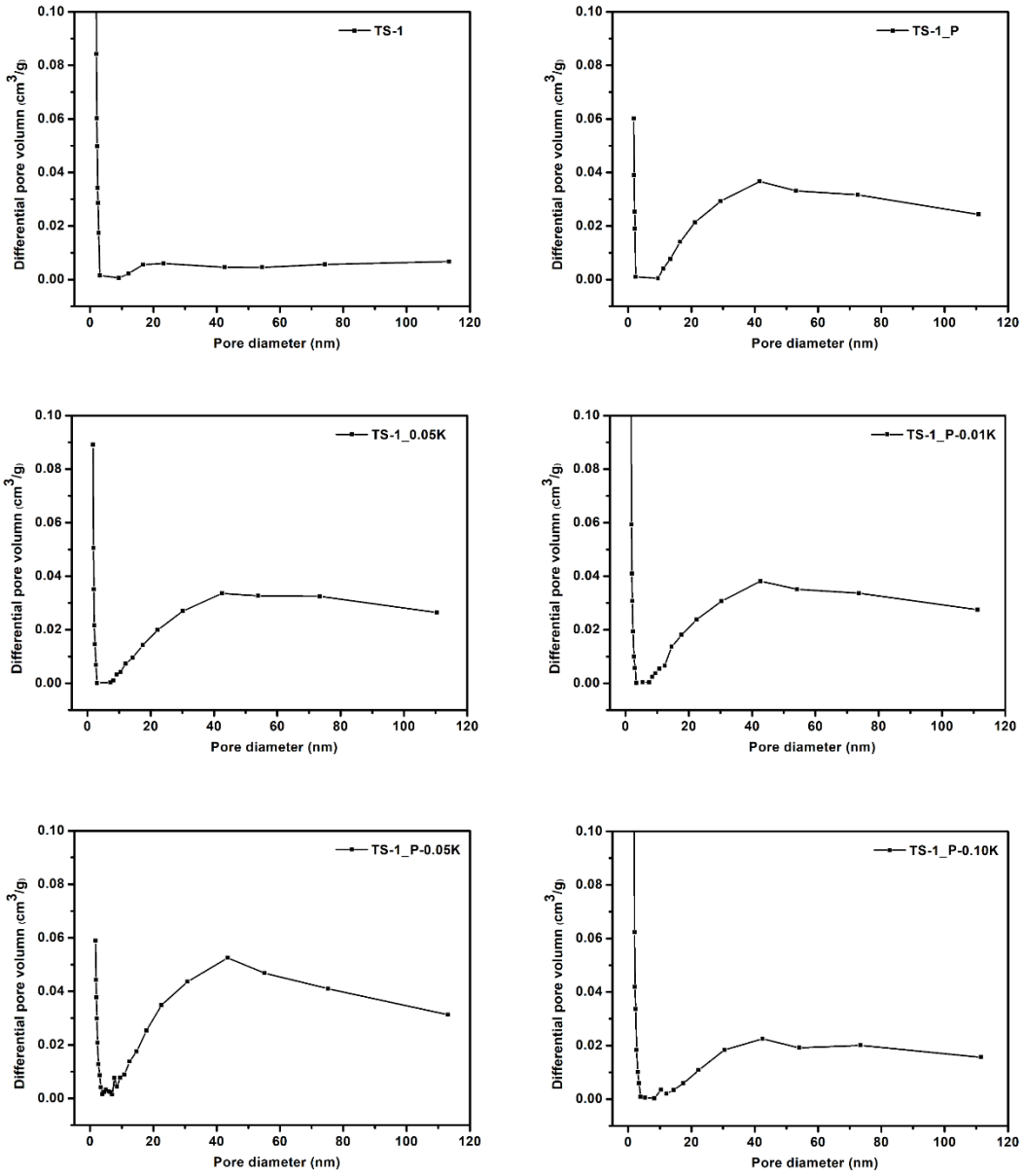

Figure S5 Pore size distributions of various TS-1 zeolites.

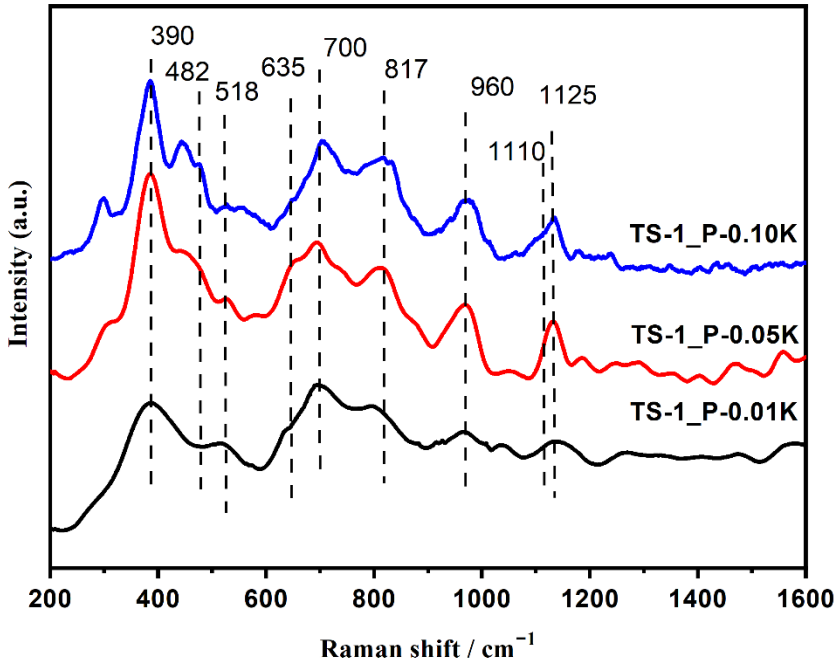

Figure S6 UV-Raman spectra excited at 325 nm of various TS-1 samples.

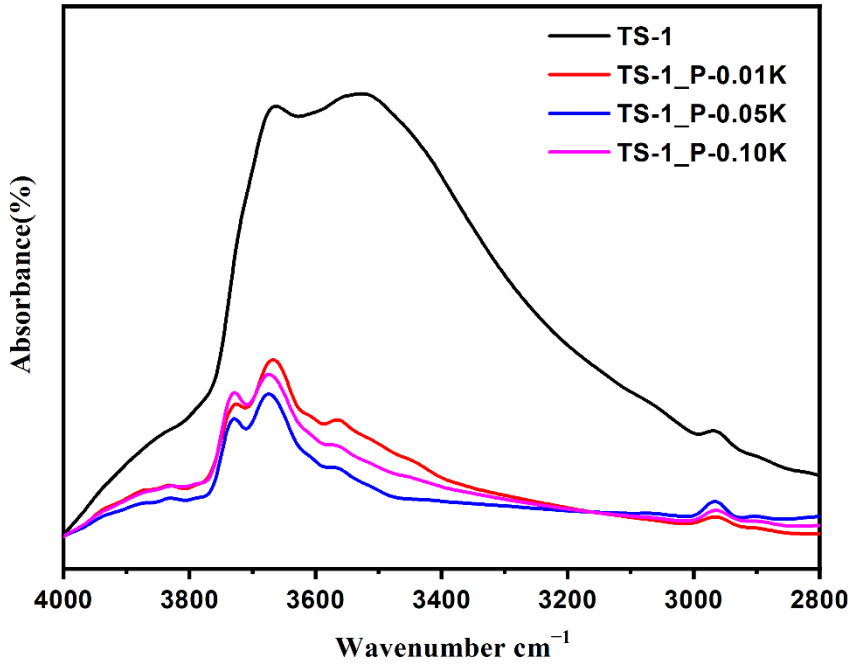

Figure S7 FTIR spectra of hydroxyl groups of the TS-1 samples before and after hydrothermal treatment.

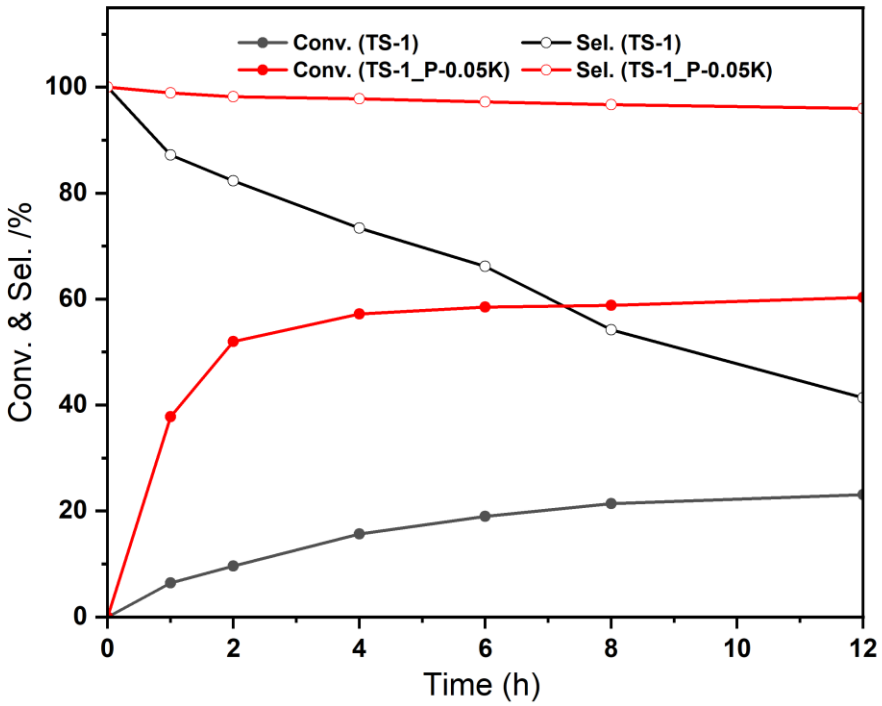

Figure S8 Cyclopentene conversion and cyclopentene oxide selectivity over TS-1 and TS-1_P-0.05K in methanol (Reaction conditions: catalyst 0.05 g, H_2O_2 10 mmol, CH_3OH 10 mL, cyclopentene 10 mmol, reaction temperature 313 K).

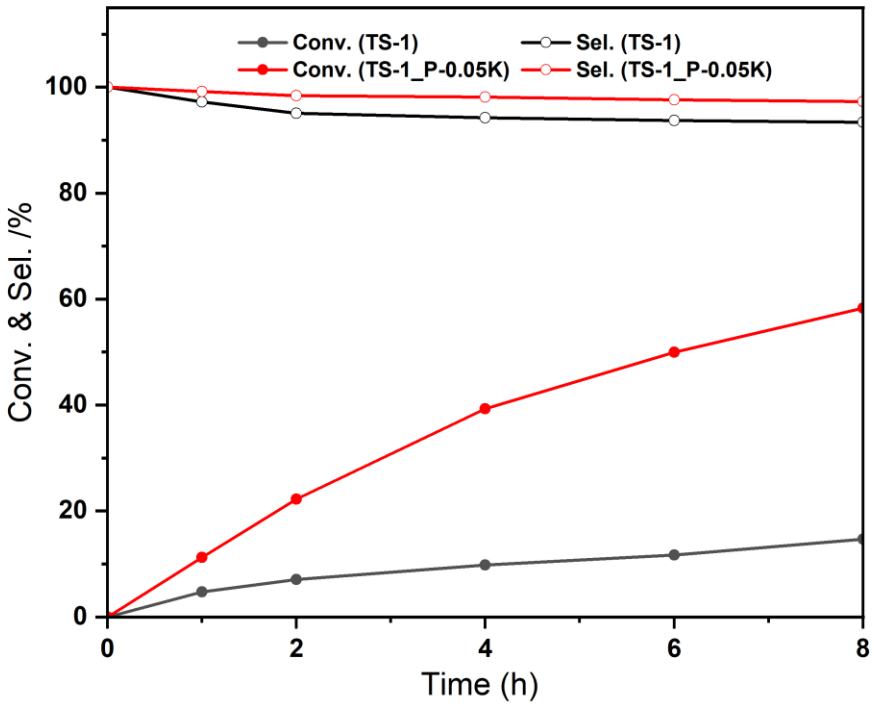

Figure S9 Cyclopentene conversion and cyclopentene oxide selectivity over TS-1 and TS-1_P-0.05K in acetonitrile (Reaction conditions: catalyst 0.05 g, H_2O_2 10 mmol, acetonitrile 10 mL, cyclopentene 10 mmol, reaction temperature 313 K).

References (for Table S1)

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