Supplementary Material

Enhancing BTX selectivity for syngas to aromatics through silylation of CTAB pretreated ZSM-5

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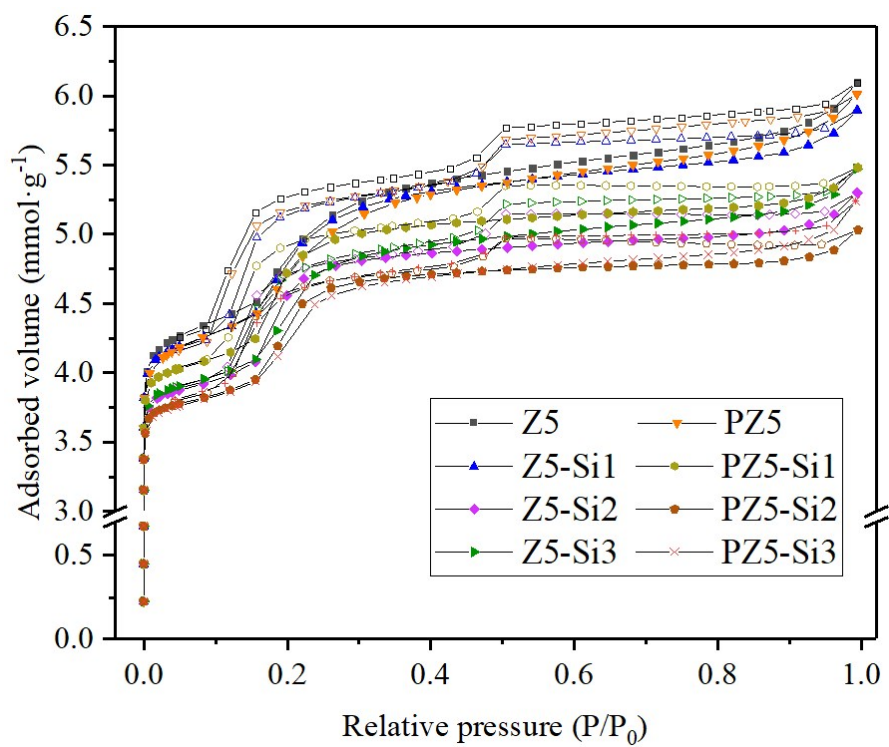
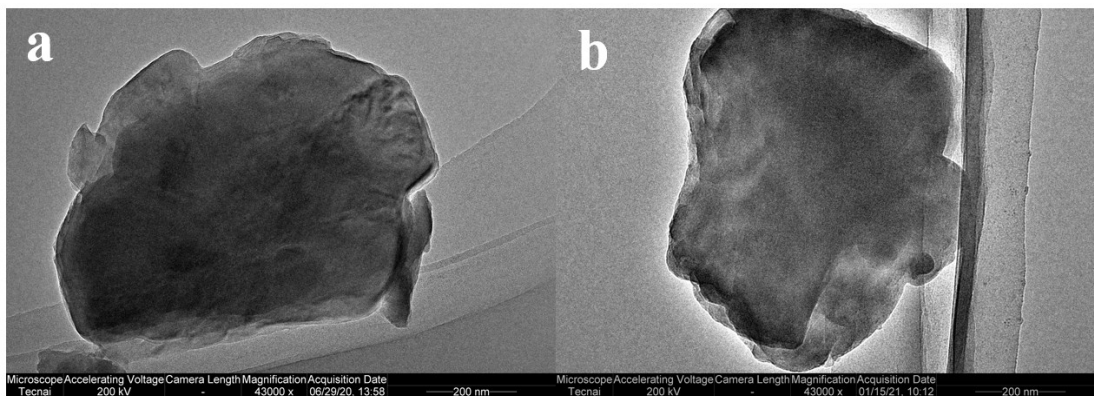**Fig. S1.** N$_2$ adsorption-desorption isotherms of ZSM-5 samples.
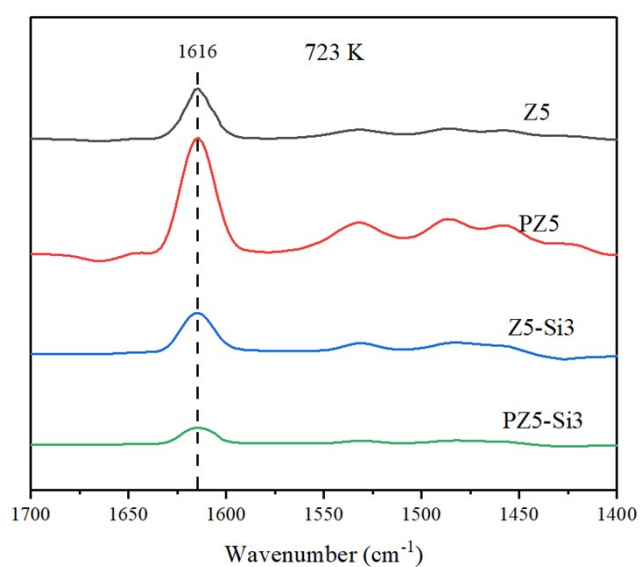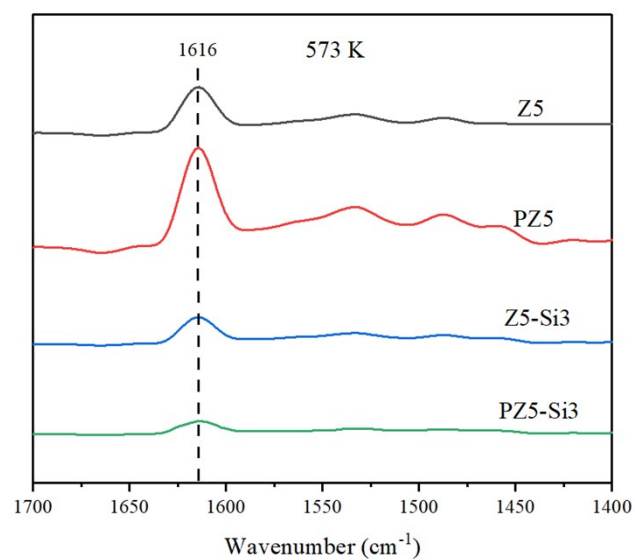
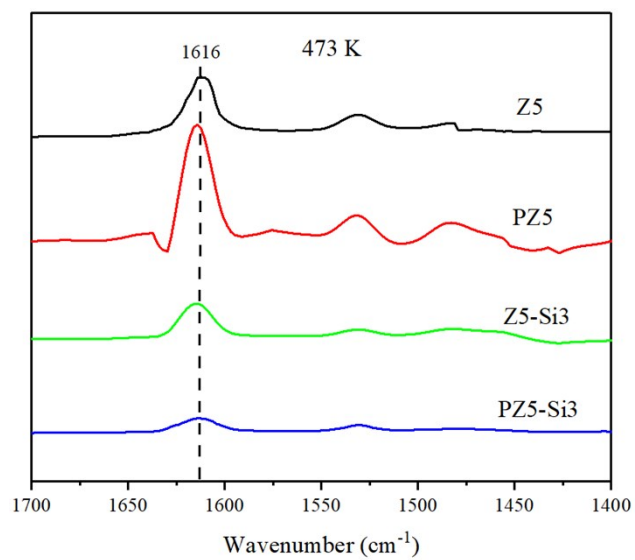**Fig. S2.** TEM images of a) Z5-Si3, b) PZ5-Si3.

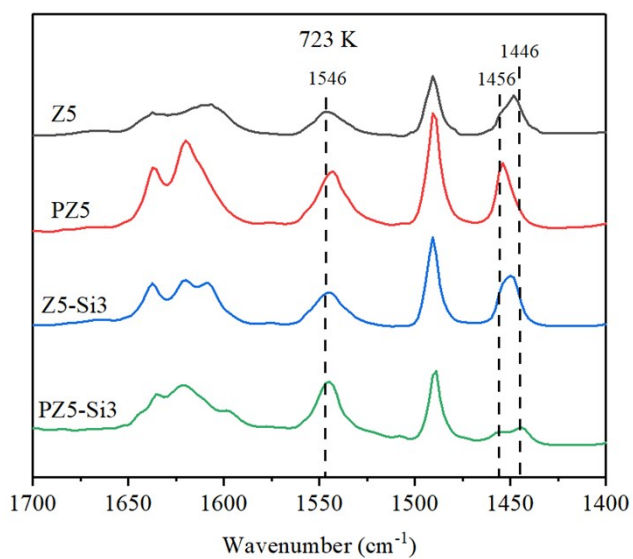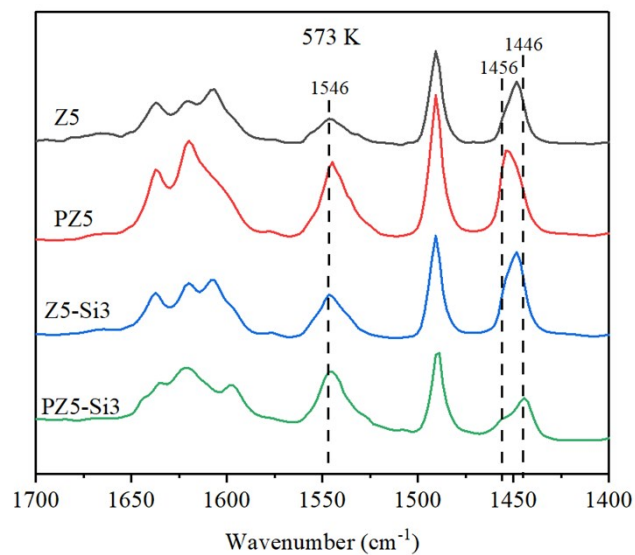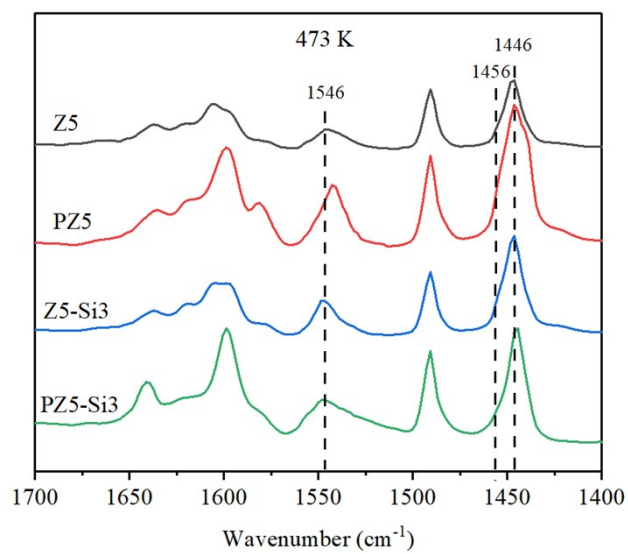**Fig. S3.** 2, 6-DTBPy-IR spectra of ZSM-5 samples at 473K, 573K and 723K

Fig. S4. Py-IR spectra of ZSM-5 samples at 473K, 573K and 723K

Table S1. Silica loading amount of ZSM-5 obtained by gravimetric method

sample	loading SiO_2 (wt%)	average loading SiO_2 (wt%)	average loading SiO_2 in all cycles (wt%)	Theoretical loading SiO_2 in each cycle (wt%)
Z5-Si1	1.75			
Z5-Si2	1.24	1.26		
Z5-Si3	0.80		1.19	7.15
PZ5-Si1	2.05			
PZ5-Si2	0.65	1.12		
PZ5-Si3	0.66			

Table S2. Brønsted acid amount of ZSM-5 samples obtained by Py-IR

Sample	Total Bronsted acid ($\mu mol \cdot g^{-1}$)	Acidity ($\mu mol \cdot g^{-1}$) W_B	M_B	S_B
Z5	120	19.7	3.4	97
PZ5	324	60.6	42.1	222
Z5-Si3	178	26.2	9.8	142
PZ5-Si3	291	92.4	19.8	179

Table S3. Catalytic performances of ceria-zirconia solid solution [a]

Sample	X_{CO} (%)	S_{CO2} (%)	Hydrocarbon distribution (%) CH_4	$C_{2-4,}^=$	$C_{2-4,}^0$	Aliphatic C_{5+}	Aromatics
CZS 673K	5.8	42.2	12.1	54.6	9.7	22.3	1.3
CZS 723K	12.4	39.8	14.6	25.7	22.0	37.0	0.7

[a] Reaction conditions: $H_2/CO/Ar$ = 48/48/4, 3.6 MPa, GHSV= 1200 ml_{syngas} / $g_{CZS} \cdot h$. X_{CO} refers to CO conversion; S_{CO2} refers to CO_2 selectivity.