

Supporting Information

Precisely regulating the acidity of mesoporous silica on the catalytic performance for 1-decene oligomerization

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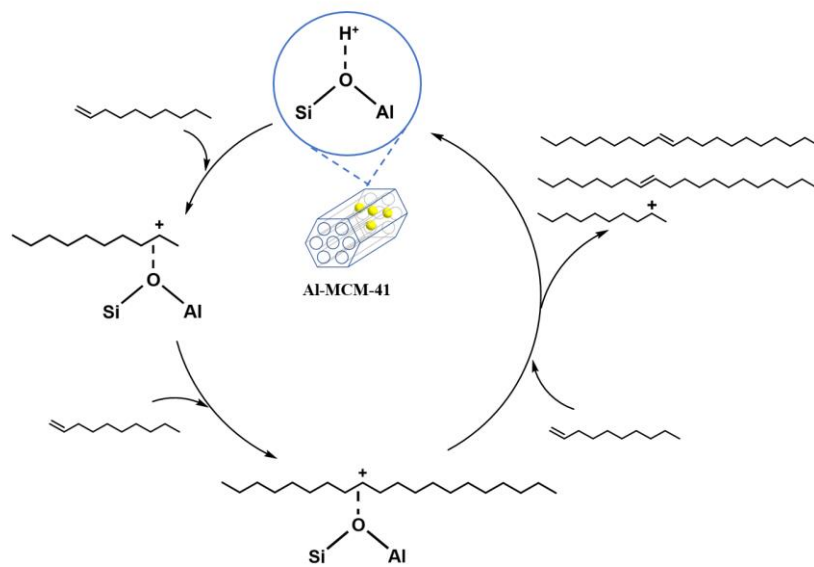
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Scheme S1 Recycling plot for the 1-decene oligomerization.

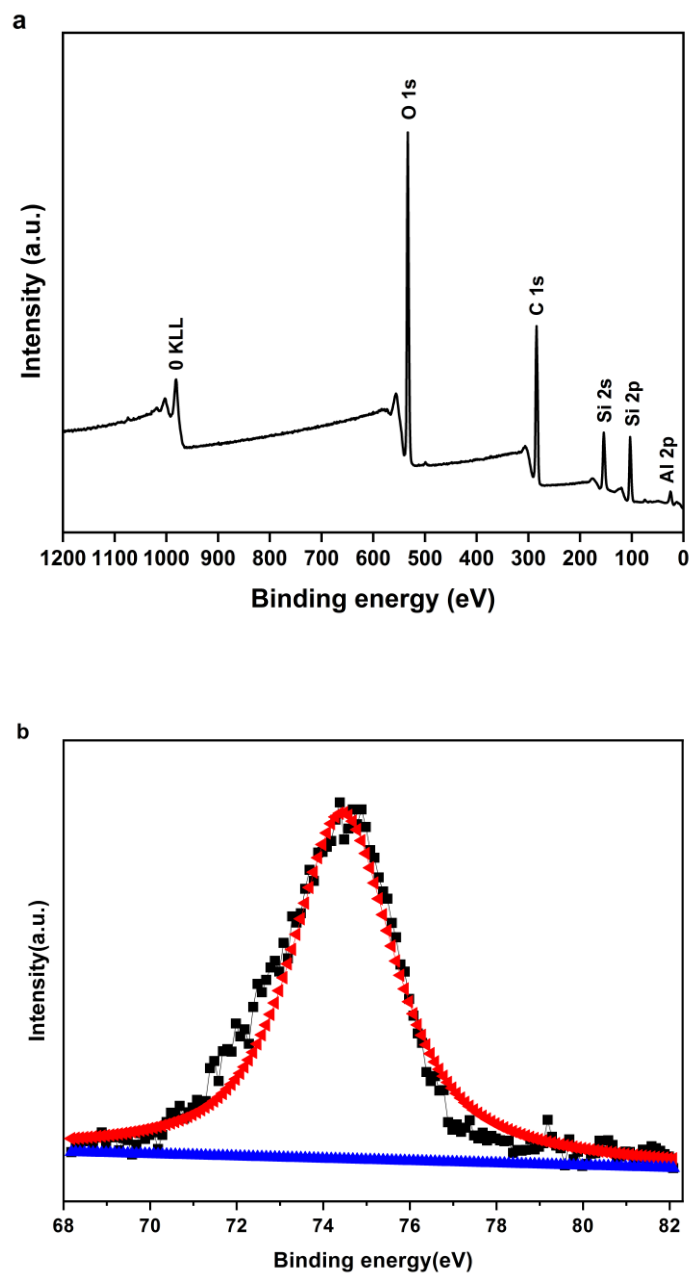


Fig.S1 XPS spectra of Al-MCM-41-15 sample: whole-range (a) and Al 2p (b) regions.

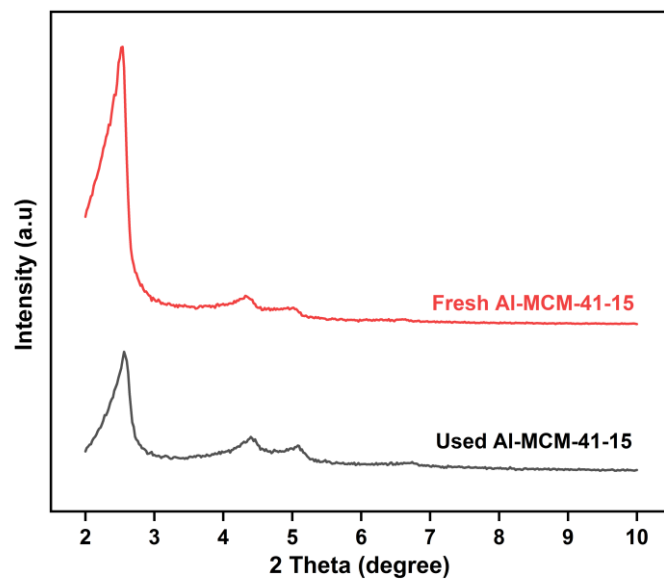


Fig. S2 XRD patterns of fresh Al-MCM-41-15 and used Al-MCM-41-15 samples

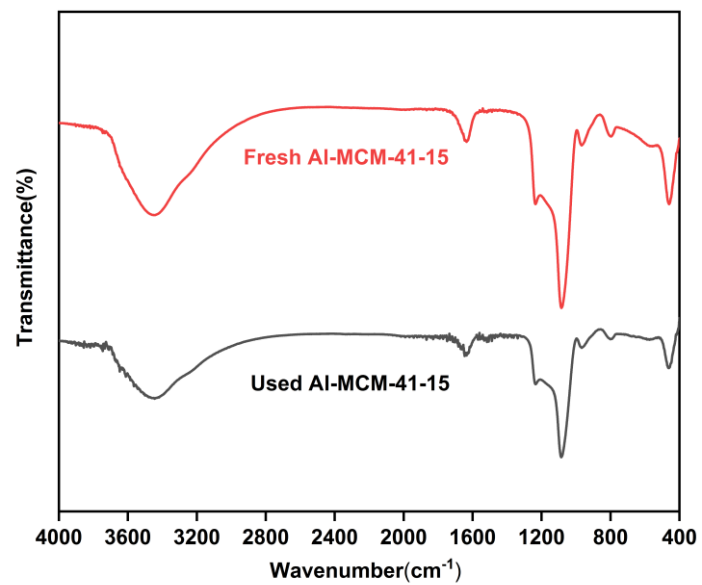


Fig. S3 FT-IR spectra of fresh Al-MCM-41-15 and used Al-MCM-41-15 samples.

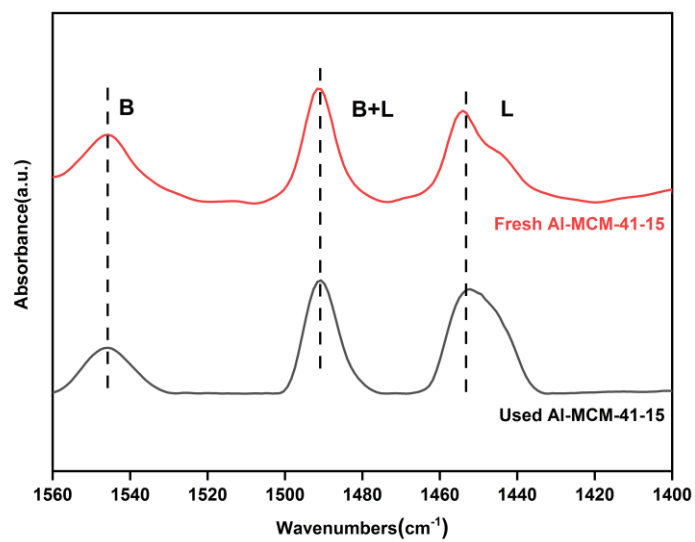


Fig. S4 Py-IR spectra of fresh Al-MCM-41-15 and used Al-MCM-41-15 samples after the adsorption of pyridine at 250 °C

Table S1. Screening test of different solvent on 1-decene oligomerization.

Solvent	Conversion [C ₁₀ , %]	Cracking selectivity [%]	Selectivity [C ₂₀ , %]	Selectivity [C ₃₀₊₄₀ , %]	Target product selectivity [%]
n-hexane	56.19	22.85	59.55	17.60	77.15
n-heptane	70.06	3.29	64.53	32.18	96.71
n-octane	56.51	5.82	77.76	16.42	94.18

Reaction conditions: 1-decene (10 ml), catalyst (2.0 g), 230 °C, 2.0 Mpa, 6 h.

Table S2. Screening test of different catalyst amount on 1-decene oligomerization.

Catalyst amount [g]	Conversion [C ₁₀ , %]	Cracking selectivity [%]	Selectivity [C ₂₀ , %]	Selectivity [C ₃₀₊₄₀ , %]	Target product selectivity [%]
0.1	34.89	3.61	81.52	14.87	96.39
0.5	49.39	3.11	81.33	15.56	96.89
1.0	58.24	3.49	75.59	20.92	96.51
2.0	70.06	3.29	64.53	32.18	96.71
3.0	61.85	6.03	75.44	18.53	93.97

Reaction conditions: 1-decene (10 ml), N-heptane (10 ml), 230 °C, 2.0 Mpa, 6 h.

Table S3 Acid site distribution of the fresh and used Al-MCM-41-X ($\mu\text{mol g}^{-1}$).

Sample	B	Bs	L	Ls	B+L	
	250 °C	350 °C	250 °C	350 °C	250°C	350°C
Fresh Al-MCM-41-15	64	47	108	76	172	123
Used Al-MCM-41-15	56	45	108	74	164	119