Electronic Supplementary Information

KLTL-MCM-41 micro-mesoporous composite as solid base for the hydrogenation of sugars

Authors: Nilesh P. Tangale, Prashant S. Niphadkar, Praphulla N. Joshi, Paresh L. Dhepe*§

*Catalysis & Inorganic Chemistry Division,

CSIR-National Chemical Laboratory,

Dr. Homi Bhabha Road, Pashan, Pune 411008, INDIA

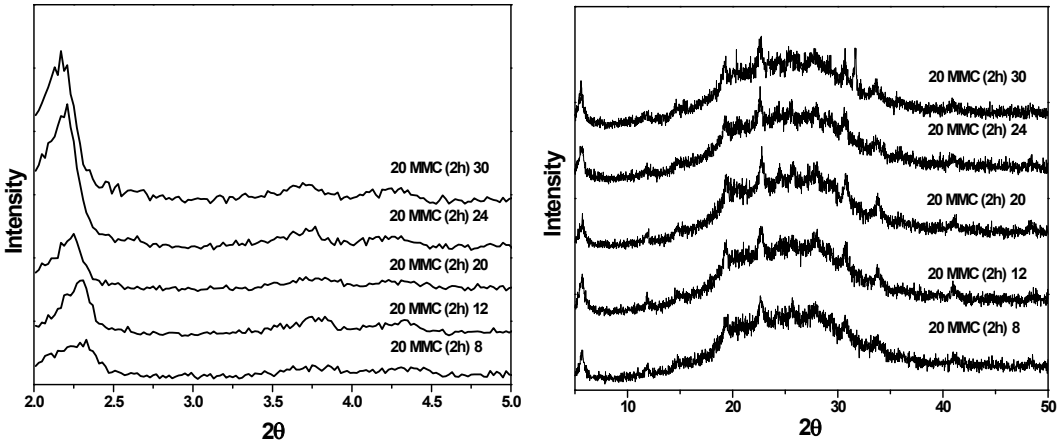
§Academy of Scientific and Innovative Research (AcSIR), New Delhi, India.

a) Optimization of KLTL-MCM-41 micro-mesoporous composite synthesis conditions

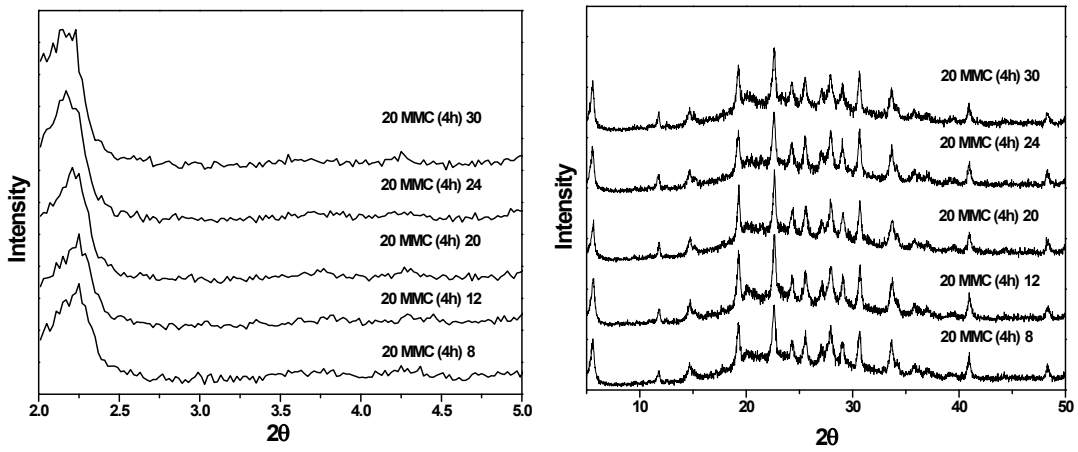
Fig. S1 Optimization of crystallization time for the synthesis of 20 MMC

Designations: 20 MMC (crystallization time for microphase) crystallization time for mesophase

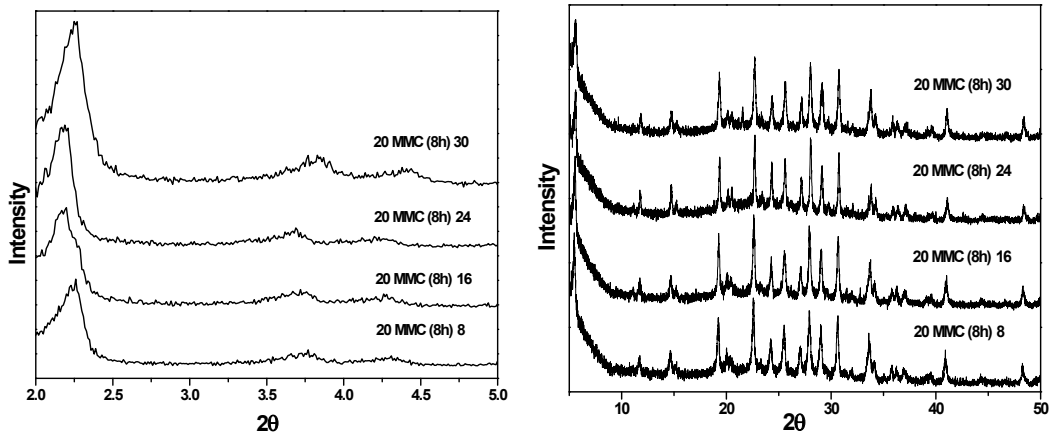
A) 20 MMC synthesized with 2h crystallization of KLTL zeolite



B) 20 MMC synthesized with 4h crystallization of KLTL zeolite



C) 20 MMC synthesized with 8h crystallization of KLTL zeolite



b) UV absorbance spectra of xylose

UV-Vis analysis of aqueous solution of xylose in presence of solid base was performed to check the possibility of ring chain opening phenomenon of xylose in alkaline media. The sugar solution A was prepared by dissolving of 0.2 g of xylose in 10 mL millipore water (pH =6.23). Another solution B was prepared by the mixing of 0.2 g of xylose and 0.1 g base in 10 mL millipore water (pH = 9.52). Finally, sugar solutions were subjected for UV-Vis analysis and the UV-Vis spectra is shown in Fig. S2.

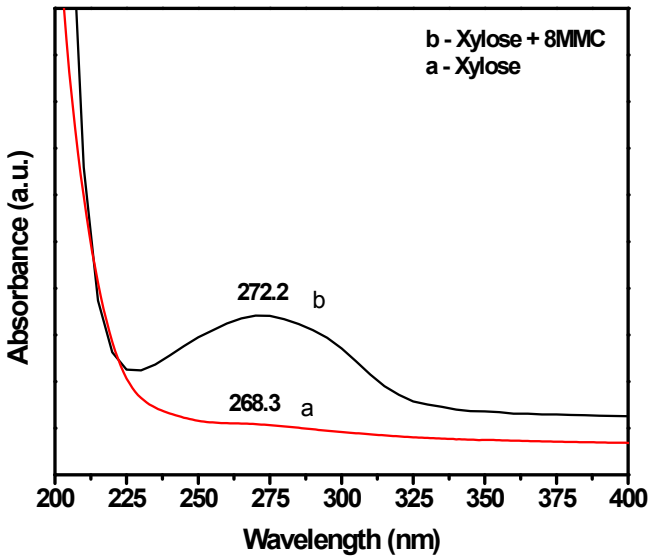


Fig. S2 UV absorbance spectra of xylose

c) Pyridine-IR of micro-mesoporous composites

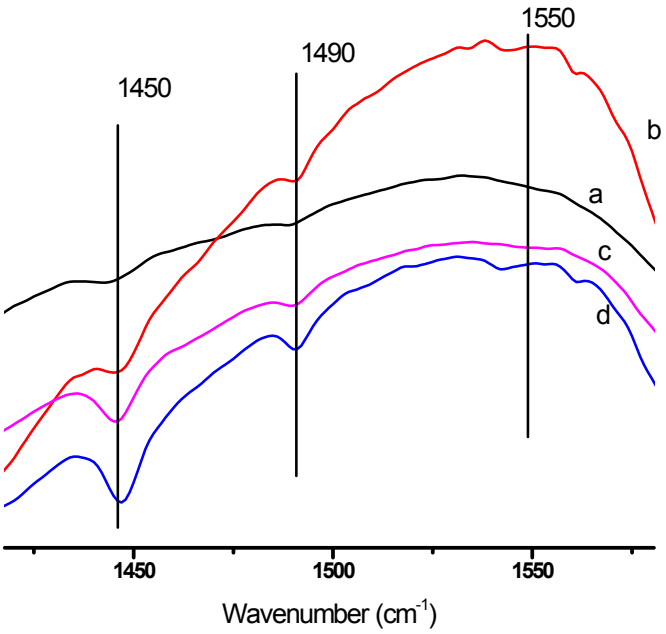


Fig. S3 Pyridine-IR of micro-mesoporous composites, a) 20 MMC, b) 15 MMC, c) 10 MMC, and d) 8 MMC

d) Characterization of Catalyst

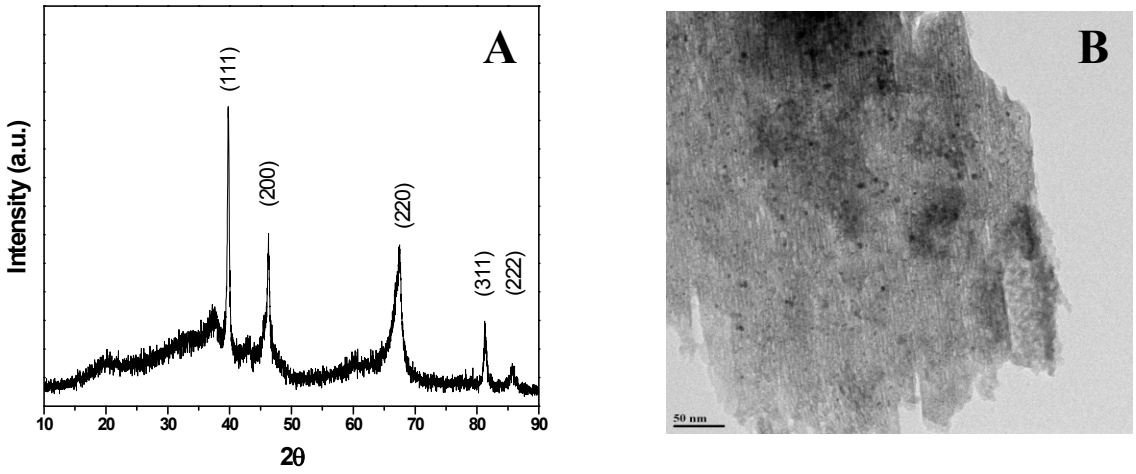


Fig. S4 PXRD pattern (A) and TEM (B) image of 3.5 *wt*% Pt loaded Al_2O_3 catalyst

d) Study of reaction parameters

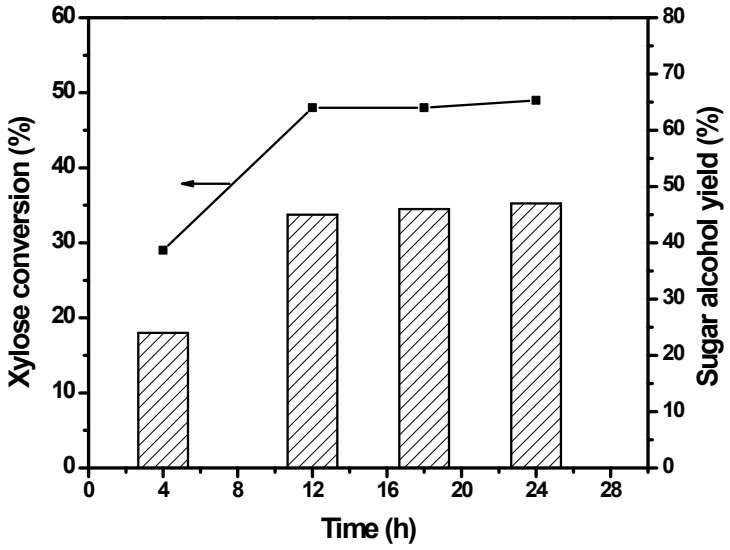


Fig. S5 Effect of time over 3.5 *wt*% Pt/γ-Al_2O_3 catalyst and 8MMC micro-mesoporous composites as solid bases

(Reaction conditions: xylose 0.5g, catalyst 0.075g, solid base 0.075g, water 35mL, temperature 60 ^oC, 16 bar H_2 pressure at R.T.)

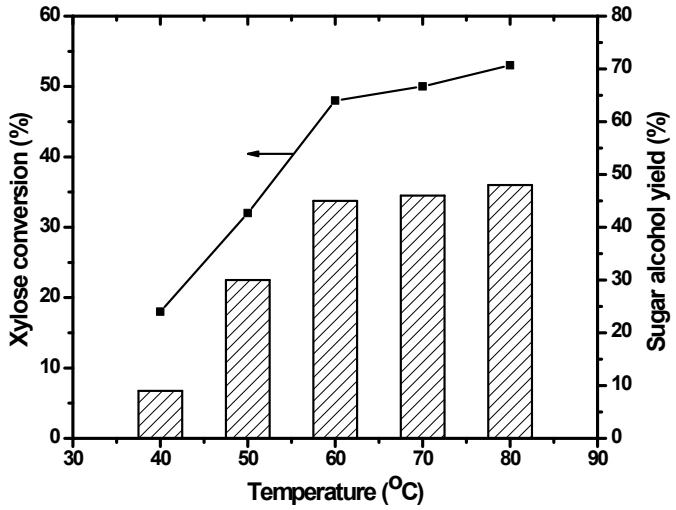


Fig. S6 Effect of reaction temperature over 3.5 *wt*% Pt/γ-Al_2O_3 catalyst and 8MMC micro-mesoporous composites as solid bases, (Reaction conditions: xylose 0.5g, catalyst 0.075g, solid base 0.075g, water 35mL, time 12h, 16 bar H_2 pressure at R.T.)

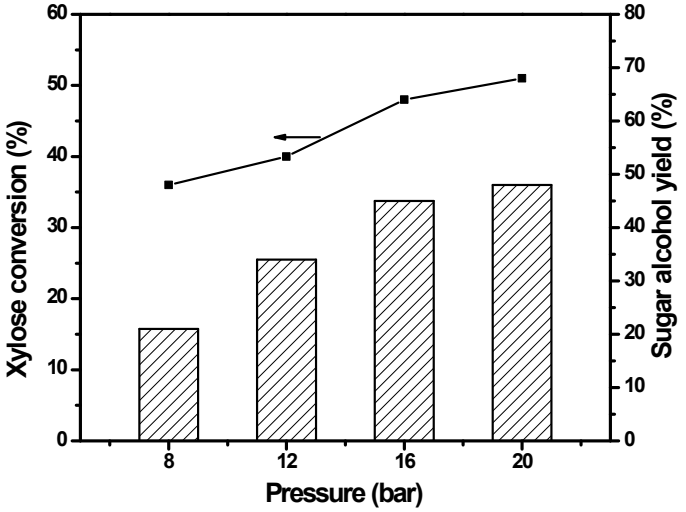


Fig. S7 Effect of hydrogen pressure over 3.5 *wt*% Pt/γ-Al_2O_3 catalyst and 8MMC micro-mesoporous composites as solid bases

(Reaction conditions: xylose 0.5g, catalyst 0.075g, solid base 0.075g, water 35mL, time 12h, 16 bar H_2 pressure at R.T.)