

Supplementary Material

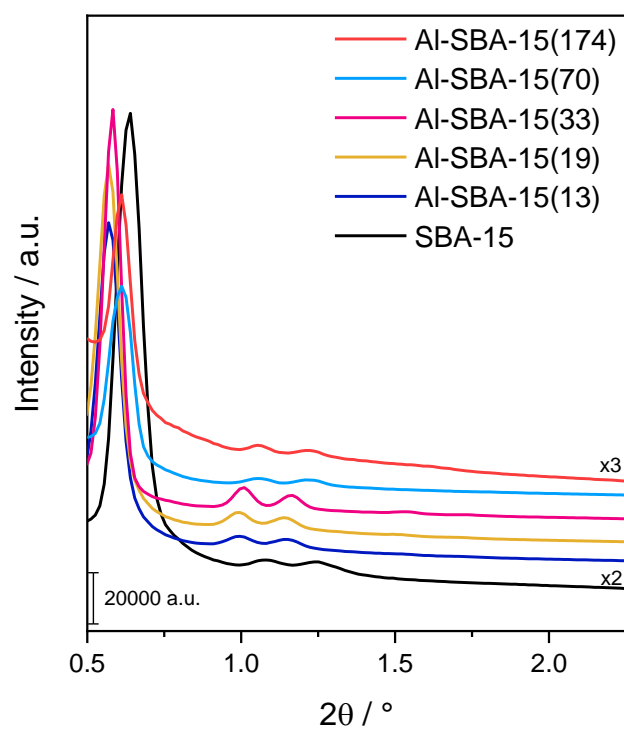


Figure S1. SA-XRD diffractograms of the synthesized mesoporous SBA-15, Al-SBA-15(13), Al-SBA-15(19), Al-SBA-15(33), Al-SBA-15(70) and Al-SBA-15(174).

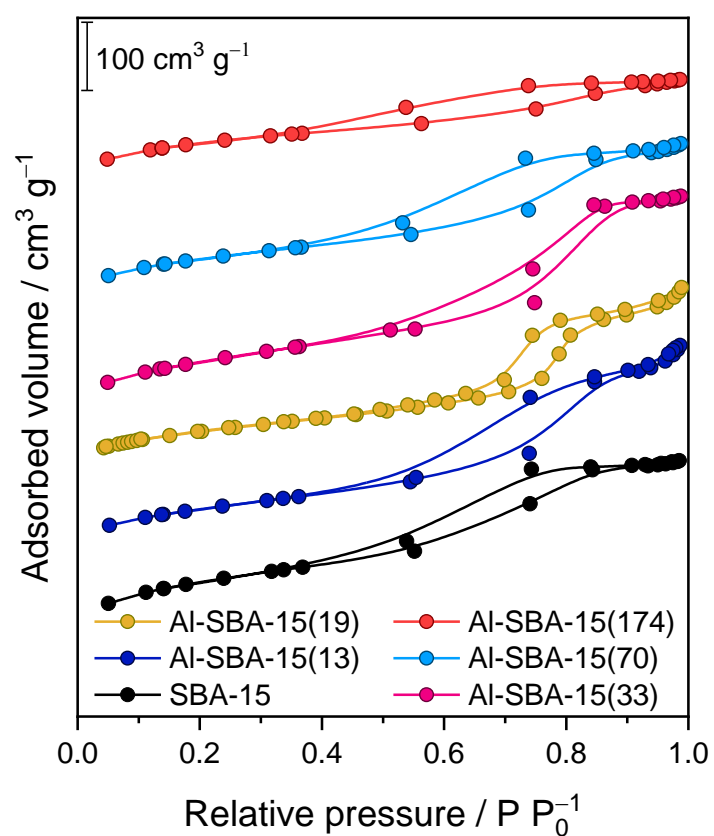


Figure S2. N₂ adsorption-desorption isotherms of the synthesized mesoporous SBA-15, Al-SBA-15(13), Al-SBA-15(19), Al-SBA-15(33), Al-SBA-15(70) and Al-SBA-15(174).

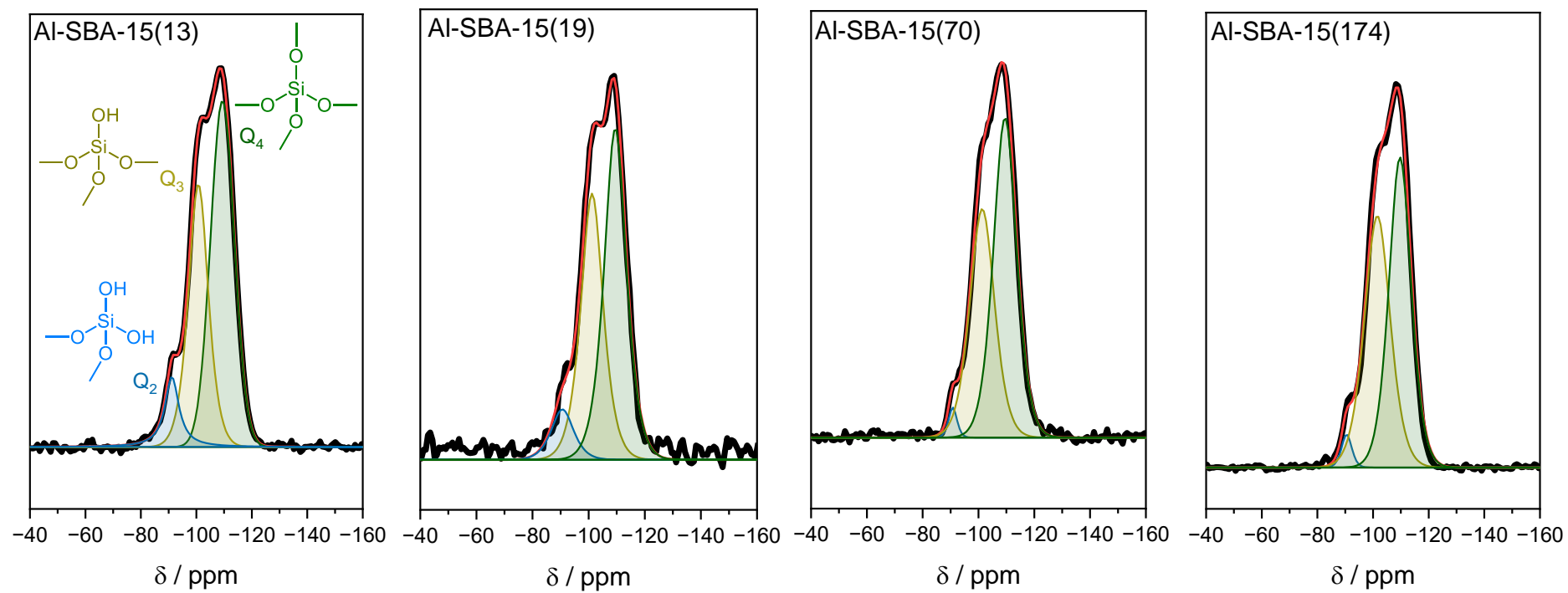


Figure S3. ^{29}Si CP/MAS NMR spectra of Al-SBA-15(13), Al-SBA-15(19), Al-SBA-15(70), Al-SBA-15(174).

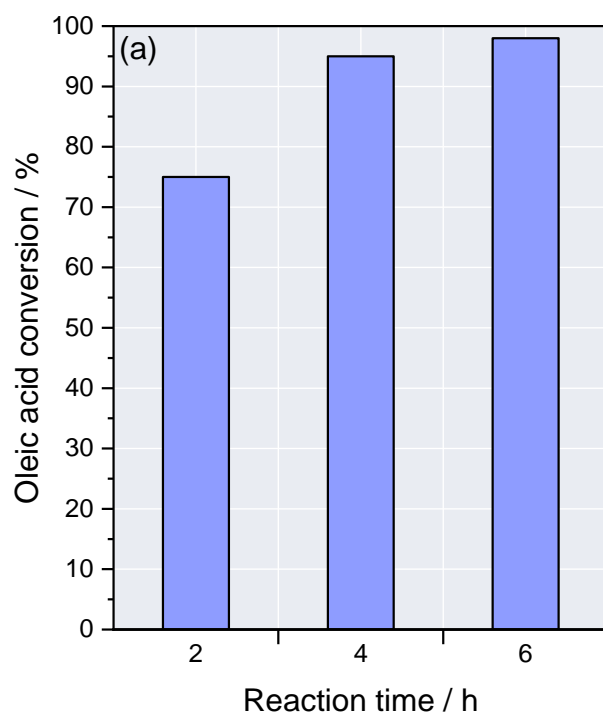


Figure S4. Oleic acid esterification over Al-SBA-15(19) at different reaction time. Reaction conditions: T = 150 °C, P = 20 bar (N₂), methanol:oleic acid 30:1 and 10% of catalyst.

Table S1. Comparison of reaction conditions and catalyst performance for different silicate-based catalysts in the esterification of fatty acids.

Catalyst	Si/M	Fatty Acid	Alcohol	T (°C)	Cat weight (%)	Alcohol:Fatty acid	Time (h)	X (%)	Reference
Sn-SBA-15	304	Oleic acid	Methanol	80	5	15:1	1	4.2	[12]
Sn-SBA-15-PrSO ₃ H	304	Oleic acid	Methanol	80	5	15:1	1	56.5	[12]
Al-MCM-41	8	Palmitic acid	Methanol	130	0.6	60:1	2	79	[19]
Al-MCM-41	16	Palmitic acid	Ethanol	130	0.6	60:1	2	67	[19]
Al-MCM-41	32	Palmitic acid	Isopropanol	130	0.6	60:1	2	59	[19]
Al-SBA-15	25	Lauric acid	Methanol	70	5	n.i.	2	85	[20]
Al-SBA-15	37.5	Lauric acid	Methanol	70	5	n.i.	2	79	[20]
Al-SBA-15	50	Lauric acid	Methanol	70	5	n.i.	2	76	[20]
Al-MCM-41	13.6	Lauric acid	Methanol	65	2	n.i.	1	60	[21]
Al-MCM-41	13.6	Lauric acid	Methanol	65	5	n.i.	1	75	[21]
Al-MCM-41	13.6	Lauric acid	Methanol	65	7	n.i.	1	82	[21]
SBA-15-SO ₃ H	-	Oleic acid	Methanol	140	5	15:1	2	97	[22]
Al-SBA-15	33	Oleic acid	Methanol	140	5	15:1	2	33	[22]
Al-SBA-15-SO ₃ H	69	Oleic acid	Methanol	140	5	15:1	2	80	[22]
Ti-SBA-15	51	Oleic acid	Methanol	140	5	15:1	2	34	[22]
Ti-SBA-15-SO ₃ H	48	Oleic acid	Methanol	140	5	15:1	2	96	[22]
Al-SBA-15	13	Oleic acid	Methanol	150	10	30:1	2	70	Present work
Al-SBA-15	19	Oleic acid	Methanol	150	10	30:1	2	75	Present work
Al-SBA-15	33	Oleic acid	Methanol	150	10	30:1	2	86	Present work
Al-SBA-15	70	Oleic acid	Methanol	150	10	30:1	2	93	Present work
Al-SBA-15	174	Oleic acid	Methanol	150	10	30:1	2	82	Present work
Al-SBA-15	19	Linoleic acid	Methanol	150	10	30:1	2	67	Present work
Al-SBA-15	19	Stearic acid	Methanol	150	10	30:1	2	64	Present work

n.i. – not informed