

Postsynthesis of mesoporous ZSM-5 zeolite by piperidine-assisted desilication and its superior catalytic properties in hydrocarbon cracking

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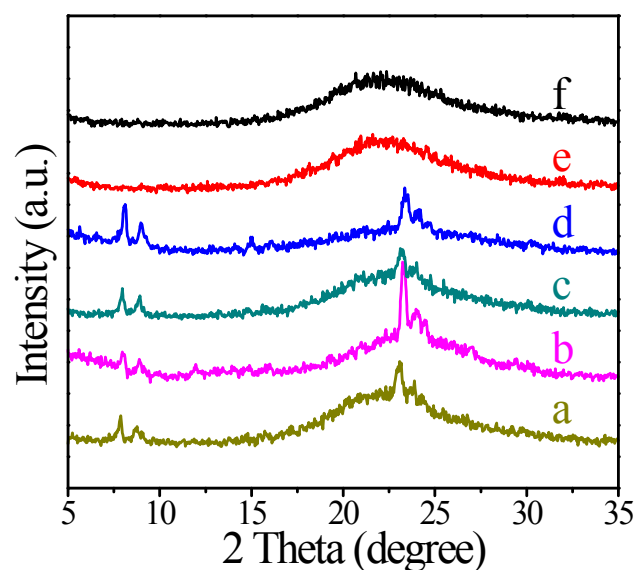


Fig. S1. XRD patterns of the samples synthesized at Si/Al molar ratio of 40 in the presence of (a) piperidine and calcined seeding gel, (b) piperidine and dried seeding gel, (c) only active seeding gel, (d) only piperidine, (e) only calcined seeding gel, (f) only dried seeding gel.

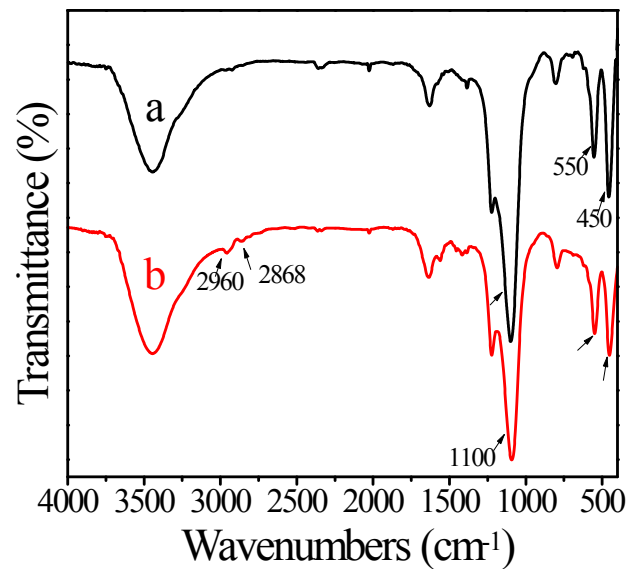


Fig. S2. FT-IR spectra of (a) calcined parent ZSM-5 (Si/Al=40) and (b) alkali-treated sample (AT 0.2 - PI 0.05) without calcination.

Table S1 Acidity determined by NH₃-TPD measurement of different samples

No.	Samples	Q (mmol g ⁻¹)		
		Weak	Strong	Total
1	ZSM-5 (parent)	0.19	0.28	0.47
2	AT 0.2 - PI 0.02	0.24	0.25	0.49
3	AT 0.2 - PI 0.01	0.31	0.19	0.50
4	AT 0.2	0.37	0.15	0.52

Table S2 Effect of the parent and alkali-treated H-ZSM-5 on product selectivity

Catalyst	Parent	AT 0.2	AT 0.2 - PI 0.02
Product Selectivity(C-%)			
Methane	6.80	8.93	8.95
Ethane	9.32	7.47	7.59
Ethylene	20.63	26.41	26.98
Propane	9.35	4.47	5.06
Propylene	30.06	31.20	31.19
Butanes	3.00	1.65	1.71
Butenes	14.28	13.76	12.79
C5	4.22	3.77	3.18
C6 ₀ ⁺	2.06	2.33	2.58
Coke (wt.%)	13.05	7.29	9.64
HTI ^a	0.28	0.14	0.15

^a HTI (hydrogen transfer index) ratio of propane and butanes selectivity to propylene and butenes selectivity