

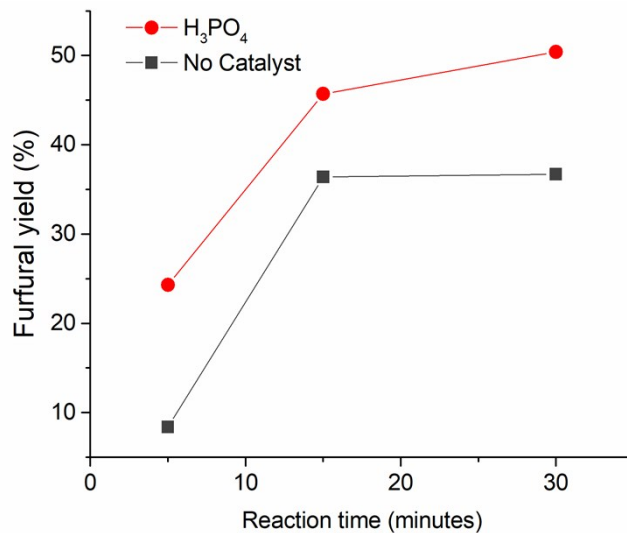
Supporting Information

# Solvent basicity controlled deformylation for the formation of furfural from glucose and fructose

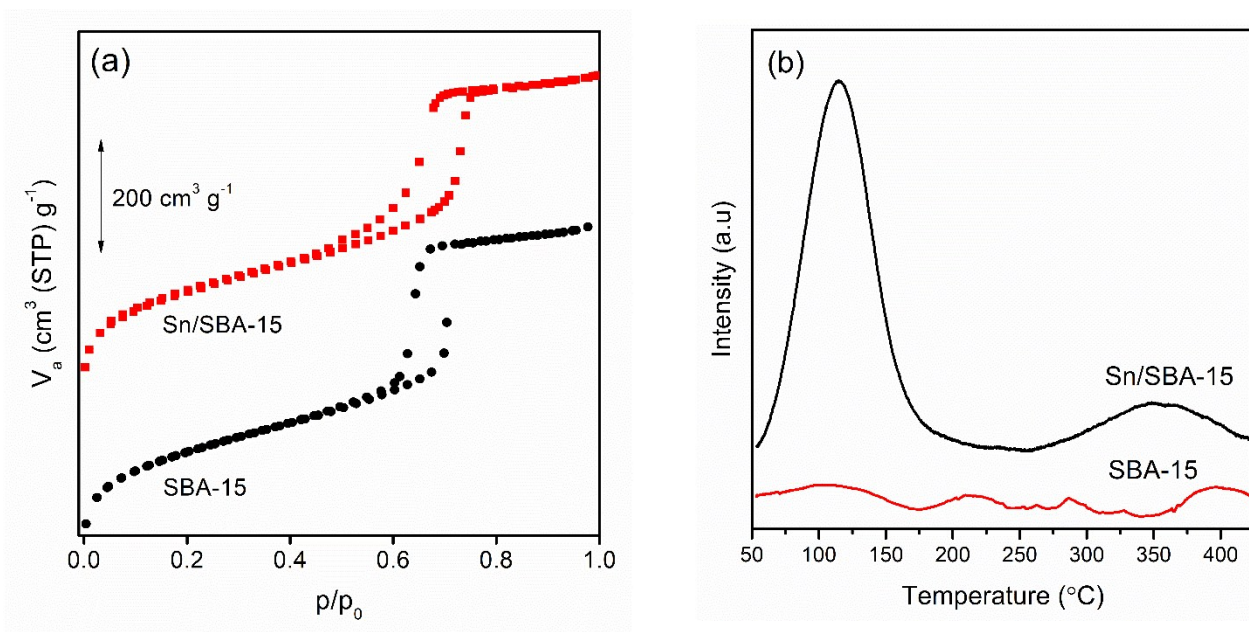
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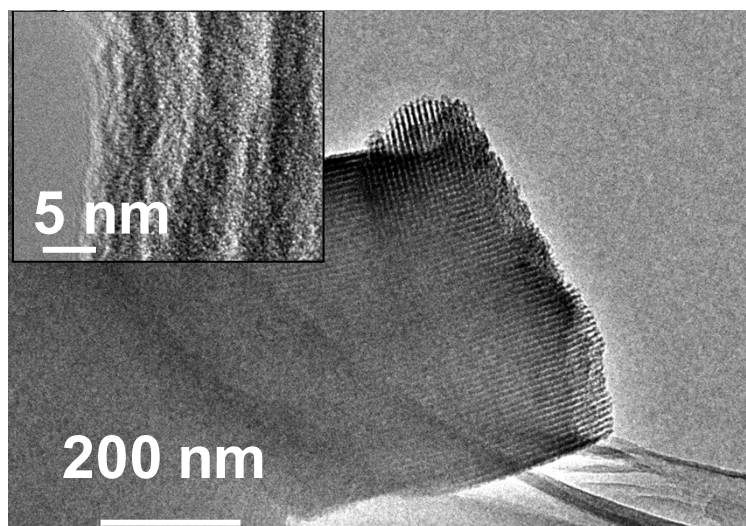
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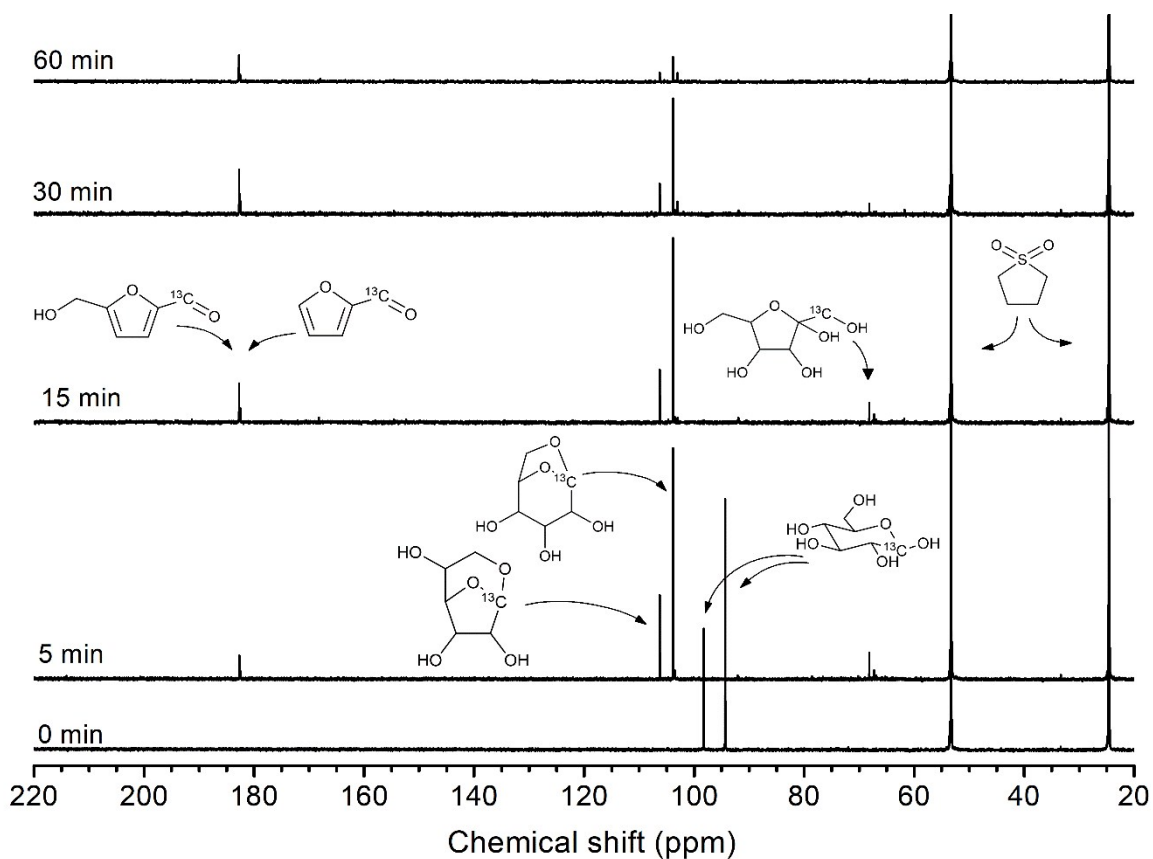
**Figure S1:** Comparison of initial furfural yield in the presence and absence of  $\text{H}_3\text{PO}_4$  catalyst. Reaction condition: Fructose 0.22 mmol, 5 mL sulfolane with or without  $\text{H}_3\text{PO}_4$  (1.5 mM), 160 °C.



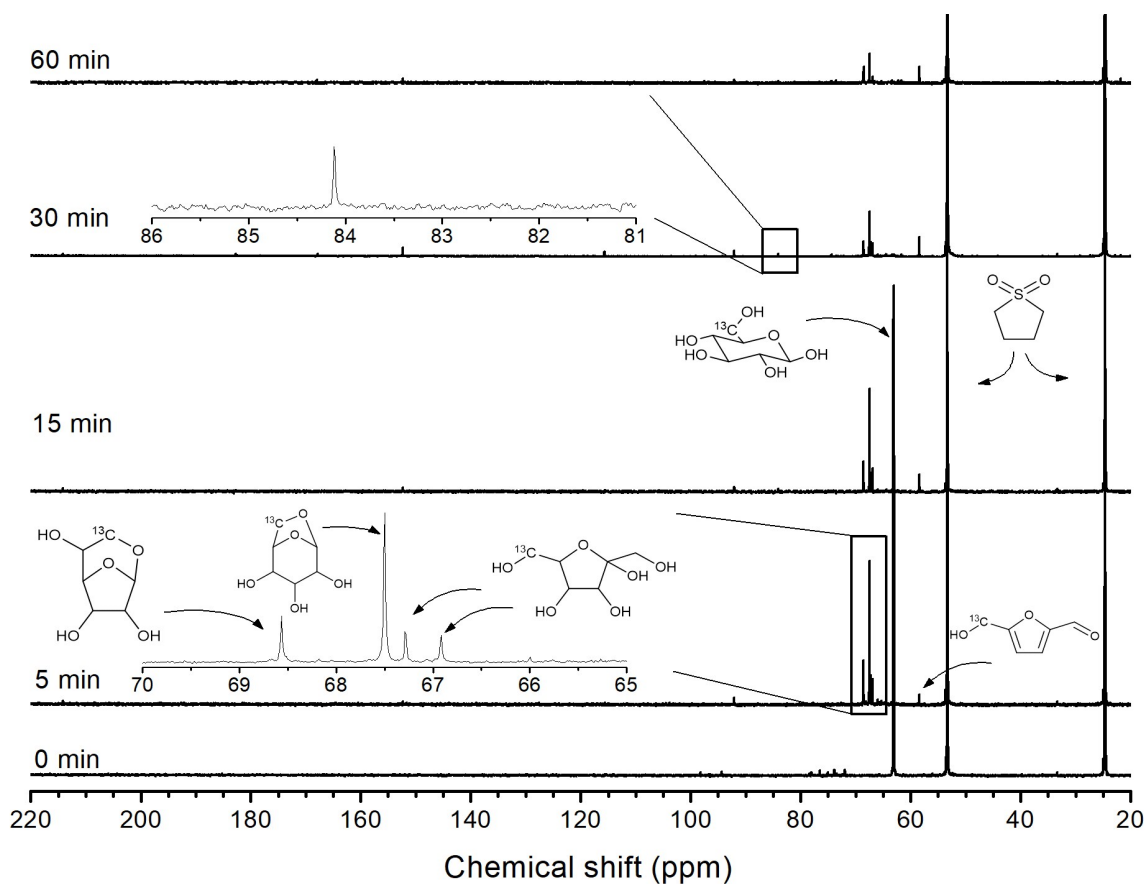
**Figure S2:**  $\text{N}_2$  adsorption isotherms (a) and  $\text{NH}_3$  TPD spectra (b) for SBA-15 support and Sn/SBA-15 catalyst.



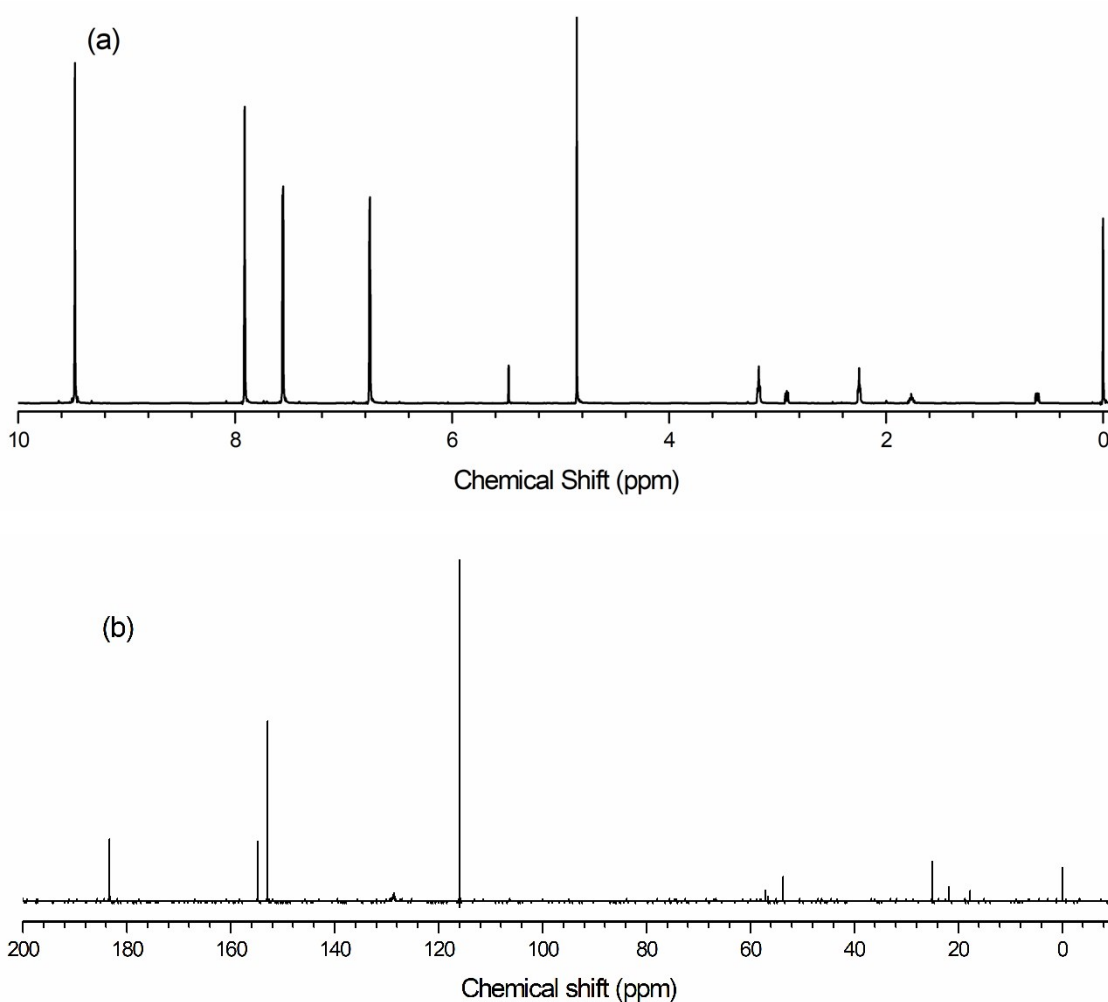
**Figure S3:** TEM images of Sn/SBA-15 catalyst containing 1 wt.% Sn. Tin nanoparticles were not visible even at high magnification.



**Figure S4:**  $^{13}\text{C}$  NMR of product mixture at different reaction time using  $^{13}\text{C}$ -1 labelled glucose. Reaction condition:  $^{13}\text{C}$ -1 labelled glucose 0.22 mmol, Sn/SBA-15 catalyst 20 mg, 5 mL sulfolane, 160 °C.



**Figure S5:**  $^{13}\text{C}$  NMR of product mixture at different reaction time using  $^{13}\text{C}$ -6 labelled glucose. Reaction condition:  $^{13}\text{C}$ -6 labelled glucose 0.22 mmol, Sn/SBA-15 catalyst 20 mg, 5 mL sulfolane, 160  $^{\circ}\text{C}$ . Inset of 5 min spectrum shows peaks for fructose, levoglucosan and anhydroglucofuranose. Inset of 30 min spectrum shows a peak for formaldehyde at 84.1 ppm.



**Figure S6:**  $^1\text{H}$  NMR (a) and  $^{13}\text{C}$  NMR (b) of product obtained after work up of reaction mixture. 60 mg product was dissolved in 1 mL of  $\text{D}_2\text{O}$  containing 5 mg  $\text{mL}^{-1}$  of sodium trimethylsilylpropanesulfonate (DSS) as reference and internal standard.

#### NMR Resonances:

Furfural:  $^1\text{H}$  NMR ( $\text{D}_2\text{O}$ )  $\delta$  9.48 (s, 1H, HCO),  $\delta$  7.91 (s, 1H, HCO),  $\delta$  7.56 (d, 1H, CH),  $\delta$  6.76 (m, 1H, CH).  $^{13}\text{C}$  NMR ( $\text{D}_2\text{O}$ )  $\delta$  183.4, 154.8, 152.9, 128.6, 116.0

Sulfolane:  $^1\text{H}$  NMR ( $\text{D}_2\text{O}$ )  $\delta$  3.17 (m, 4H,  $\text{CH}_2\text{SO}_2$ ),  $\delta$  2.25 (m, 4H,  $\text{CH}_2$ ).  $^{13}\text{C}$  NMR ( $\text{D}_2\text{O}$ )  $\delta$  53.7, 25.0

Unidentified:  $^1\text{H}$  NMR ( $\text{D}_2\text{O}$ )  $\delta$  5.48 (s).  $^{13}\text{C}$  NMR ( $\text{D}_2\text{O}$ )  $\delta$  56.6