

Supporting Information for

**Depolymerization of Wheat Straw to Produce Glucose by
Self-Catalyzed Hydrolysis**

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Table S1. The chemical composition of native WS and t-WS (wt% of the solid)^a

Sample	Distribution of different composition (wt%)						
	Cellulose	Xylan	Arabinan	Acetyl groups	Klason lignin	Ash	Others ^b
WS	37.4±0.1	22.7±0.2	2.9±0.1	2.3±0.1	18.5±0.2	9.8±0.1	6.4
t-WS ^c	57.2±0.1	8.3±0.2	0.1±0.1	0.2±0.1	24.8±0.2	4.6±0.1	4.8

^aAverage of two replicates. ^b3.3% was moisture. ^c57.0 g solid was obtained from 100 g of WS.

Table S2. Liquid composition of WS treated by CO₂-H₂O-HAc

Yields of products (g 100 g ⁻¹)						
XOS	GOS	Xylose	Glucose	Arabinose	HMF	Furfural
12.8	1.2	3.6	0.6	1.7	1.2	1.0

XOS = xylo-oligosaccharides, GOS = gluco-oligosaccharides.

Table S3. Surface area and pore volume of sample

Sample	Surface area (m ² g ⁻¹)	Pore volume (mL g ⁻¹)
WS	5.3	1.03 × 10 ⁻²
t-WS	7.1	2.51 × 10 ⁻²
t-WS-O ₂₀ N ₃₀ -210-	8.7	1.93 × 10 ⁻²

10

Table S4. The acid density of oxidized WS

Sample	Acid density (mmol g ⁻¹)
WS-O ₂₀ N ₃₀ -210-10	0.026
t-WS-O ₂₀ N ₃₀ -210-10	0.240
t-WS-O ₅ N ₄₅ -200-10	0.118
t-WS-O ₁₁ N ₃₉ -200-10	0.129
t-WS-O ₂₀ N ₃₀ -200-10	0.140
t-WS-O ₃₅ N ₁₅ -200-10	0.160
t-WS-O ₅₀ -200-10	0.235
t-WS-O ₂₀ -200-10	0.173
t-WS-O ₃₅ -200-10	0.178
t-WS-O ₈₀ -200-10	0.170
t-WS-O ₁₀₀ -200-10	0.169
t-WS-O ₅₀ -180-10	0.110
t-WS-O ₅₀ -190-10	0.126
t-WS-O ₅₀ -210-10	0.252
t-WS-O ₅₀ -200-5	0.041
t-WS-O ₅₀ -200-8	0.216
t-WS-O ₅₀ -200-15	0.258
t-WS-O ₅₀ -200-20	0.272

Table S5. Weight of solid residue and its composition from hydrolysis of t-WS oxidized by O₂ at different temperature for 10 h^a

Sample	Residue solid (g)	Cellulose (%)	Xylan (%)	Ligin (%)	Ash (%)
t-WS-O ₅₀ -180	0.141	68.9	0.4	26.6	4.7
-10					
t-WS-O ₅₀ -190	0.119	60.1	0.2	30.5	5.0
-10					
t-WS-O ₅₀ -200	0.107	49.8	0	40.8	5.3
-10					
t-WS-O ₅₀ -210	0.082	17.1	0	48.9	4.9
-10					

^a Hydrolysis reaction: water (20 mL), oxidized sample (0.2 g), 0.4 MPa N₂, 170 °C, 6 h.



Figure S1. Instrument for oxidation of biomass.

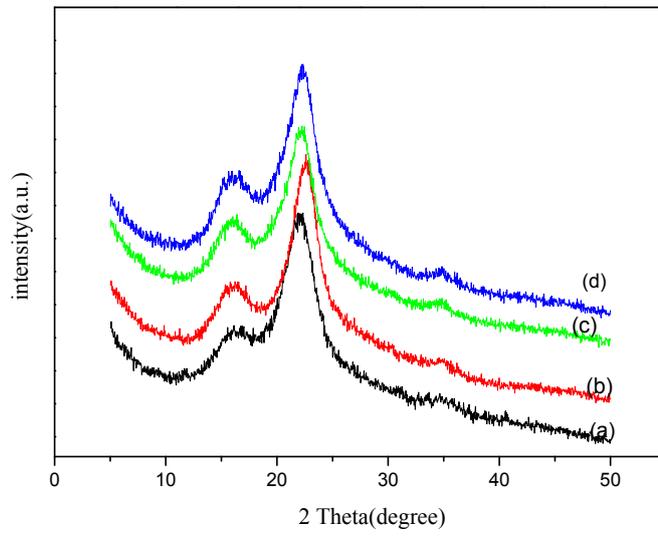


Figure S2. XRD patterns of wheat straw (a) WS (b) t-WS (c) t-WS-O₅₀-200-10 (d) t-WS-O₂₀N₃₀-210-10.

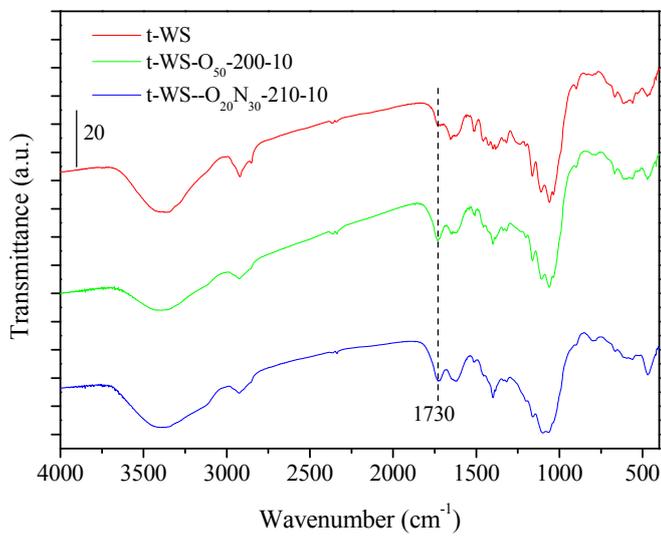


Figure S3. FTIR spectra of t-WS, t-WS-O₂₀N₃₀-210-10 and t-WS-O₅₀-200-10.