

## Electronic Supplementary Information

### Boosting reactivity of crystalline cellulose by a cold base treatment for catalytic hydrolysis with a carbon-based catalyst

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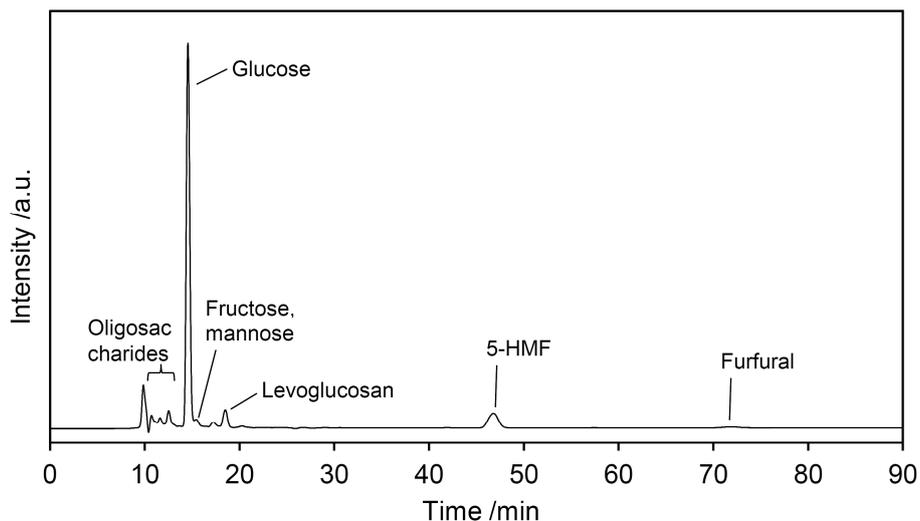
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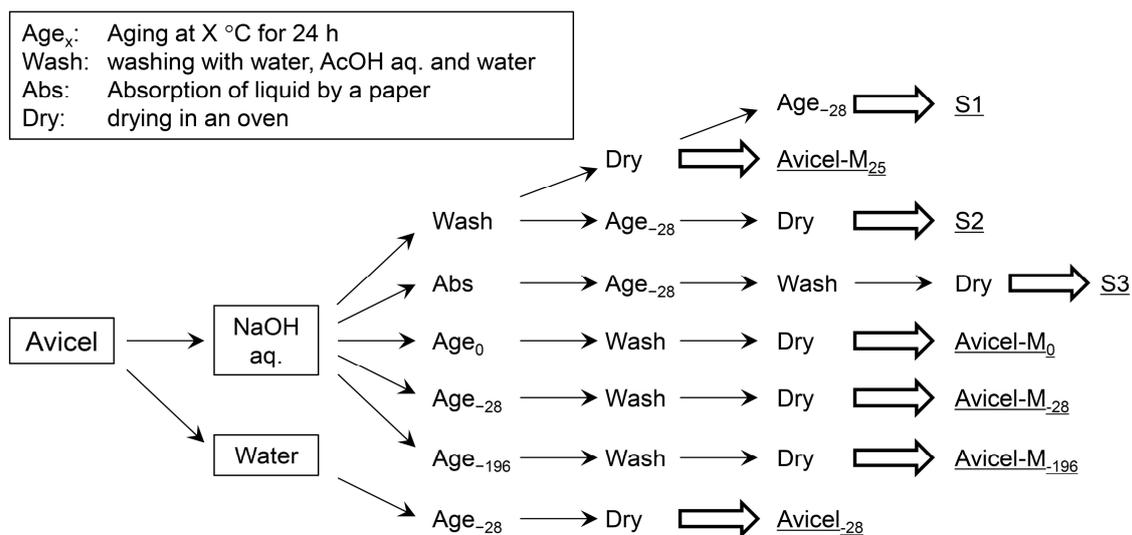
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#### **Total –4 pages, 5 figures, 2 tables–**

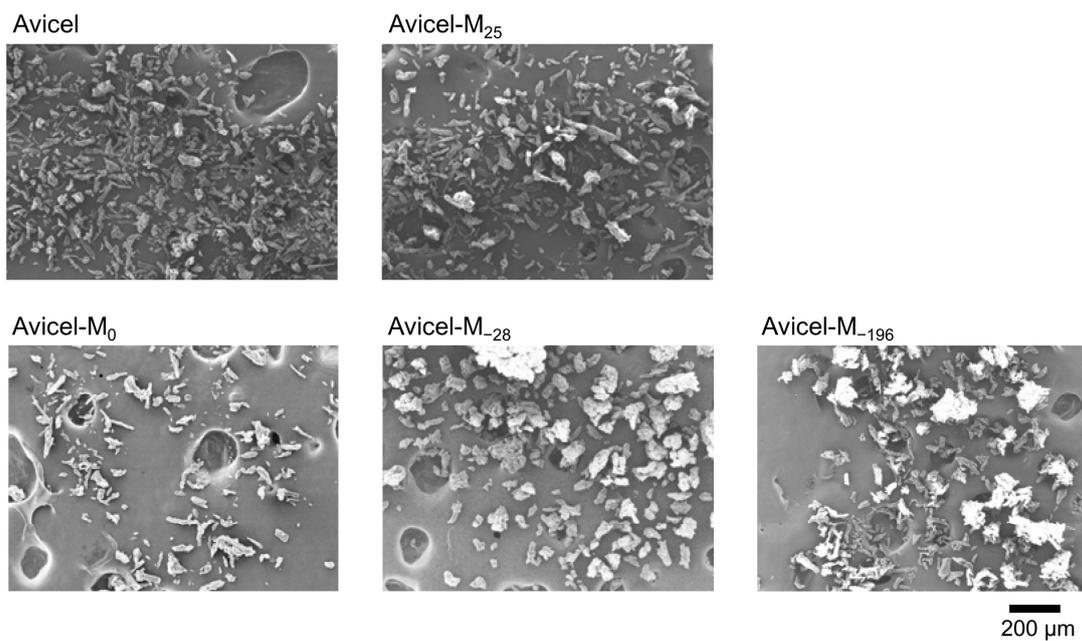
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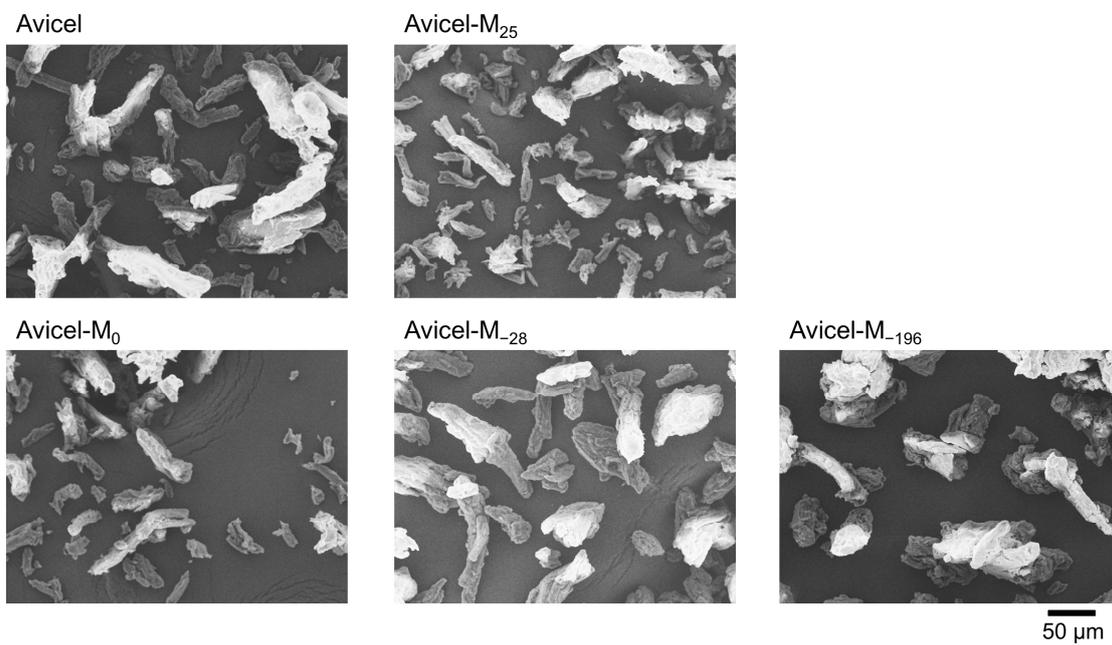
**Fig. S1** HPLC chart for the hydrolysis of Avicel-M<sub>-28</sub>. The first spike (ca. 10 min) is not a product.



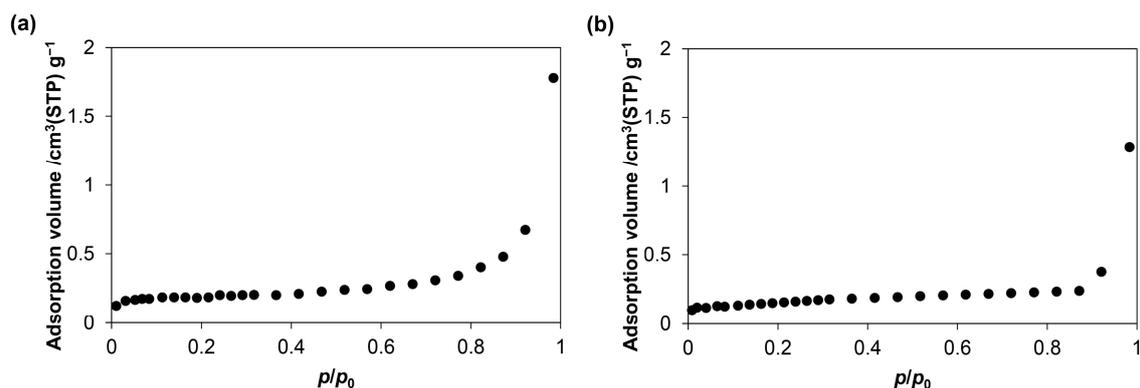
**Fig. S2** Treatments for cellulose. “NaOH aq.” indicates that cellulose is immersed in 18% NaOH aq. at r.t. for 20 min, and “Water” does the same procedure in pure water.



**Fig. S3** SEM images of cellulose samples with a low magnification. Magnification for the five samples is the same.



**Fig. S4** SEM images of cellulose samples with a high magnification. Magnification for the five samples is the same.



**Fig. S5** N<sub>2</sub> adsorption isotherms for (a) Avicel and (b) Avicel-M<sub>25</sub>. As low-temperature mercerized samples gave unreliable isotherms, they were omitted.

**Table S1** Hydrolysis of cellulose samples by Cel-cat.<sup>a</sup>

Entry	Sample <sup>b</sup>	Yield of products /%C						Conv. /%
		Glucose	Oligomers	Fructose and mannose	LG <sup>c</sup>	5-HMF <sup>d</sup>	Others <sup>e</sup>	
S1	S1	27	1.2	0.5	1.8	3.4	12	47
S2	S2	32	1.2	0.5	2.0	4.1	11	51
S3	S3	46	1.9	0.8	2.9	5.8	10	68

<sup>a</sup>Reaction conditions: cellulose sample 324 mg, catalyst 50 mg, water 40 mL, rapid heating to 230 °C, and cooling down soon after reaching the temperature.. <sup>b</sup>See Fig. S2. <sup>c</sup>Levoglucosan. <sup>d</sup>5-Hydroxymethylfurfural. <sup>e</sup>(Conversion value) – (total yield of identified compounds).

**Table S2** BET surface areas of cellulose samples measured by nitrogen adsorption at –196 °C.

Sample	Specific surface area (m <sup>2</sup> g <sup>-1</sup> )
Avicel	1.0
Avicel-M <sub>25</sub>	1.2
Avicel-M <sub>0</sub>	<1 <sup>a</sup>
Avicel-M <sub>-28</sub>	<1 <sup>a</sup>
Avicel-M <sub>-196</sub>	<1 <sup>a</sup>

<sup>a</sup>We tried to measure the isotherms several times but faced errors due to too small adsorption amount of N<sub>2</sub> for the samples mercerized at low temperatures. Therefore, the BET surface areas were shown as <1 m<sup>2</sup> g<sup>-1</sup>.