

## Electronic Supplementary Information (ESI)

### Deactivation mechanisms of tin-zeolites in biomass conversions

Giacomo M. Lari, Pierre Y. Dapsens, David Scholz, Sharon Mitchell, Cecilia Mondelli\*  
and Javier Pérez-Ramírez\*

*Institute for Chemical and Bioengineering, Department of Chemistry and Applied Biosciences, ETH Zurich, Vladimir-Prelog-Weg 1, CH-8093 Zurich, Switzerland. Fax: +41 44 6331405 Tel: +41 44 6337120; E-mail: [cecilia.mondelli@chem.ethz.ch](mailto:cecilia.mondelli@chem.ethz.ch); [jpr@chem.ethz.ch](mailto:jpr@chem.ethz.ch)*

**Table S1.** Conversion and selectivity for the tin-containing zeolites in the continuous-flow conversion of DHA/H<sub>2</sub>O into LA after 1 h on stream.<sup>a</sup>

Catalyst	$X_{\text{DHA}}$ (%)	$S_{\text{LA}}$ (%)	$S_{\text{GAL}}$ (%)	$S_{\text{PAL}}$ (%)
[Sn]MFI-OH	47.8	82.7	7.0	5.5
[Sn]MFI-F	87.4	76.3	1.4	4.3
Sn-MFI	71.1	89.1	2.7	4.9
Sn-MOR	45.4	72.6	7.8	10.2
[Sn]BEA-F	41.4	55.0	10.3	18.8
Sn-BEA	44.3	75.8	8.4	9.5
Sn-FAU	30.0	30.1	13.5	29.0

<sup>a</sup> DHA: dihydroxyacetone, LA: lactic acid, GAL: glyceraldehyde, PAL: pyruvaldehyde.

**Table S2.** Conversion and selectivity for the tin-containing zeolites in the continuous-flow conversion of DHA/MeOH into ML after 1 h on stream.<sup>a</sup>

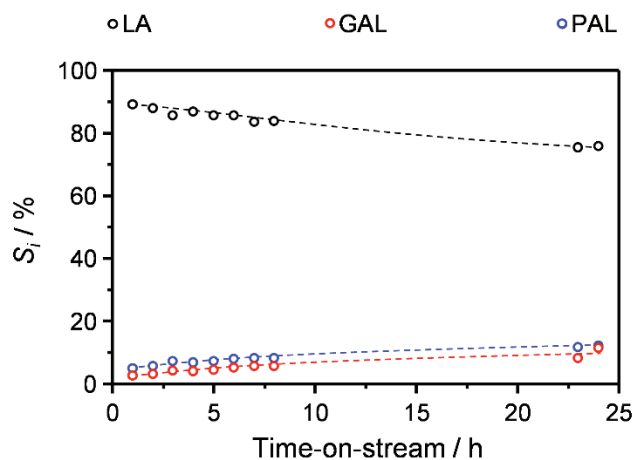
Catalyst	$X_{\text{DHA}}$ (%)	$S_{\text{ML}}$ (%)	$S_{\text{GAL}}$ (%)	$S_{\text{PAL}}$ (%)
[Sn]MFI-OH	42.0	65.3	25.4	15.2
[Sn]MFI-F	29.3	31.1	47.9	17.8
Sn-MFI	99.9	99.0	6.2	9.3
Sn-MFI <sup>b</sup>	87.2	90.1	9.1	6.7
Sn-MOR	79.5	31.1	2.6	38.1
[Sn]BEA-F	98.0	98.0	6.0	1.2
Sn-BEA	81.5	98.9	0.9	0
Sn-FAU	56.7	67.7	12.8	39.8

<sup>a</sup> DHA: dihydroxyacetone, ML: methyl lactate, GAL: glyceraldehyde, PAL: pyruvaldehyde. <sup>b</sup> Second use after a 24-h run and calcination at 823 K for 5 h.

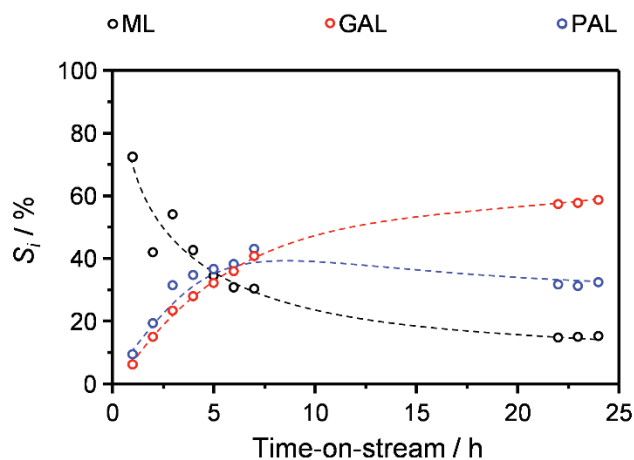
**Table S3.** Conversion and selectivity for the tin-containing zeolites in the continuous-flow conversion of XYLO/H<sub>2</sub>O into XYLU after 1 h on stream<sup>a</sup>

Catalyst	$X_{XYLO}$ (%)	$S_{XYLU}$ (%)	$S_{LYX}$ (%)
[Sn]MFI-OH	29.1	69.3	33.5
[Sn]MFI-F	17.0	64.5	37.1
Sn-MFI	23.5	75.9	29.4
Sn-MOR	42.7	77.1	27.9
[Sn]BEA-F	49.2	60.8	37.6
Sn-BEA	56.2	66.0	35.2
Sn-FAU	36.0	62.5	38.2

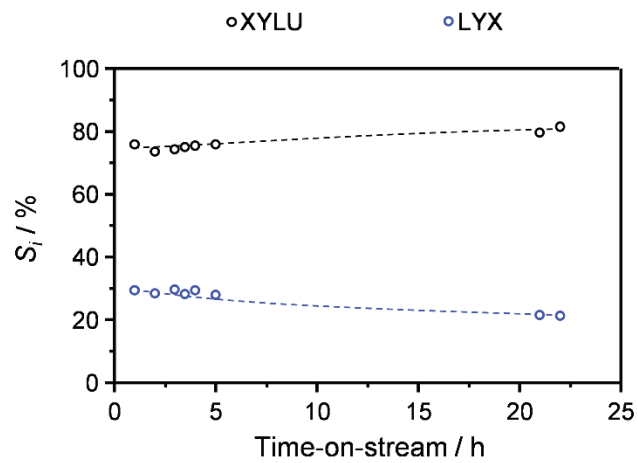
<sup>a</sup> XYLO: xylose, XYLU: xylulose, LYX: lyxose.



**Figure S1.** Evolution of the product selectivity during the continuous-flow conversion of DHA/H<sub>2</sub>O over Sn-MFI.



**Figure S2.** Evolution of the product selectivity during the continuous-flow conversion of DHA/MeOH over Sn-MFI.



**Figure S3.** Evolution of the product selectivity during the continuous-flow conversion of XYLO/H<sub>2</sub>O over Sn-MFI.