

Electronic Supporting Information (ESI)

Hierarchically porous titanium phosphate nanoparticles: an efficient solid acid catalyst for microwave assisted conversion of biomass and carbohydrates into 5-hydroxymethylfurfural

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Table S1. Recyclability study of MTiP-1 catalyst for fructose dehydration reactions.

Entry	Substrate, mg	Catalyst, mg	HMF Yield (%)
1	Fructose, 50	MTiP-1, 25	43
2	Fructose, 50	recovered	40
3	Fructose, 50	recovered	38
4	Fructose, 50	recovered	36
5	Fructose, 50	recovered	35

Reaction conditions: fructose = 50 mg, MTiP-1 = 25 mg,

DMA-LiCl = 2 g, $T = 140\text{ }^{\circ}\text{C}$, $t = 5\text{ min}$ and MI = 300W.

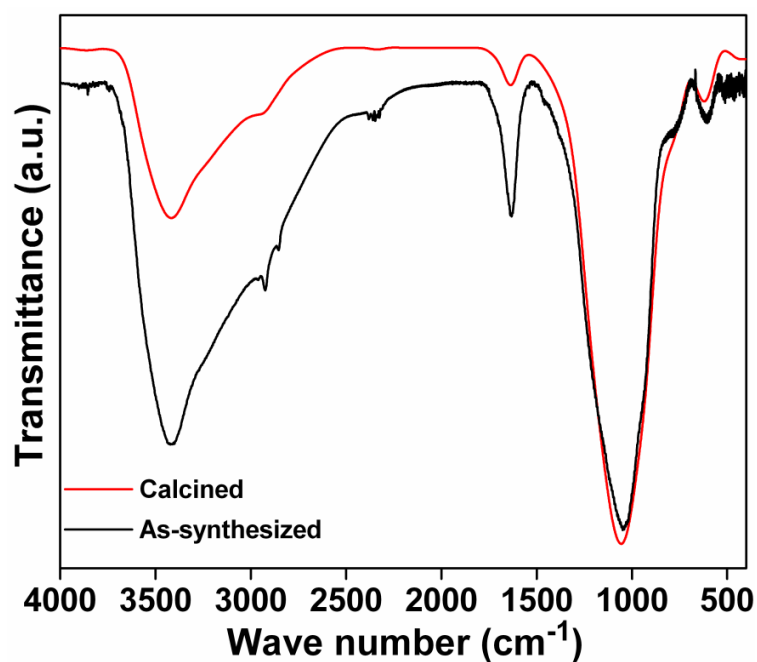
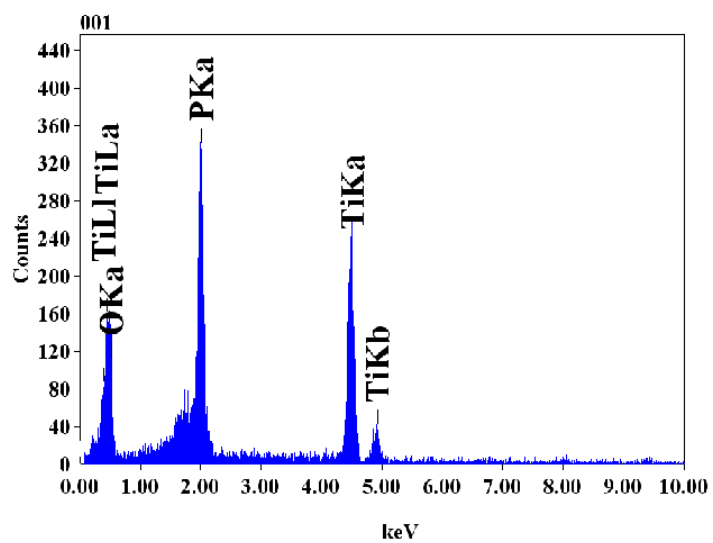


Figure S1. FT-IR spectra of calcined and as-synthesized material.



Ele...	Cl...	(keV)	mass%	Error%	At%
O K*		0.525	50.02	1.53	70.69
P K		2.013	22.14	0.26	16.17
Ti K		4.508	27.84	0.39	13.14
Total			100.00		100.00

Figure S2. Energy dispersive spectrum (EDS) of MTiP-1.

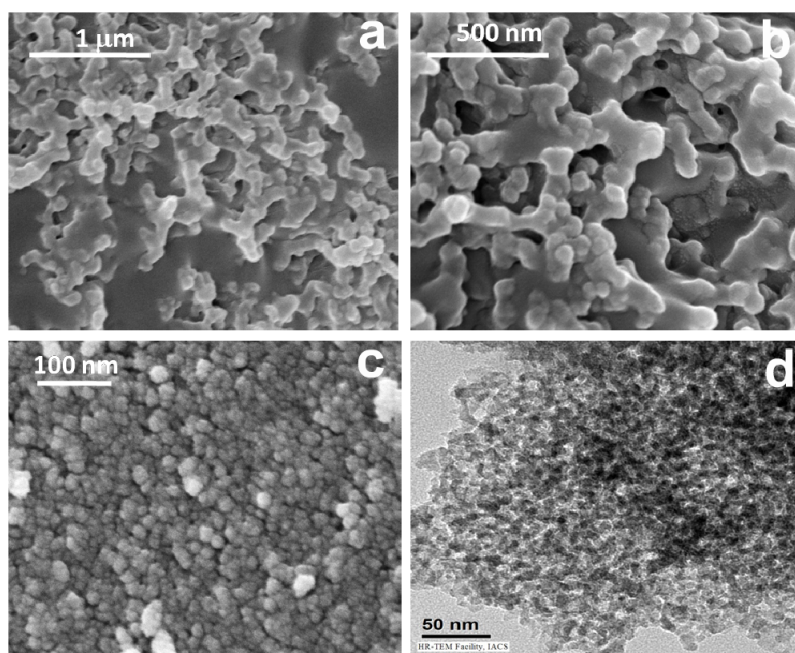


Figure S3. SEM and TEM images of MTiP-1 material.

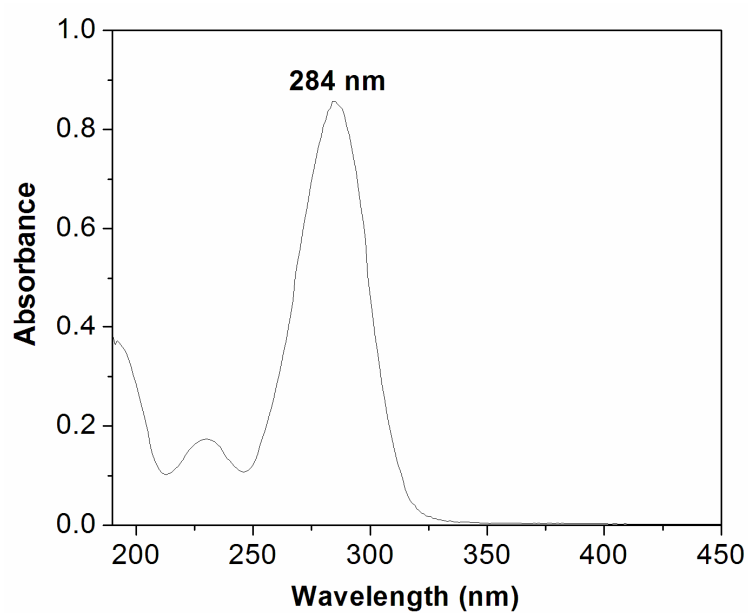


Figure S4. Representative UV-Vis spectrum of HMF product obtained from dehydration reaction of fructose with MTiP-1 catalyst.

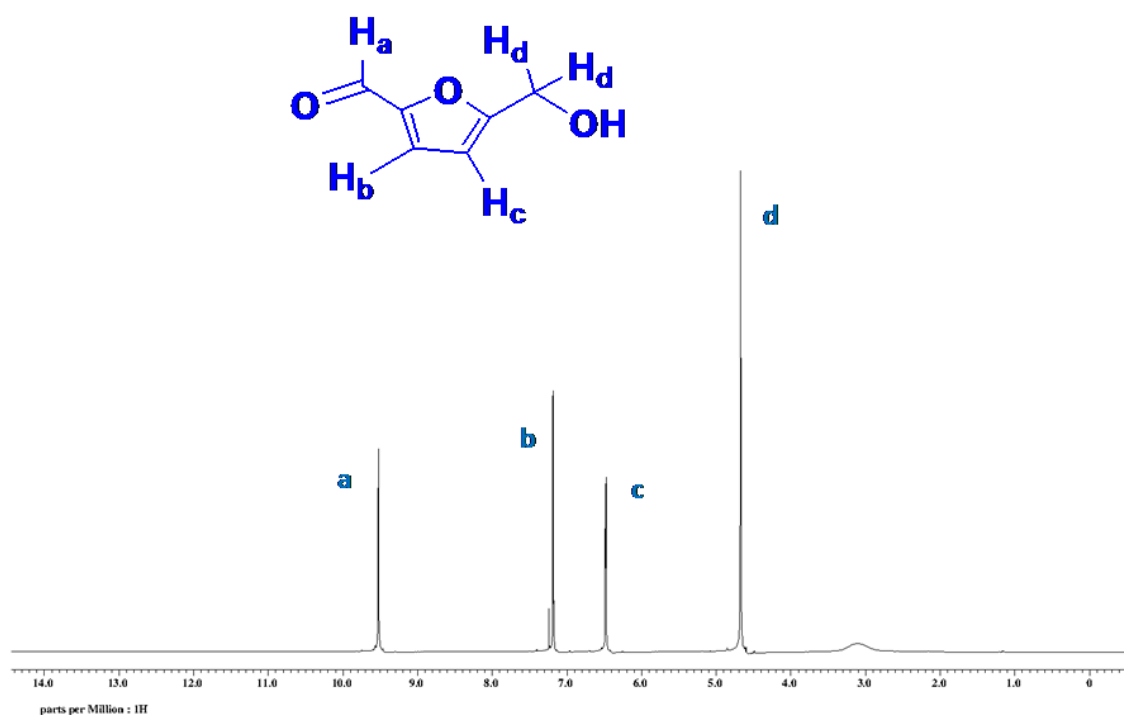


Fig. S5. ¹H NMR spectra (CDCl₃) of isolated HMF product extracted with diethyl ether from the reaction mixture.

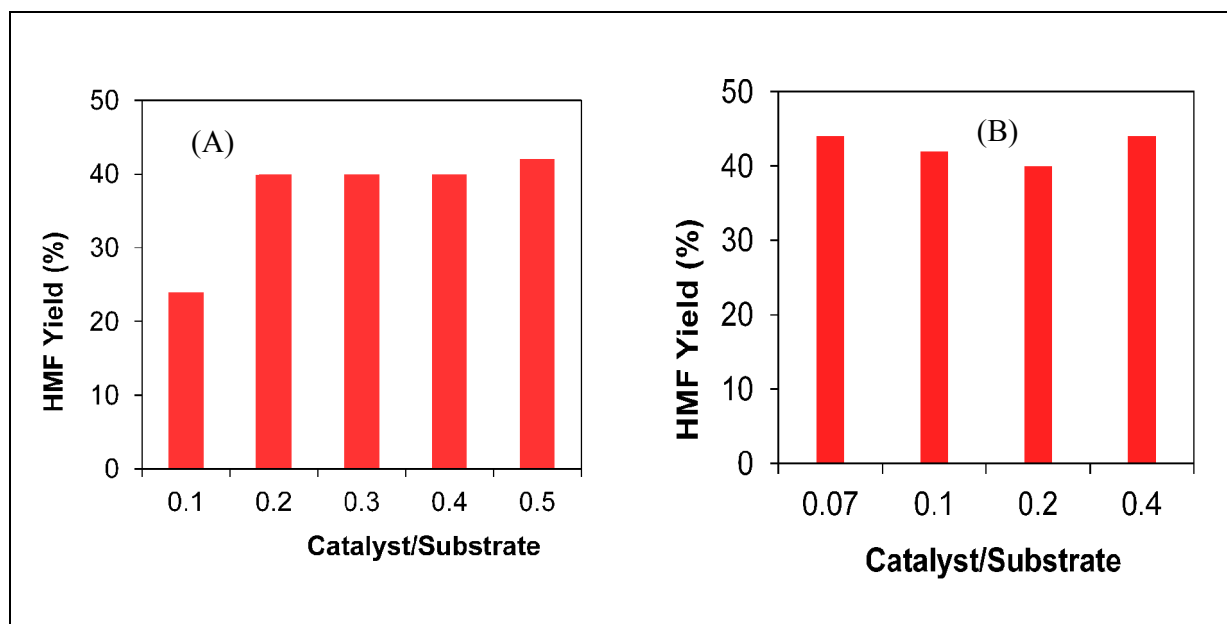


Fig. S6. Plot of HMF yields as a function of catalyst/substrate for dehydration of fructose with MTiP-1 catalyst under the condition of (A) catalyst variation and (B) fructose variation.

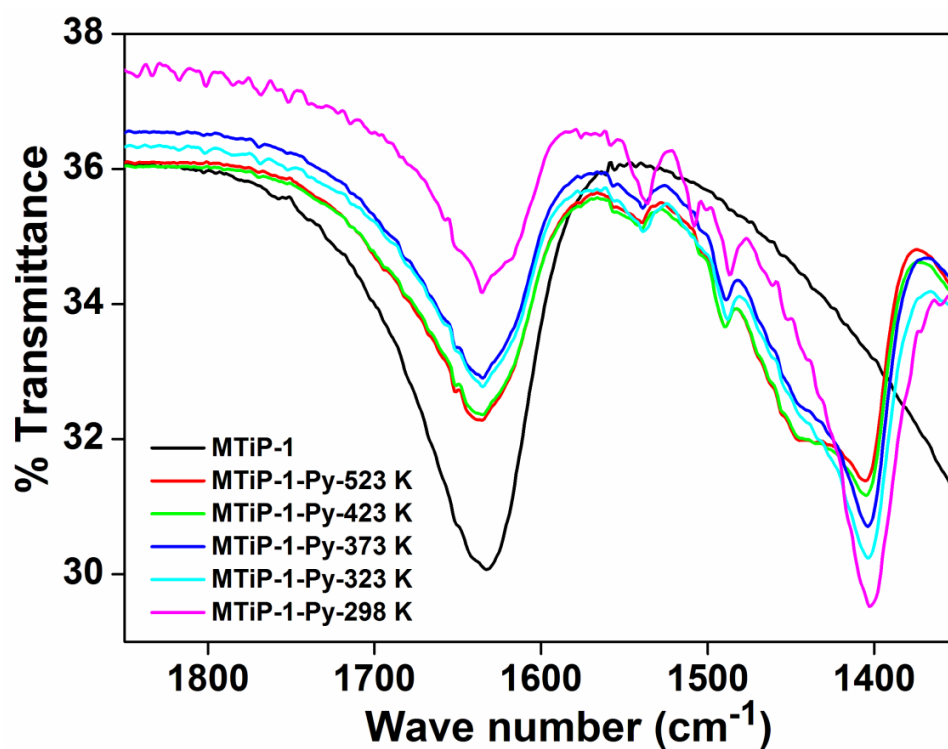


Fig. S7. FT-IR spectra of pyridine adsorbed MTiP-1 at different temperatures.