Electronic Supplementary Information (ESI)

Aqueous-phase tandem catalytic conversion of xylose to furfuryl alcohol over [Al]-SBA-15 molecular sieves

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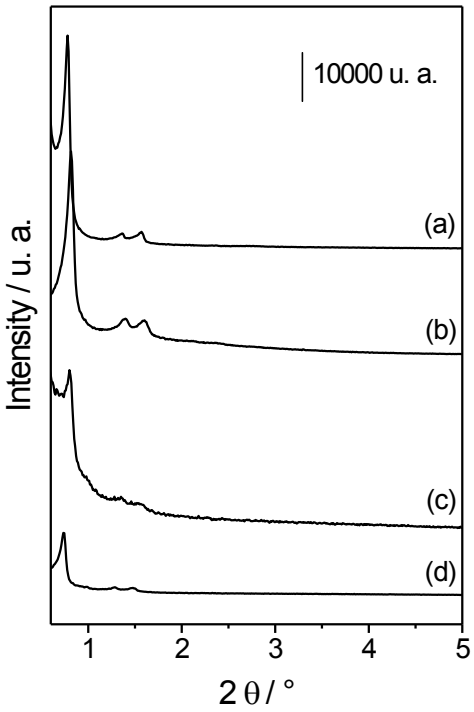

Figure S1. Small angle diffractograms of the synthesized mesoporous catalysts: (a) SBA-15, (b) [Al]-SBA-15 (Si/Al = 23), (c) [Al]-SBA-15 (Si/Al = 73) and (d) [Al]-SBA-15 (Si/Al = 114).

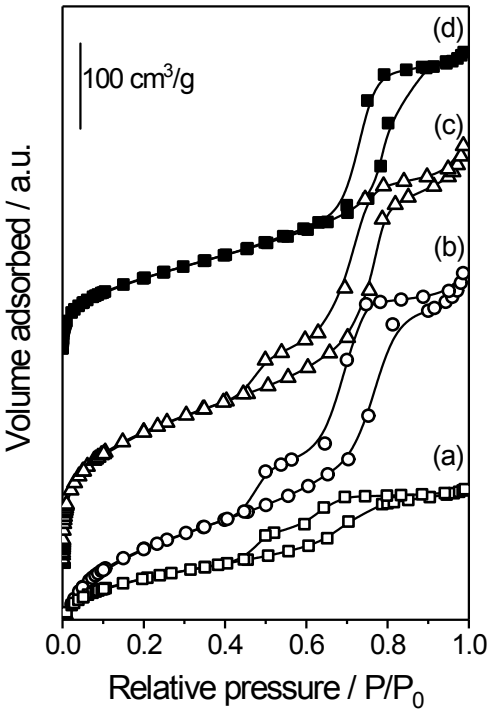

Figure S2. N_2 Adsorption-desorption isotherms of the synthesized mesoporous catalysts: (a) SBA-15, (b) [Al]-SBA-15 (Si/Al = 114), (c) [Al]-SBA-15 (Si/Al = 73) and (d) [Al]-SBA-15 (Si/Al = 23).

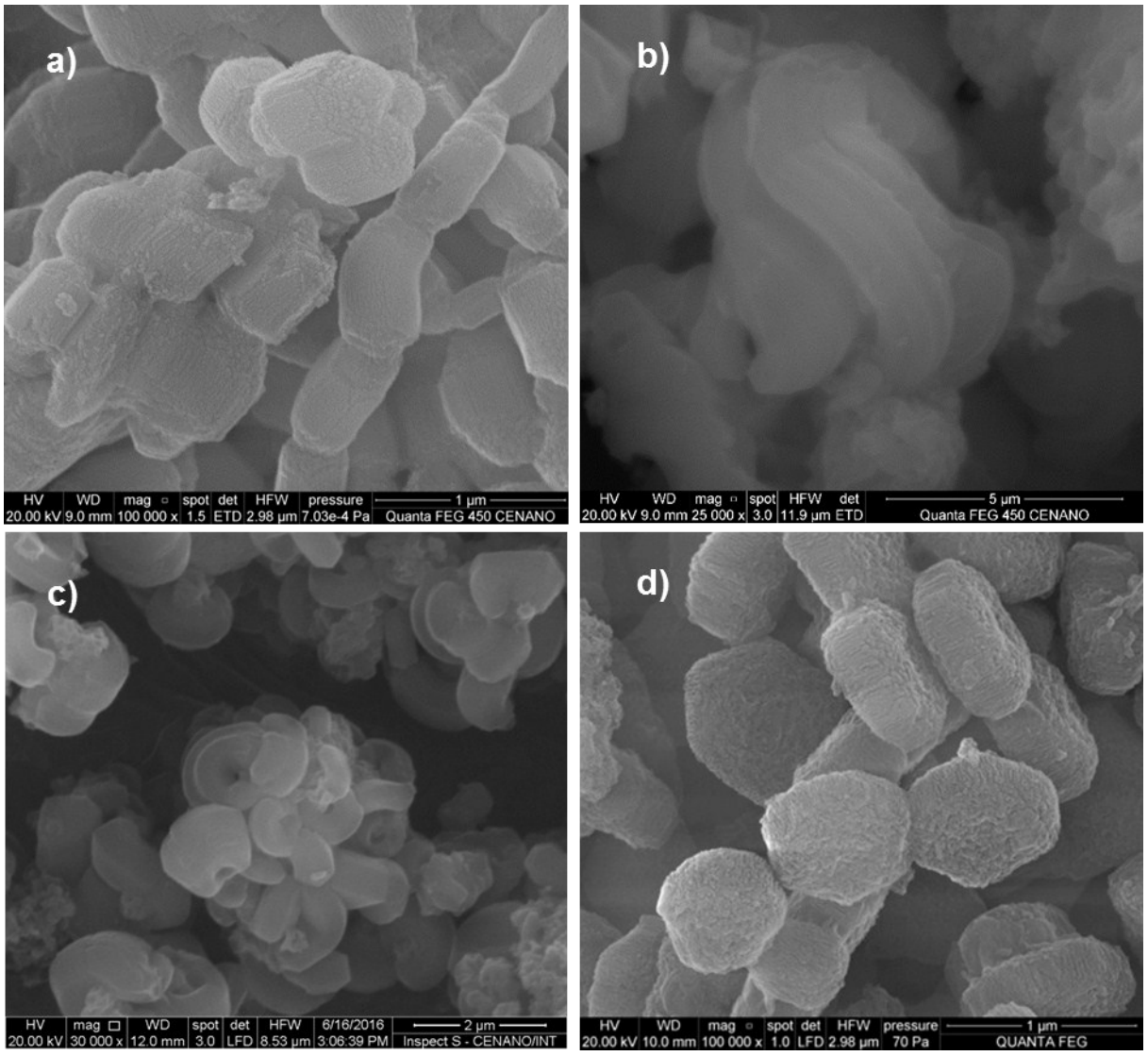

Figure S3. Scanning electron microscopy images of the synthesized mesoporous catalysts: (a) SBA-15, (b) [Al]-SBA-15 (Si/Al = 114), (c) [Al]-SBA-15 (Si/Al = 73), (d) [Al]-SBA-15 (Si/Al = 23).

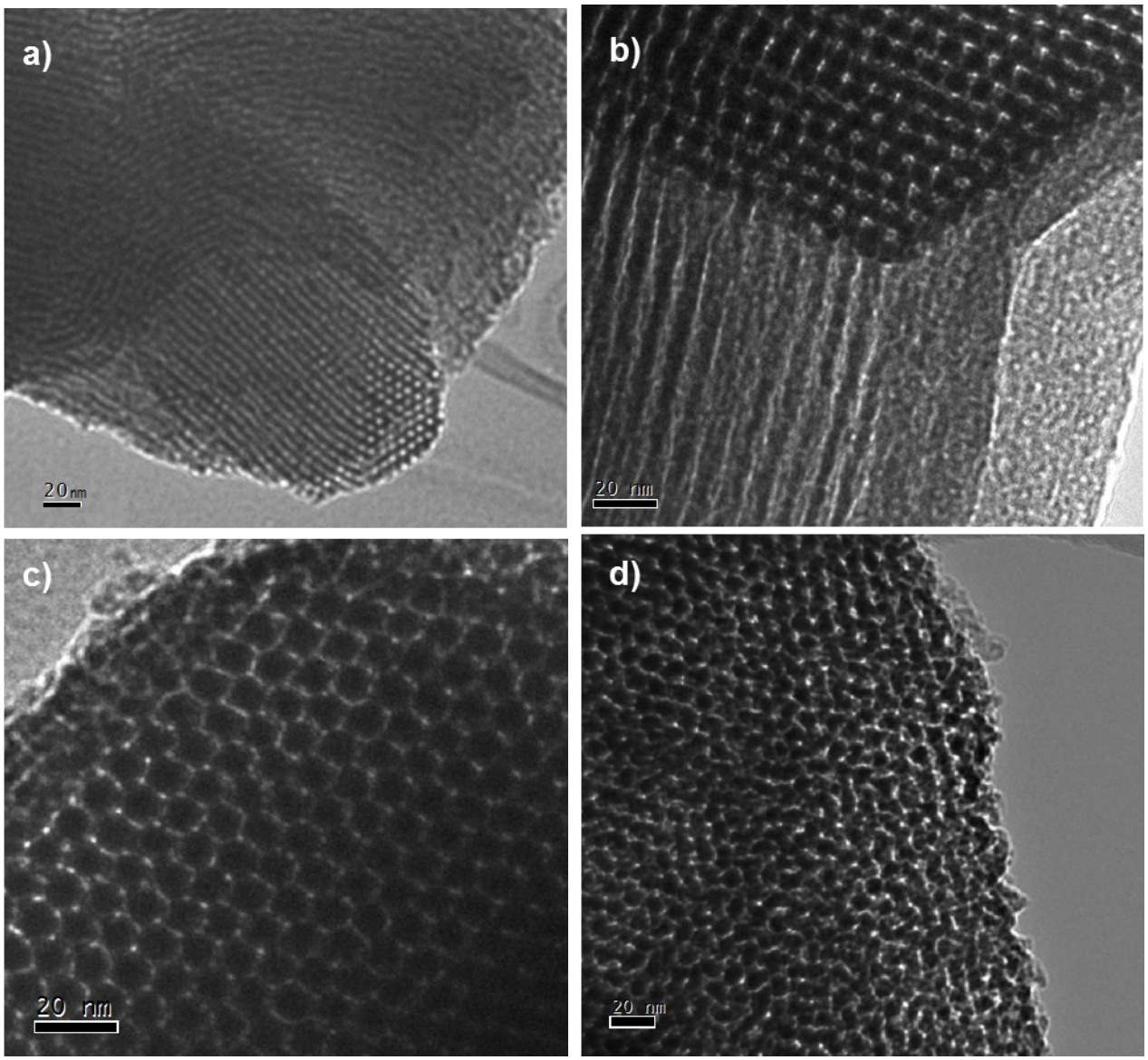

Figure S4. Transmission electron microscope images of the synthesized mesoporous catalysts: (a) SBA-15, (b) [Al]-SBA-15 (Si/Al = 114), (c) [Al]-SBA-15 (Si/Al = 73), (d) [Al]-SBA-15 (Si/Al = 23).

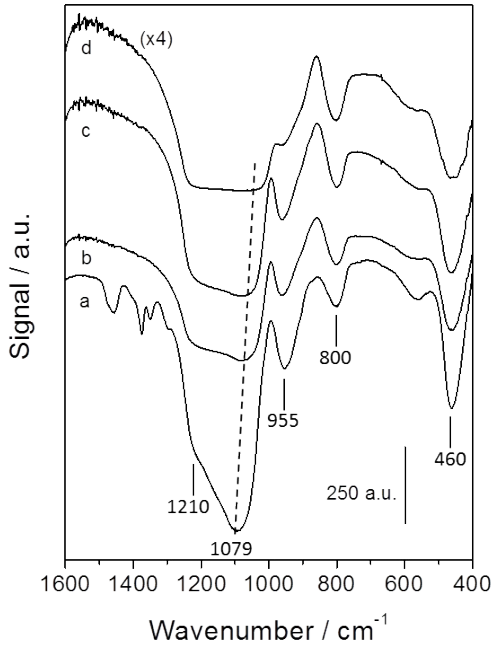

Figure S5. FTIR spectra of the synthesized mesoporous catalysts: (a) [Al]-SBA-15 (Si/Al = 23), (b) [Al]-SBA-15 (Si/Al = 73), (c) [Al]-SBA-15 (Si/Al = 114), (d) SBA-15.

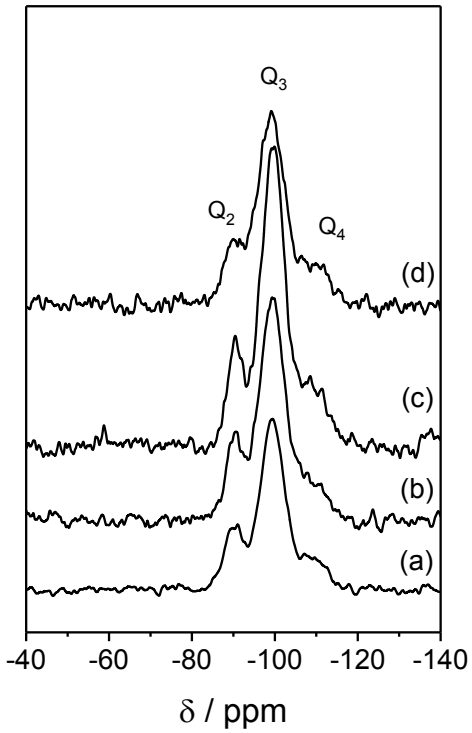

Figure S6. ^{29}Si CP-NMR spectra of the synthesized mesoporous catalysts: (a) [Al]-SBA-15 (Si/Al = 23), (b) [Al]-SBA-15 (Si/Al = 73), (c) [Al]-SBA-15 (Si/Al = 114), (d) SBA-15.

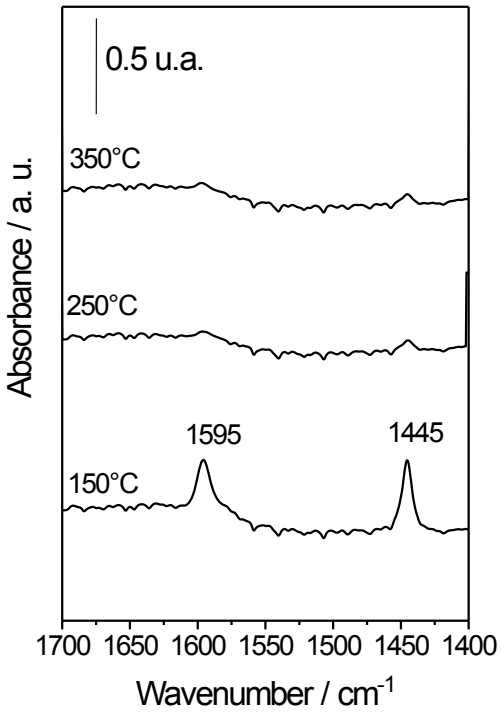

Figure S7. FTIR spectra of adsorbed pyridine on siliceous SBA-15 at (a) 150 ^{o}C, (b) 250 ^{o}C, (c) 350 ^{o}C.

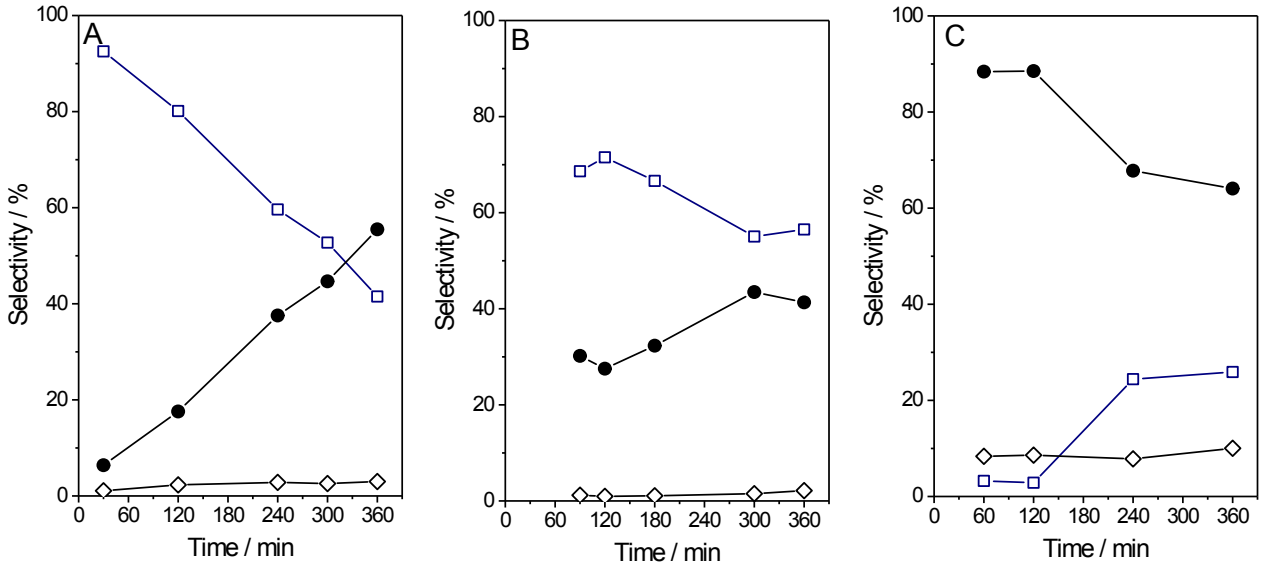

Figure S8. Selectivities to xylulose (□), furfuryl alcohol (●) and furfural (◊) on synthesized mesoporous catalysts: (a) [Al]-SBA-15 (Si/Al = 114), (b) [Al]-SBA-15 (Si/Al = 73), (c) [Al]-SBA-15 (Si/Al = 23). Reaction conditions: 130 ^{o}C, 30 bar (N_2), water:2-propanol 1:1, xylose solution at 83 mmol L^{-1}.

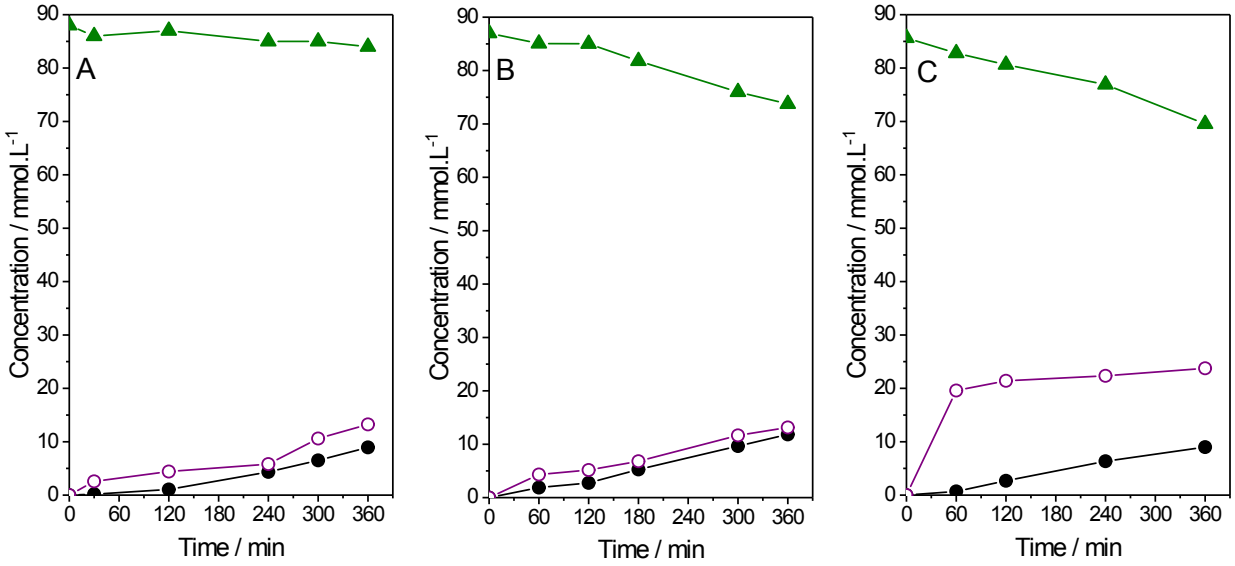

Figure S9. Concentration curves of pentoses (▲), furfuryl alcohol (●) and acetone (○) on synthesized mesoporous catalysts: (a) [Al]-SBA-15 (Si/Al = 114), (b) [Al]-SBA-15 (Si/Al = 73), (c) [Al]-SBA-15 (Si/Al = 23). Reaction conditions: 130 ^{o}C, 30 bar (N_2), water:2-propanol 1:1, xylose solution at 83 mmol L^{-1}.

Table S1. Reaction temperature (T), catalyst amount (m_{cat}), total reaction time (t), xylose conversion (X_{xylose}) and selectivity to xylulose (S_{xylu}), furfuryl alcohol (S_{FFA}) and furfural (S_{FF}) using [Al]-SBA-15 (Si/Al = 23).

Entry	T (°C)	m_{cat} (g)	t (h)	X_{Xylose} (%)	S_{Xylu} (%)	S_{FFA} (%)	S_{FF} (%)
1	130	0.25	6	25	24	41	1
2	130	0.50	6	29	24	47	6
3	150	0.25	6	72	7	18	12
4	130	0.25	24	45	13	44	13