Supporting Information

Fine tuning the diffusion length in hierarchical ZSM-5 to maximize the yield of propylene in catalytic cracking of hydrocarbons

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Content:

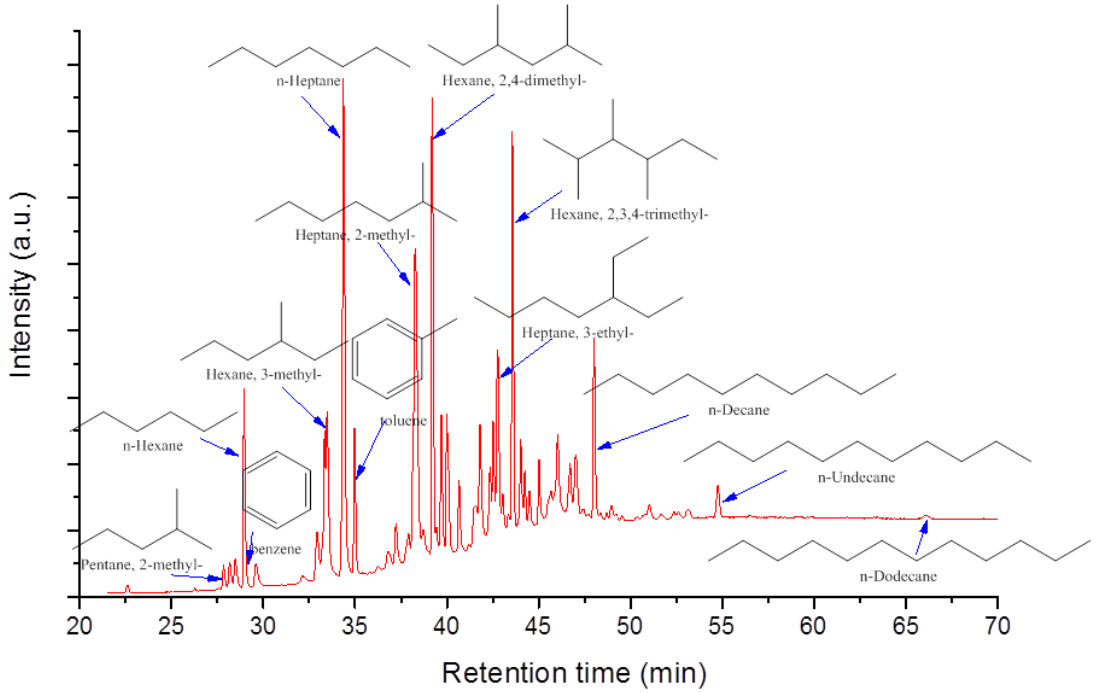

Fig. S1. Analysis of Full Range Naphtha by GC/MS. Conditions: HP-PLOTQ column, Carrier gas: Helium, column flow:7.24 ml/min. Temperature Program: 60 ^{o}C hold for 5 min, ramp 50 to 260 at 5 ^{o}C /min, 260 ^{o}C hold for 40min.

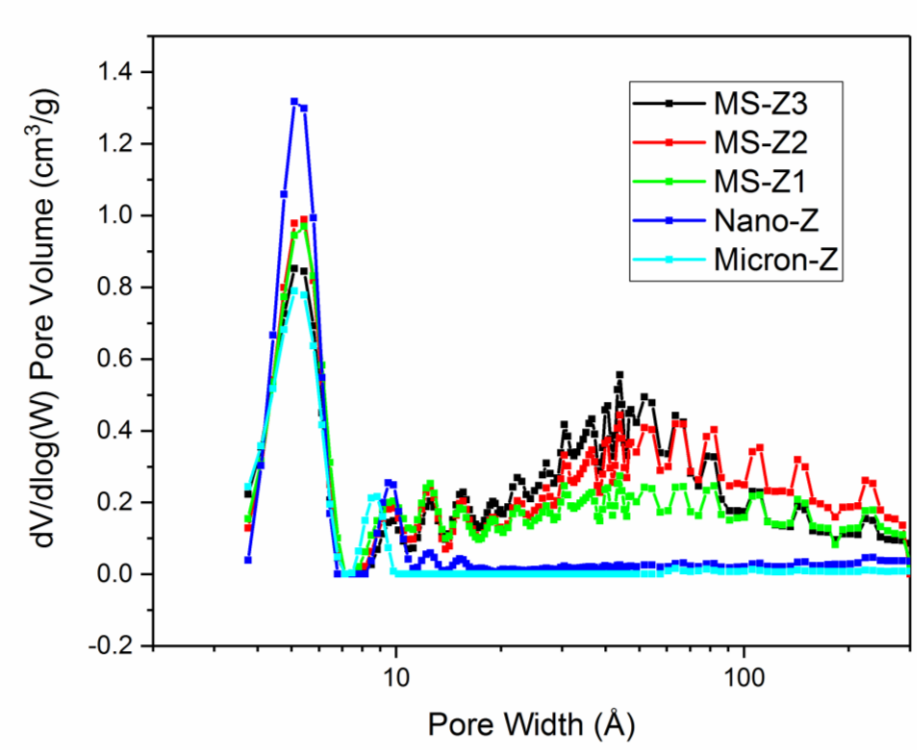

Fig. S2. Pore size distributions of the catalysts studied.

Table S1 Conversion of cumene and 1,3,5-Triisopropylbenzene (TIPB) over MS-Z3, MS-Z2, MS-Z1, Nano-Z and Micron-Z catalysts at 400 ^{o}C, TOS=10 min.

Conversion (wt %)	Catalysts				
	MS-Z3	MS-Z2	MS-Z1	Nano-Z	Micron-Z
Cumene	45.5	44.6	39.8	29.8	17.2
TIPB	36.1	35.8	20.5	7.4	1.9

Table S2 Selectivity (wt%) of products from catalytic cracking of n-decane over different catalysts at iso-conversion (71~75wt%) at 550 ^{o}C, TOS=5min.

Products	Catalysts				
	MS-Z3	MS-Z2	MS-Z1	Nano-Z	Micron-Z
WHSV (g_{Feed}·g_{Cat}^{-1}· h^{-1})	36	36	54	108	108
Conversion (wt %)	71.0	74.0	70.9	73.2	75.0
Selectivity (wt %)					
Methane	0.9	0.8	0.7	0.6	0.8
Ethylene	9.6	10	9.5	7.4	6.7
Ethane	3.8	3.7	3.2	2.6	3.0
Propylene	24.7	24.1	22.6	17.6	14.6
Propane	14.4	16.1	16.2	19.4	22.3
Butenes	17.5	15.7	16.3	16.0	14.2
Butane	7.3	7.6	8.6	11.2	11.9
Benzene	3.9	3.4	3.4	2.9	2.1
Toluene	0.5	0.7	0.6	0.7	1.3
Xylenes	1.9	2.6	2.5	3.1	5.6
Others	13.0	13.2	12.0	13.6	11.8
Coke	2.4	2.1	4.4	4.7	5.6

Table S3 Properties of Arabian Light.

Property	Value
Density (g/cm^3) (15 ^{o}C)	0.8658
Sulfur (wt%)	1.9
Nitrogen (ppm)	660
Vanadium (ppm)	13
Nickel (ppm)	5
Residue (wt%)	4.0
Simulated Distillation (^{o}C)	
Initial boiling point	34
50%	363
End boiling point	773

Table S4 Cracking of Arabian Light over different catalysts at 600 ^{o}C, TOS=5min.

Products	Catalysts				
	MS-Z3	MS-Z2	MS-Z1	Nano-Z	Micron-Z
Yield (wt %)					
Methane	3.3	3.9	3.2	3.3	3.8
Ethylene	11.5	10.5	9.8	9.7	6.7
Ethane	4.4	4.0	4.2	4.3	4.3
Propylene	**15.0**	**13.9**	**11.4**	**9.8**	**5.7**
Propane	5.9	5.6	5.4	5.6	4.5
Butenes	5.9	5.9	4.6	3.8	2.1
Butanes	1.8	1.8	1.6	1.4	0.8
Light olefins	32.4	30.2	25.7	23.3	14.5
Total gas	47.8	45.5	40.1	37.8	27.9
Selectivity in gas phase (wt %)					
Ethylene	24.1	23.1	24.4	25.8	23.9
Propylene	31.3	30.5	28.7	25.8	20.6