Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supporting information

Influence of pore topology on synthesis and reactivity of Sn-modified zeolite catalysts for carbohydrate conversions

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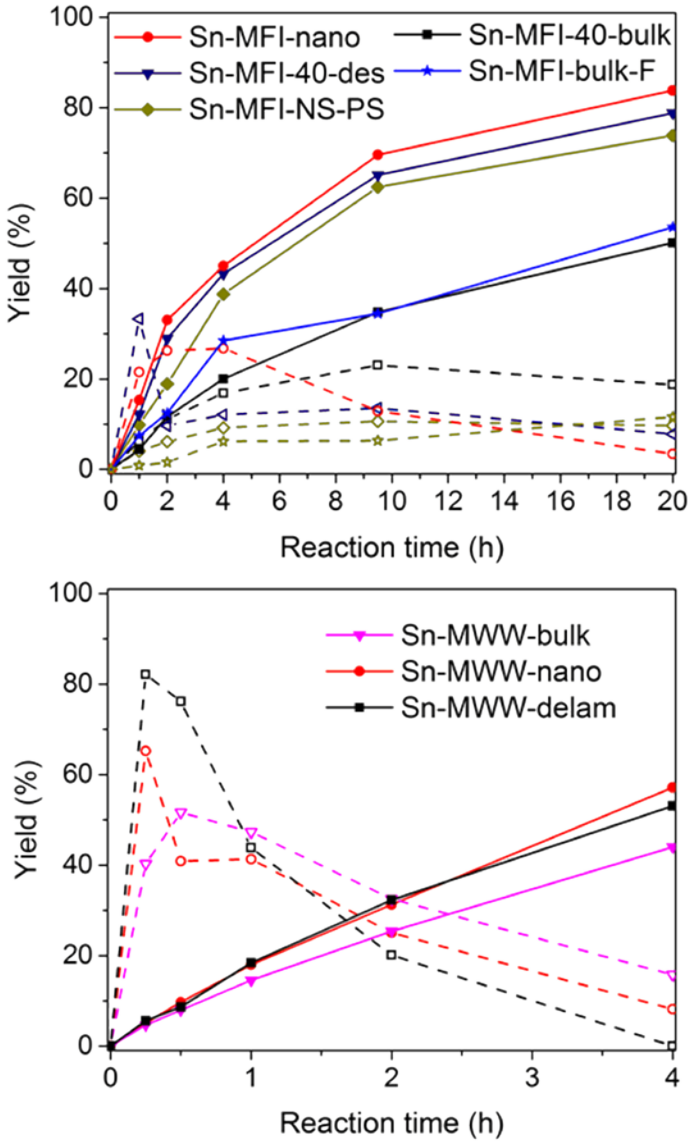

Figure S1: *Product distribution in the conversion of DHA to methyl lactate (solid lines) and HMP (dashed lines) for a) Sn-MFI and b) Sn-MWW materials.*

Fig. S1 shows the ML and HMP yields as a function of the reaction time for Sn-MWW and Sn-MFI zeolites. It is seen that HMP is a reaction intermediate. High HMP yields up to 82% were observed for Sn-MWW. The highest HMP yield was obtained for Sn-MWW-delam. The maximum HMP yields were much lower for the Sn-MFI zeolites. For Sn-MOR-bulk and Sn-MOR-nano, HMP was the predominant product and only very small amounts of ML were observed.

Whereas it was found that the HMP yield for Sn-MFI and Sn-MWW zeolites passes through a maximum as a function of reaction time, HMP was not further converted over the Sn-MOR-bulk, Sn-MOR-nano, Sn-MFI-bulk-F and Sn-MFI-NS zeolite samples. The difference is due to the presence of Brønsted acid sites in the Sn-MFI and Sn-MWW samples, which can catalyze the hydrolysis of the ether bonds in HMP to form glyceraldehyde.

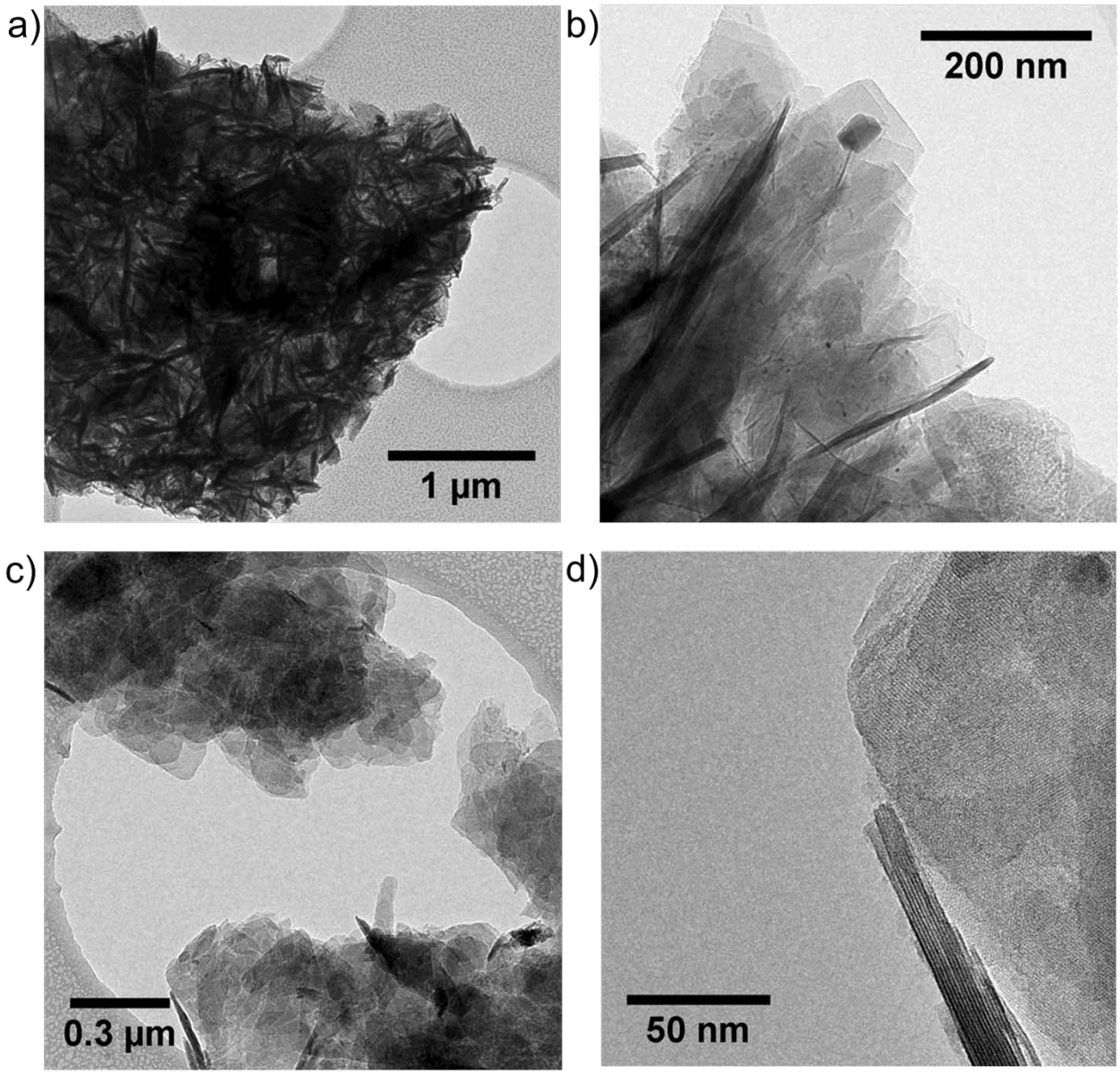

Figure S2: *TEM images of Sn-MWW-nano (a,b) and Sn-MWW-delam (c,d).*

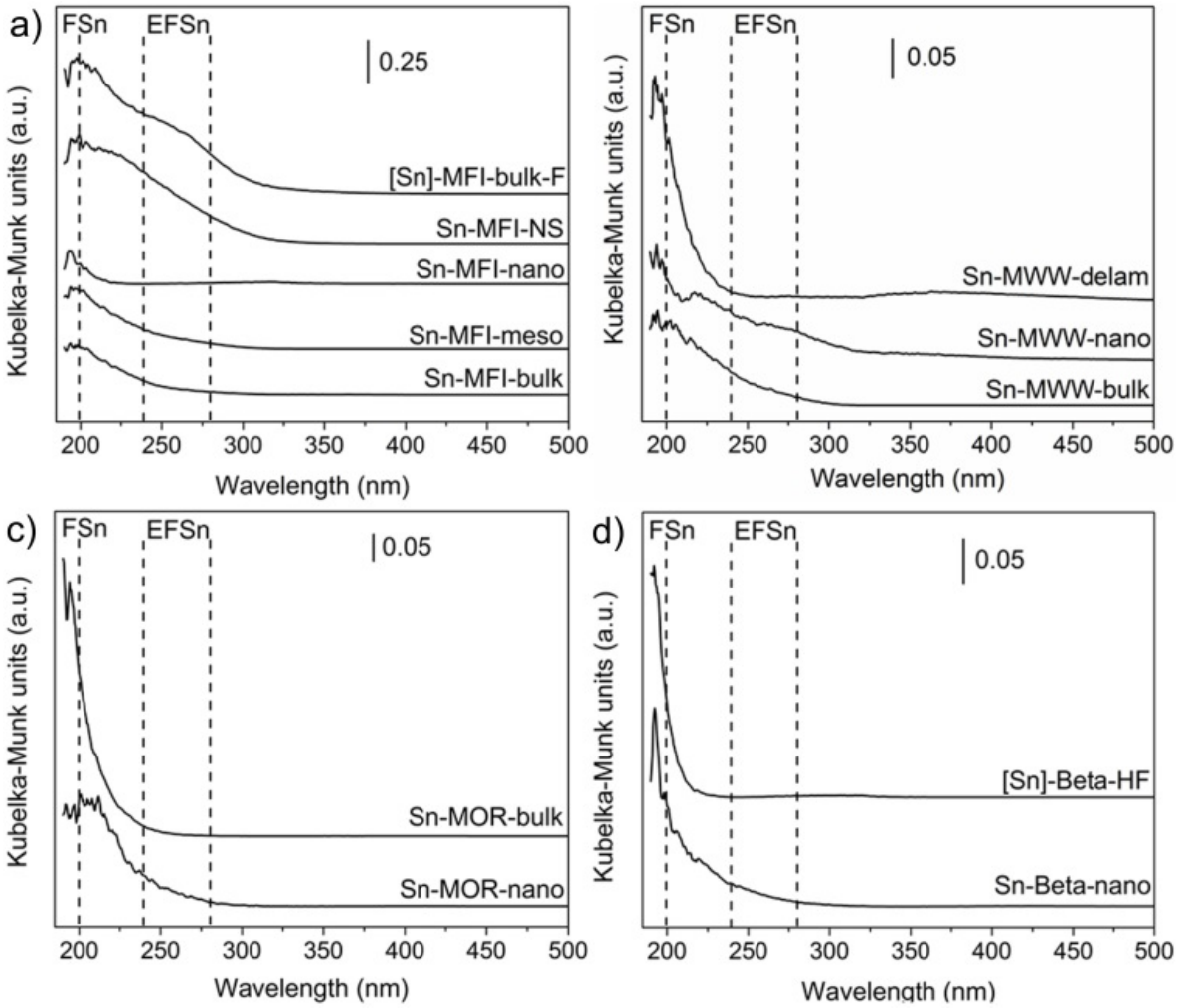

Figure S3: *Diffuse reflectance UV-Vis spectra of a) Sn-MFI, b) Sn-MWW, c) Sn-MOR and d) Sn-Beta materials. Bands assigned to framework and extraframework (EFSn) Sn species are denoted with FSn and EFSn, respectively, and indicated with vertical dashed lines.*

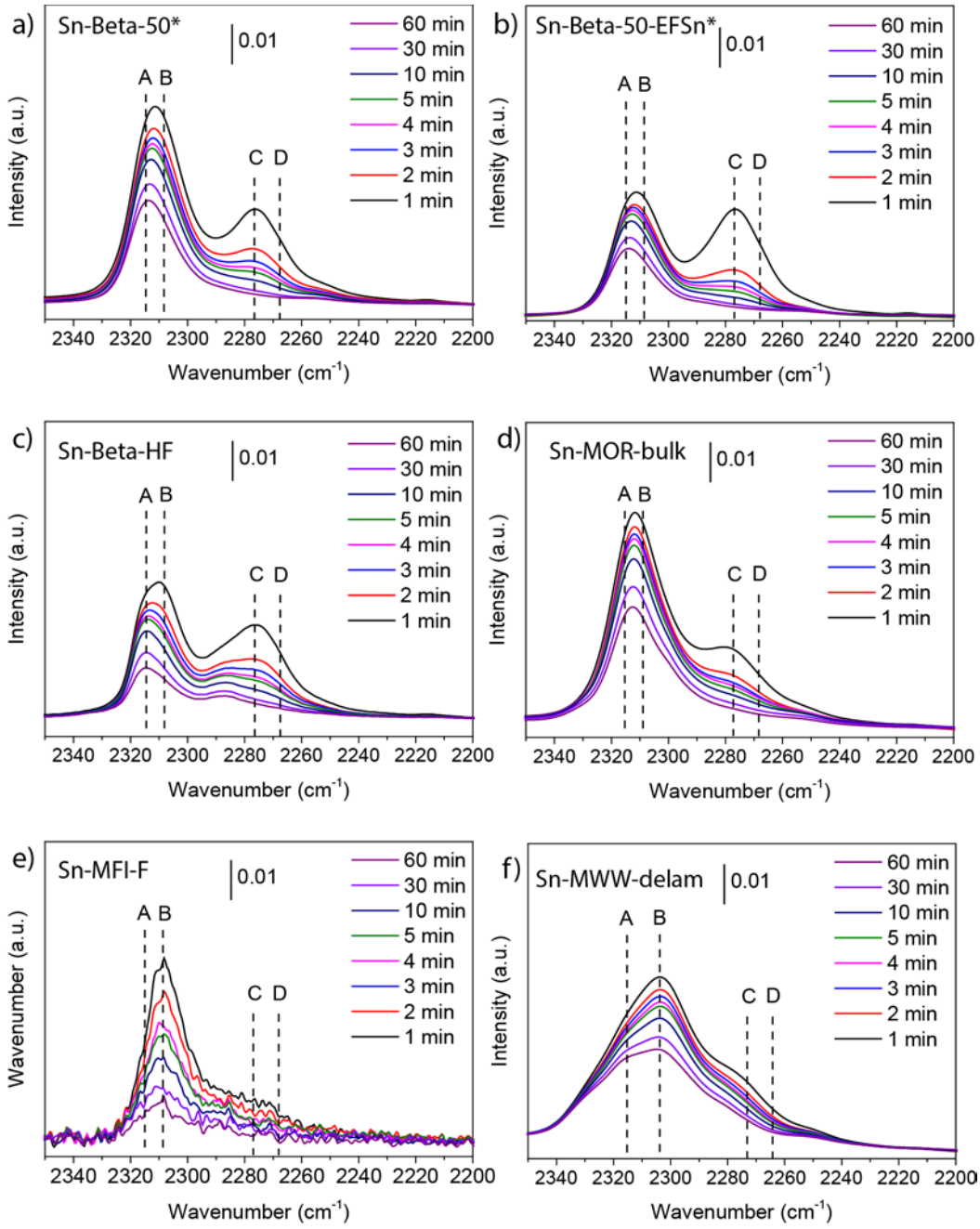

Figure S4*: FT-IR spectra of s) Sn-Beta-50*, b) Sn-Beta-50-EFSn*, c) [Sn]-Beta-HF, d) Sn-MOR-bulk, e) [Sn]-MFI-F and f) Sn-MWW-delam after adsorption and desorption of CD_3CN for 1,2,3,4,5,10, 30 and 60 minutes in vacuo at room temperature. The spectra were normalized by weight and Sn-content. The characteristic bands due to CD3CN adsorbed on (A) open FSn, (B) closed FSn, (C) silanol groups and (D) physisorbed on the zeolite surface are indicated in the spectra.*

Sn-Beta-50: 5.1 wt% Sn (no extraframework Sn sites), Sn-Beta-50-EFSn with extraframework Sn-sites, 5.9 wt% Sn. Prepared according to W.N.P. van der Graaff, G. Li, B. Mezari, E.A. Pidko, E.J.M. Hensen, ChemCatChem, 2015, 7, 1152–1160.