

Supporting information

Top-Down Approach Making Anisotropic Cellulose Aerogels as Universal Substrates for Multi-Functionalization

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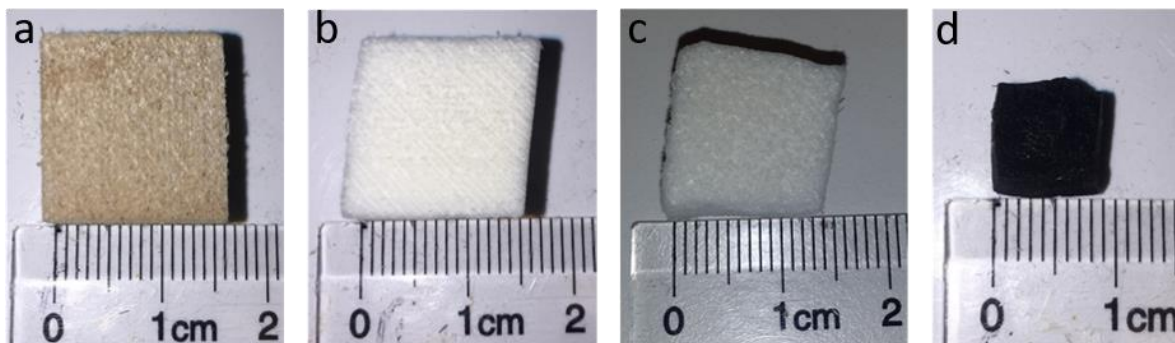


Figure S1. Images representing the dimensional changes from (a) untreated native wood, followed by (b) the delignified wood, (c) DMAc/LiCl treated delignified wood and (d) aerogel after carbonization

Table S1. Dimensional change, weight change and density change of the prepared samples, throughout the wood aerogel preparation

	Native wood	Delignified wood	Wood aerogel
Length [mm]:	15	16.3 ± 0.4	14.6 ± 0.7
Width [mm]:	15	16.4 ± 0.3	14.6 ± 0.5
Thickness [mm]:	10	10.36 ± 0.04	10.3 ± 0.1
Weight [g]:	0.291 ± 0.004	0.22 ± 0.03	0.17 ± 0.01
Density [kg/m³]:	129 ± 2	90 ± 12	79 ± 8

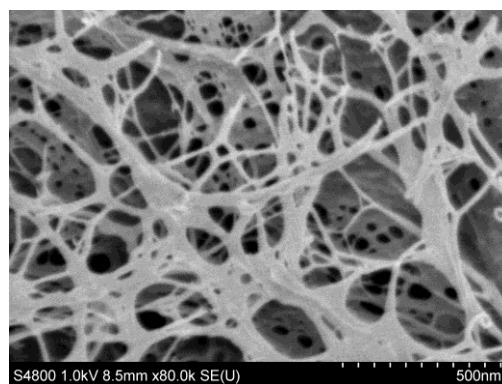
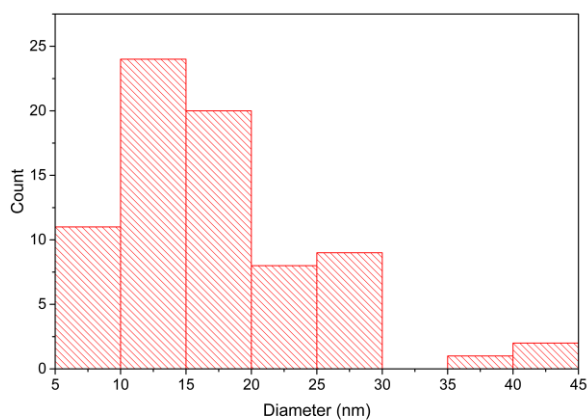


Figure S2. Length distributions of regenerated cellulose from 24h DMAc/LiCl treated wood. Length distribution was obtained using the computer software imageJ.

Wood aerogel

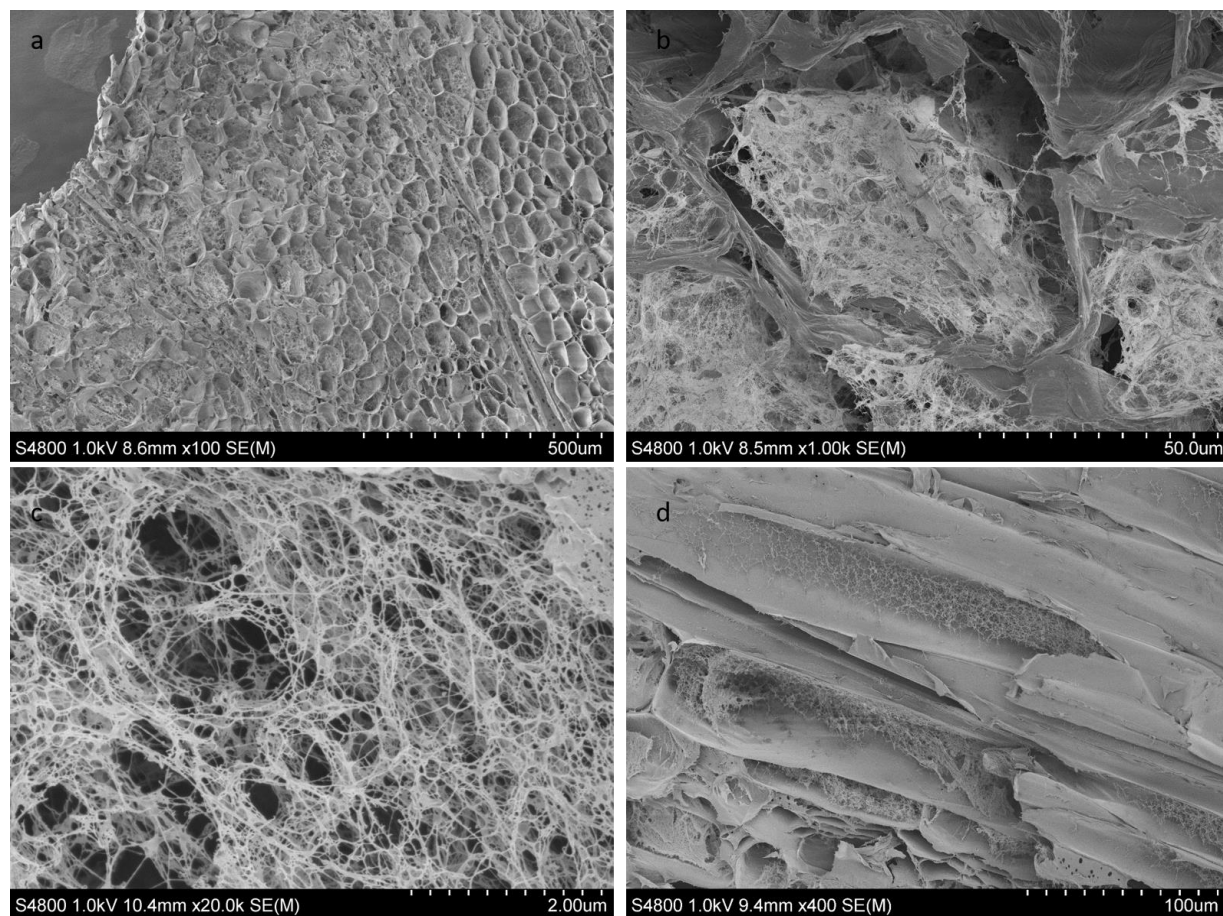


Figure S3. SEM images showing the fibrillation inside the fibre cells. a) low magnification showing the encompassing fibrillation. b) demonstrating the fibrillation inside a fibre, c) showing a high magnification of the nanofibres formed inside the fibre lumen space and d) showing the fibrillation along the fibres.

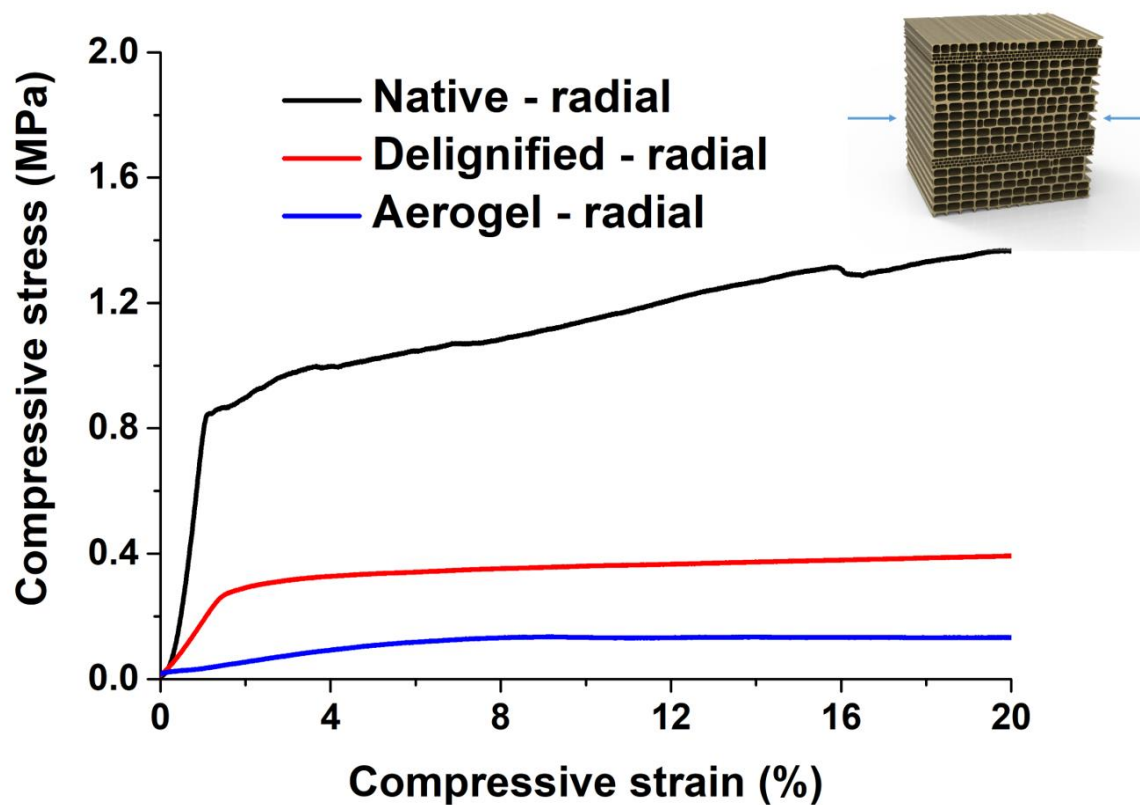


Figure S4. Compressive stress-strain curves for native wood, delignified wood and wood aerogel in the radial direction. The compression was performed at 50% relative humidity and 23°C.



Figure S5. PEDOT:PSS infiltrated aerogel from a view along the fibres, to accentuate the infiltration through the fibres

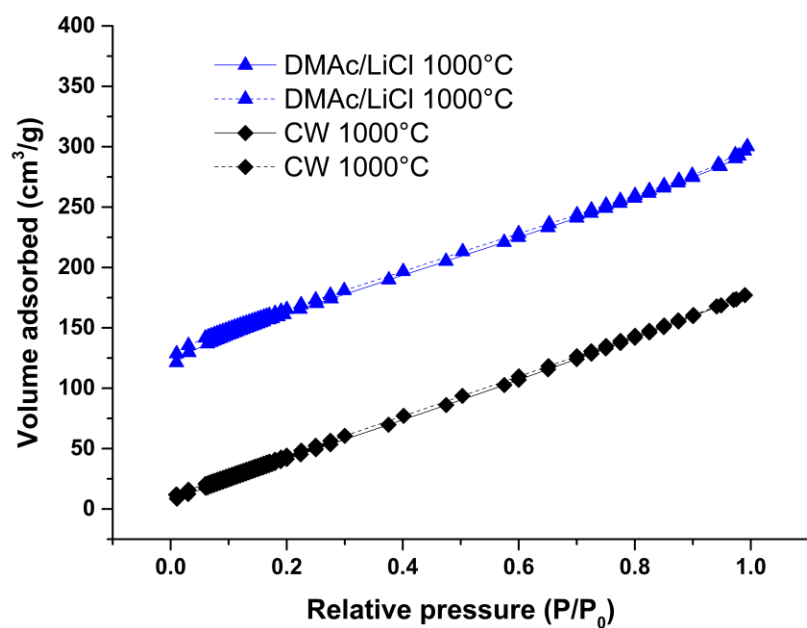


Figure S6. Nitrogen adsorption & desorption measurements of native Carbonized Wood (CW) and carbonized DMAc/LiCl treated aerogel. Solid lines display adsorption, whereas dashed lines symbolizes desorption

Carbon Aerogel

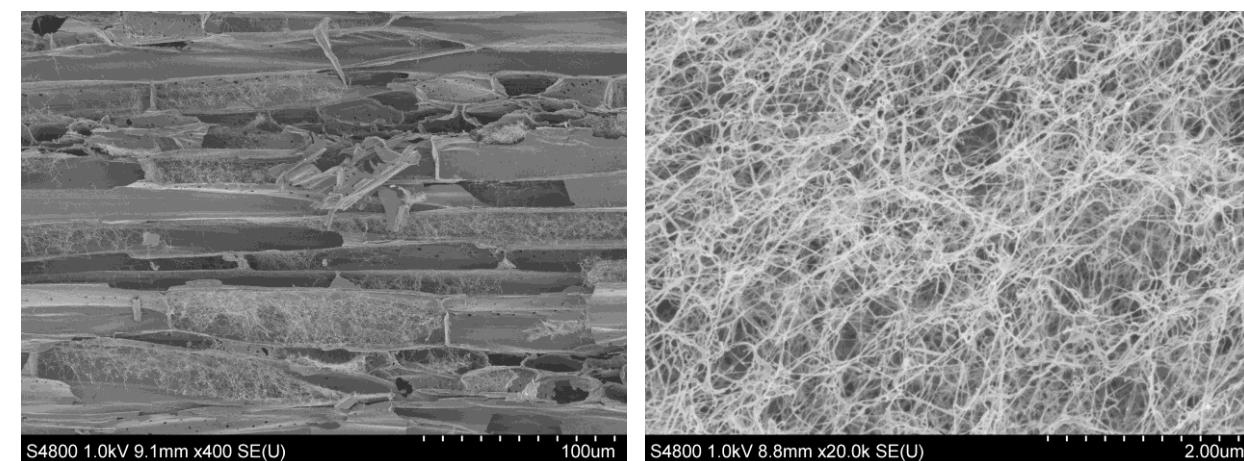


Figure S7. Lower and higher magnification images of the carbon aerogel, showing fibrillation of many wood fibre lumens and the highly fibrillated networks remaining inside the cells after carbonization

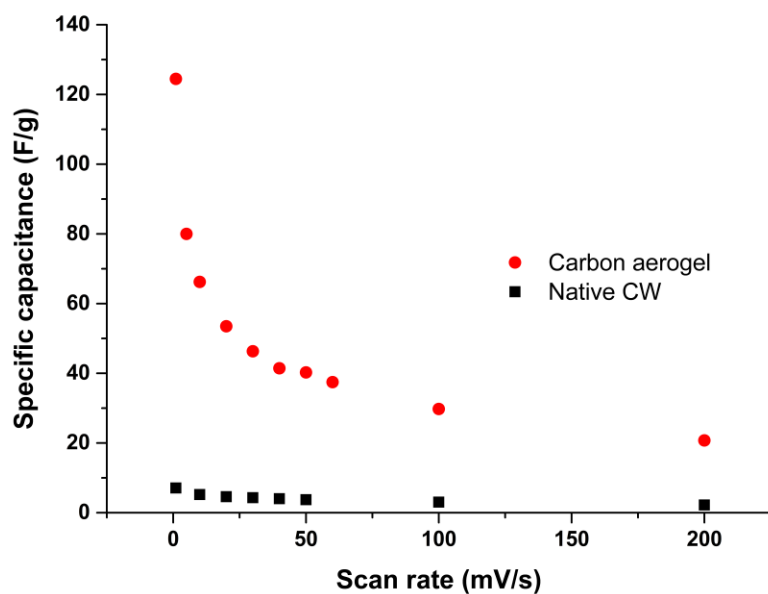


Figure S8. Specific capacitance of the carbon aerogel and native carbonized wood is shown. The capacitance was measured using cyclic voltammetry (CV) between the potential range: 0.05V-0.2V. The CV was performed in a 3-electrode system, using a platinum grid as counter electrode, Ag/AgCl reference and our substrate as working electrode. The working electrodes were cut to a nominal area of 1 cm² with the thickness 1 mm. The electrolyte consisted of a 0.5 M H₂SO₄ solution. All experiments were performed in room temperature.