SUPPORTING INFORMATION

Unraveling the Properties of Biomass-Derived Hard Carbons upon Thermal Treatment for a Practical Application in Na-ion Batteries.

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1. TEM images:

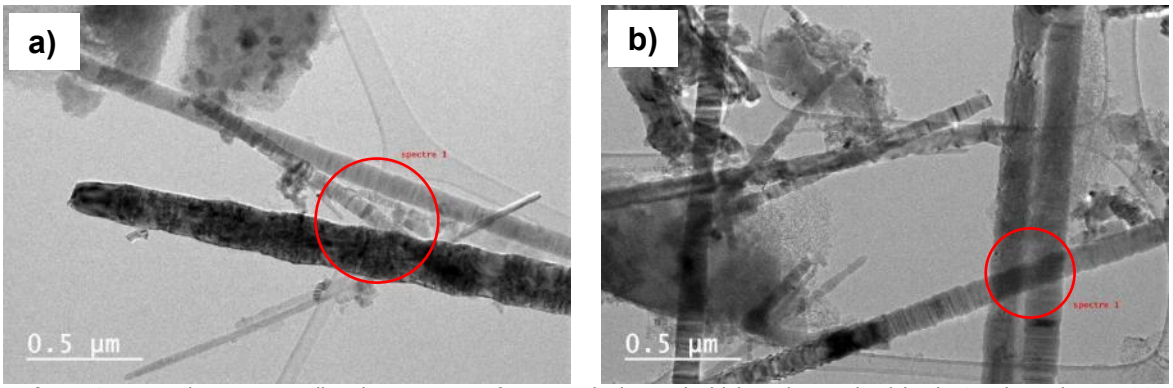


***Figure S 1**. TEM images revealing the presence of nanoparticules and whiskers (nanotubes) in a)HC_miscanthus_1400 and b)HC_wheat-straw_1400.*

***Table S 1.** Chemical composition by EDX analysis of miscanthus and wheat straw hard carbons obtained at 1400°C. The analysis corresponds to the red zones indicated for each sample in figure S1a and b.*

Sample/Chemical Element	C, at%	O, at%	Si, at%	Ca, at%
HC_miscanthus_1400	29,56	1,86	65,87	0,64
HC_wheat-straw_1400	17,90	1,04	79,32	1,34

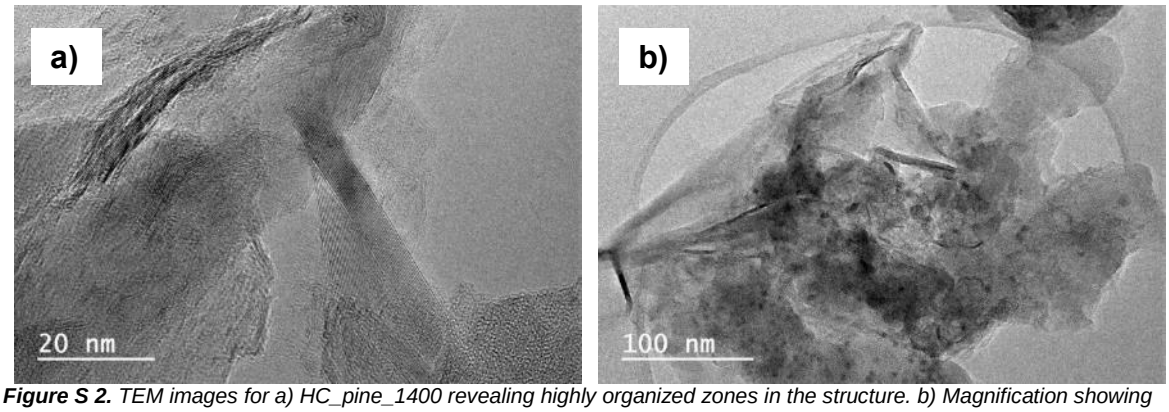
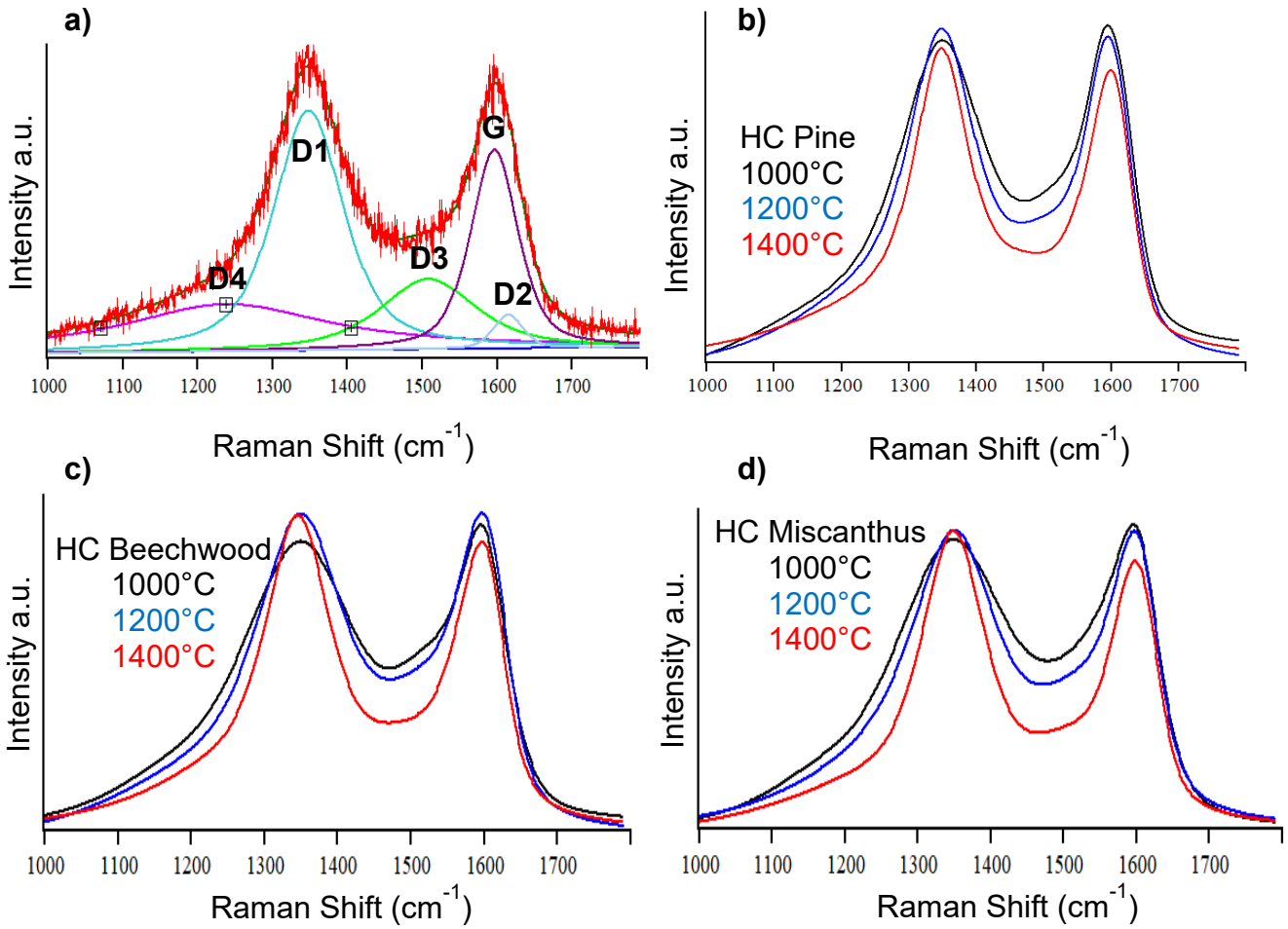


Figure S 2. *TEM images for a) HC_pine_1400 revealing highly organized zones in the structure. b) Magnification showing the presence of nanotubes and nanoparticles.*

2. RAMAN results:



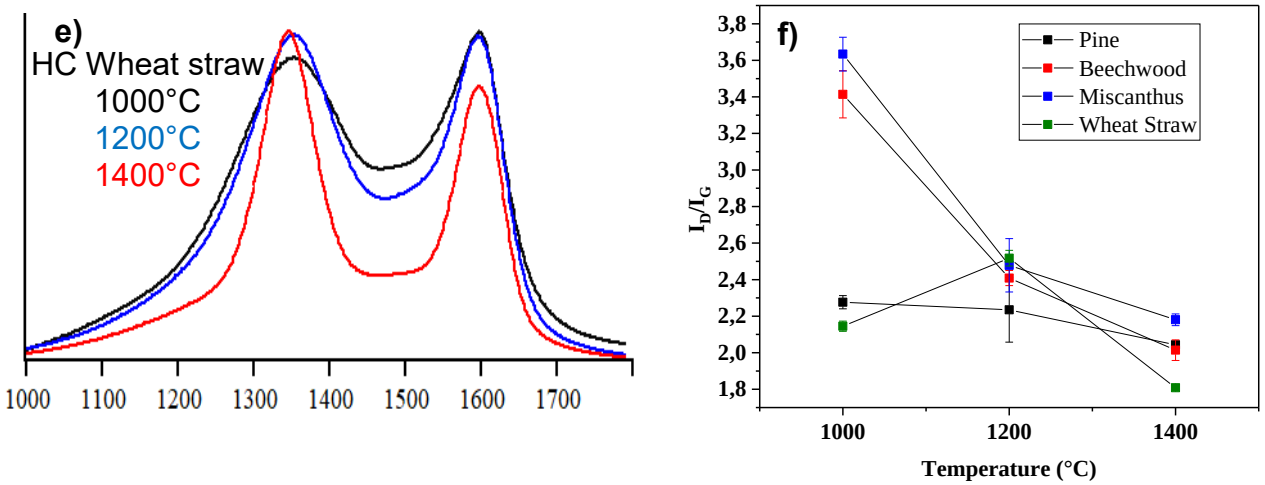


Figure S 3. *a) Spectra deconvolution with the selected 5 bands. Fitted spectra for the series of b) pine, c) beechwood, d) miscanthus and c) wheat straw hard carbons. f) I_D/I_G ratio for all the hard carbons as a function of temperature.*

3. SEM images for 1000 and 1200°C hard carbons and EDX analysis:

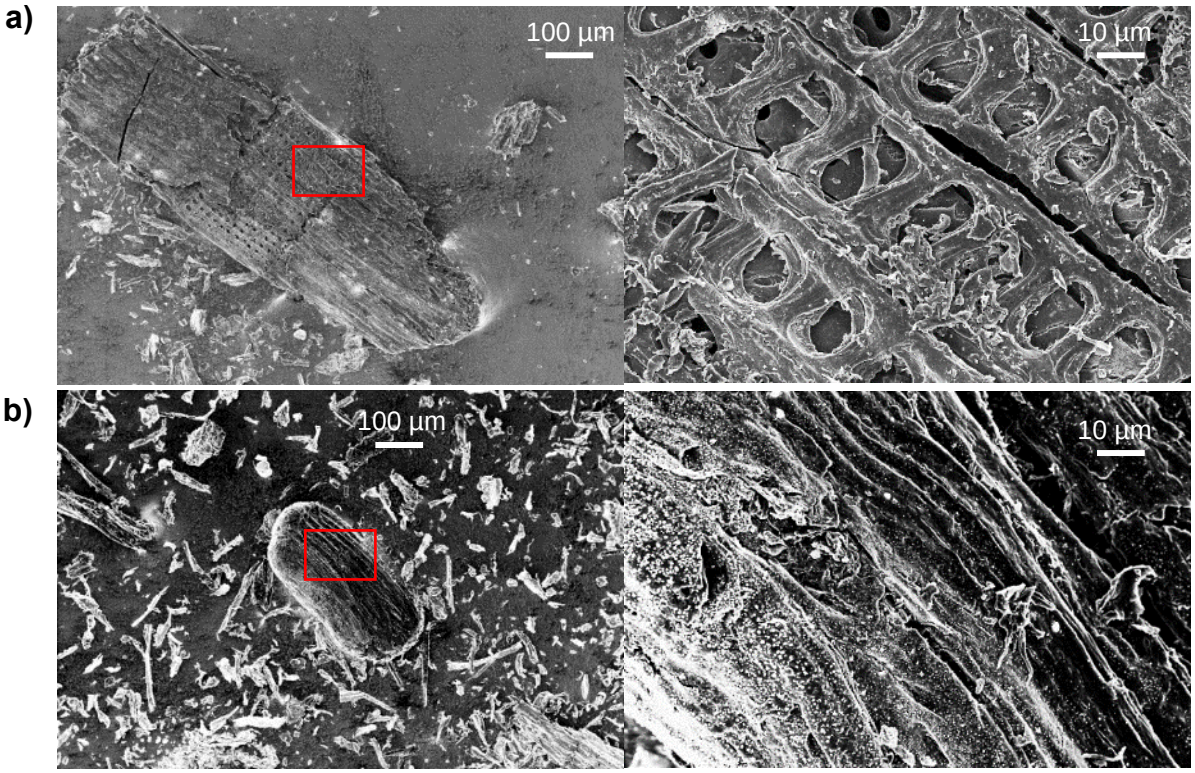


Figure S 4. *SEM images for a) HC_pine_1000, and b) HC_ pine_1200.*

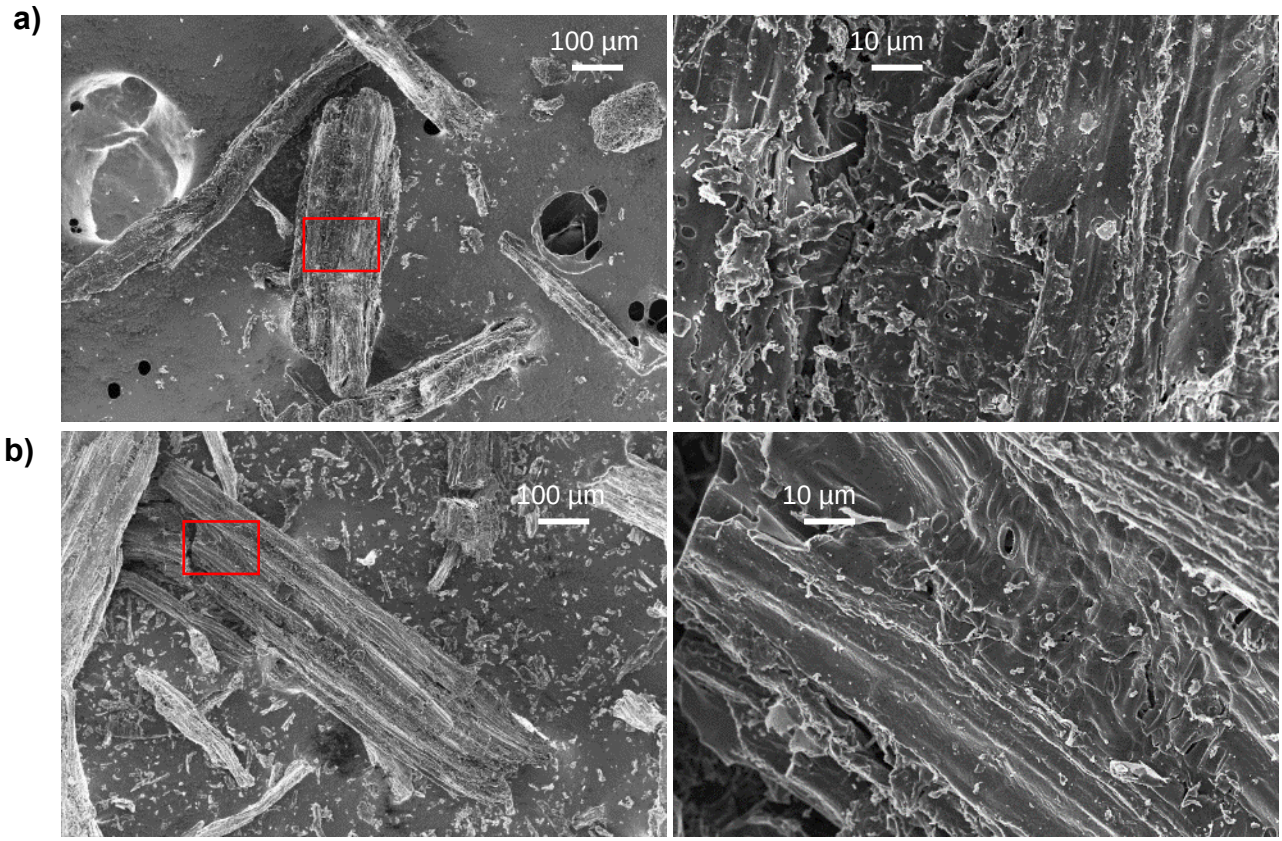


Figure S 3. *SEM images for a) HC_beechwood_1000, and b) HC_ beechwood_1200.*

Table S 2. *Chemical composition by EDX analysis of pine and beechwood hard carbons obtained at 1400°C.*

Chemical Element in overall spectra	C, at%	O, at%	Si, at%	Ca, at%	K, at%
HC_pine_1400	87,80	11,91	0,13	0,04	0,12
HC_beechwood_1400	85,02	14.31	0,11	0,26	0,30

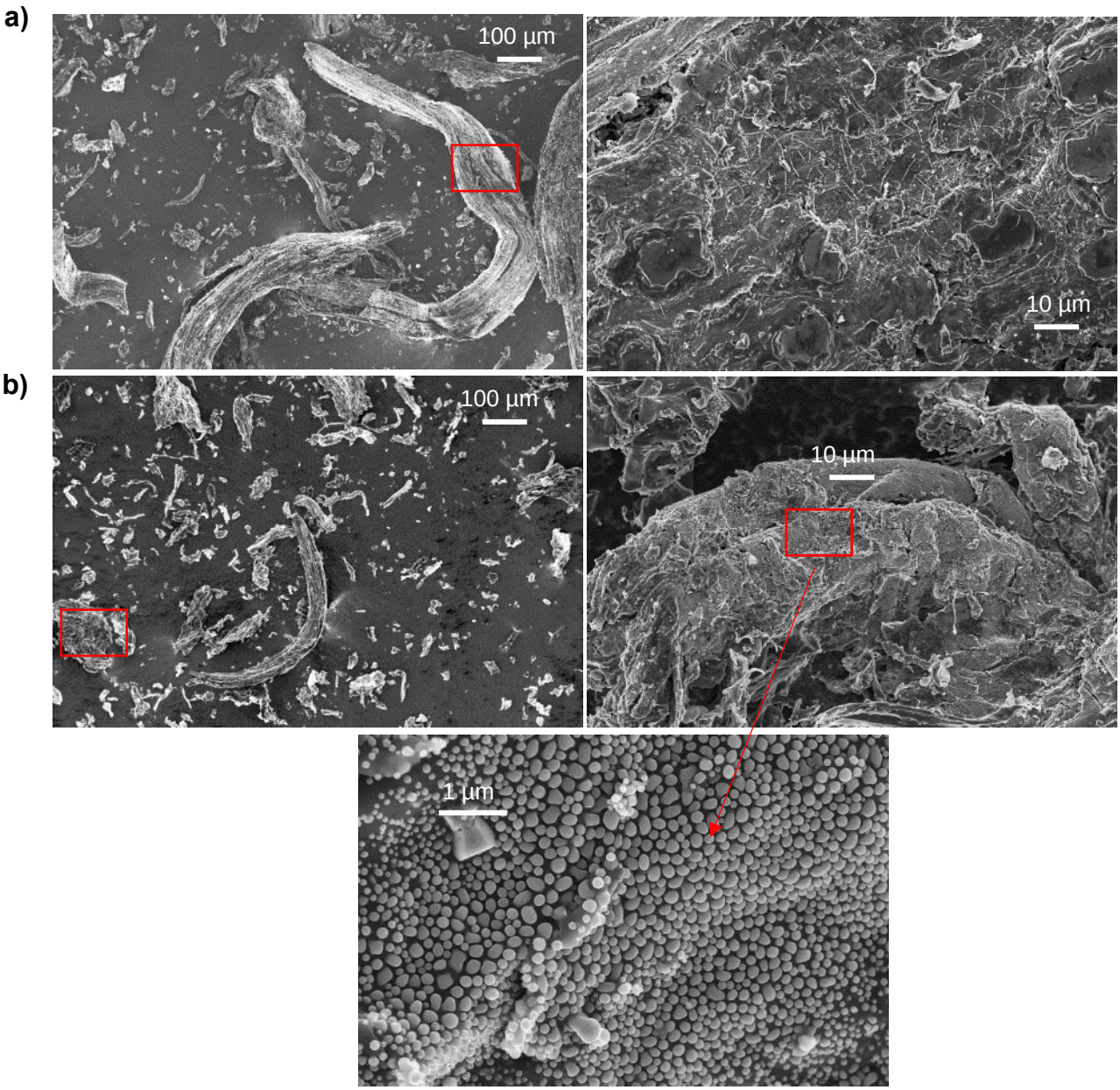


Figure S 4. *SEM images for a) HC_miscanthus_1000, and b) HC_ miscanthus_1200.*

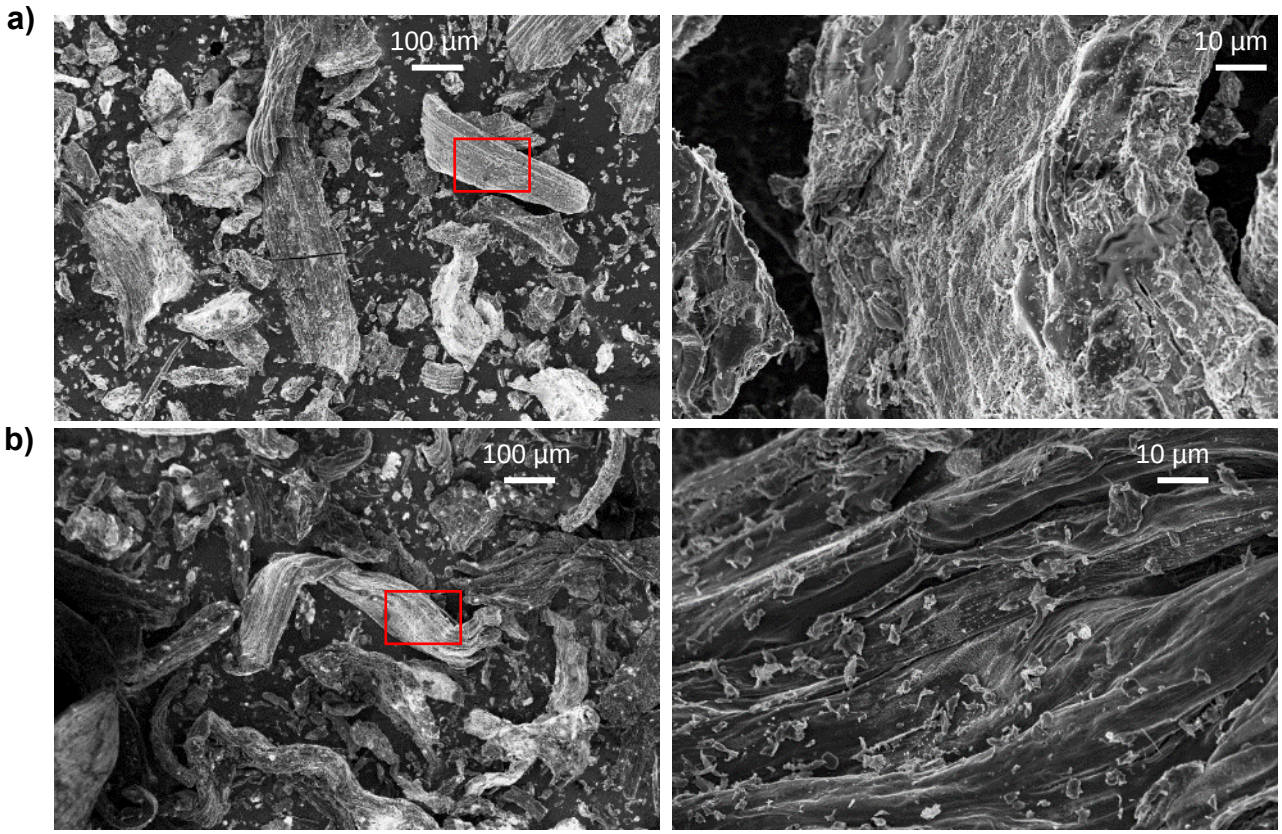


Figure S 5. *SEM images for a) HC_wheat-straw_1000, and b) HC_ wheat-straw_1200.*

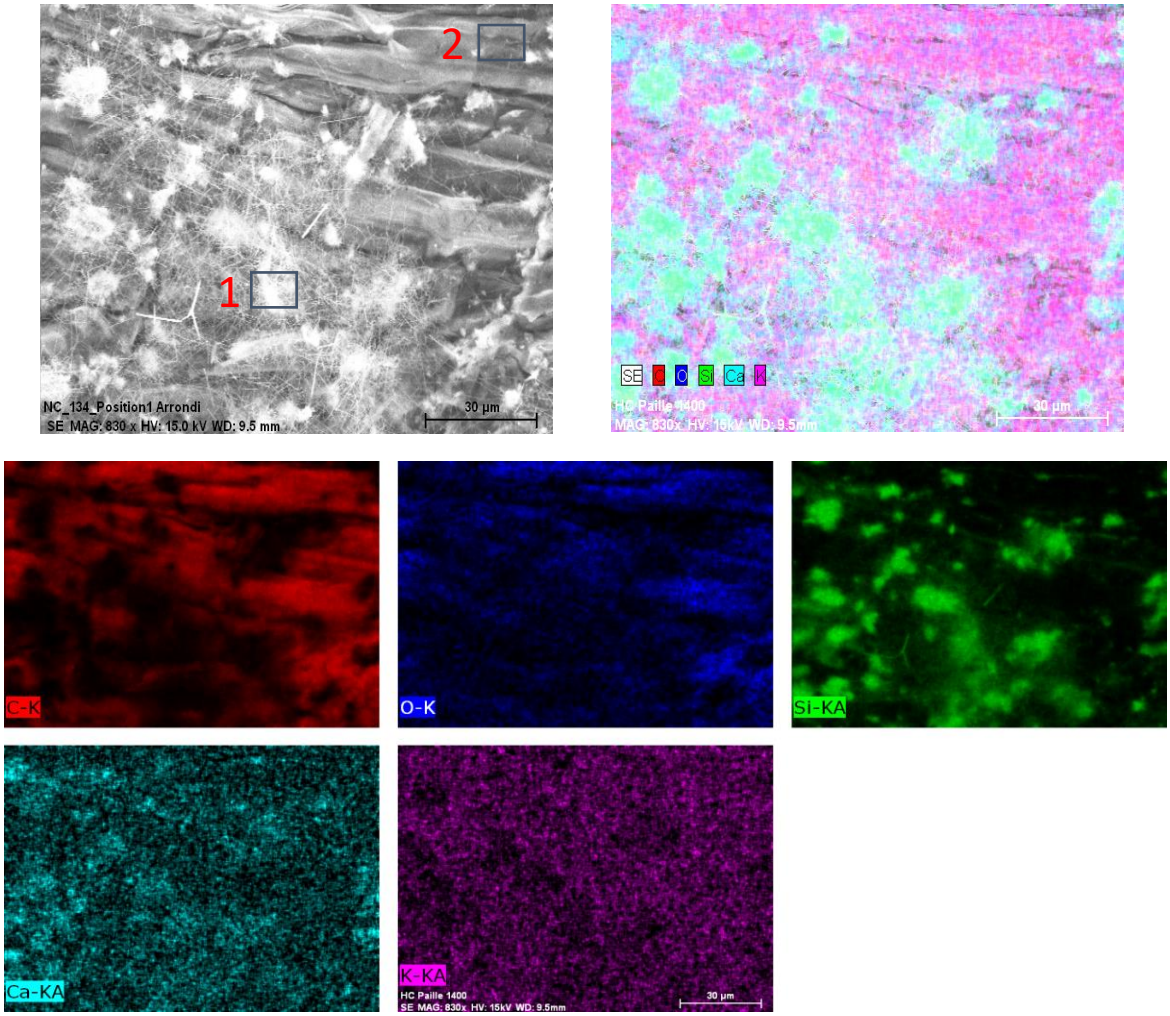


Figure S 6. *EDX cartography for HC_wheat-straw_1400.*

Table S 3. *Chemical composition by EDX analysis of HC_wheat-straw_1400 in two different zones of the surface.*

Chemical Element per zone	C, at%	O, at%	Si, at%	Ca, at%	K, at%
HC_wheat-straw_1400 zone 1	69,38	4,66	24,35	0,89	0,25
HC_wheat-straw_1400 zone 2	88,36	9,78	0,43	0,37	0,44

4. CO2 isotherms:

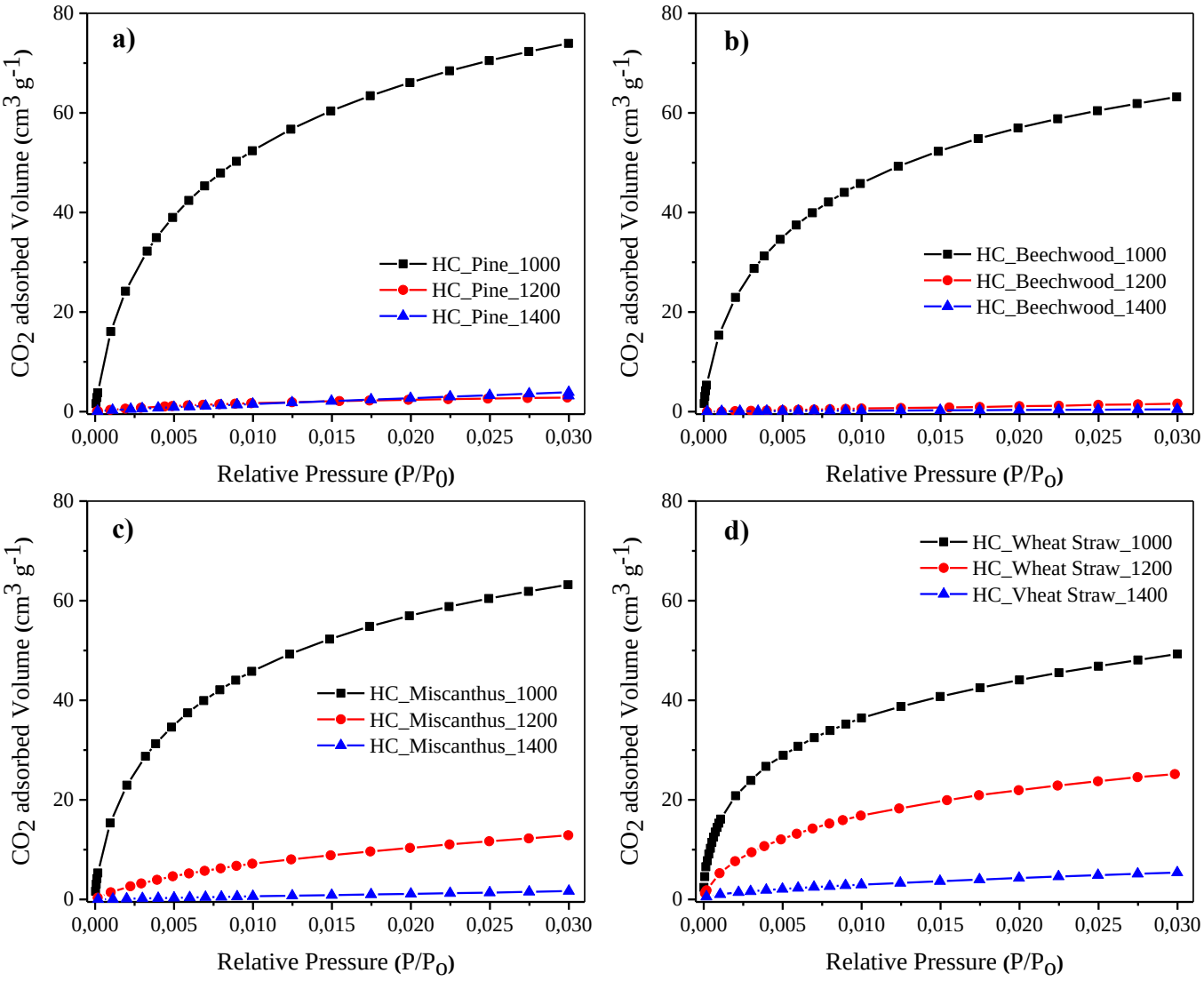


Figure S 7. *CO_2 isotherms for specific surface area characterization of a) pine, b) beechwood, c) miscanthus and d) wheat straw derived hard carbons.*

5. Pore size distributions:

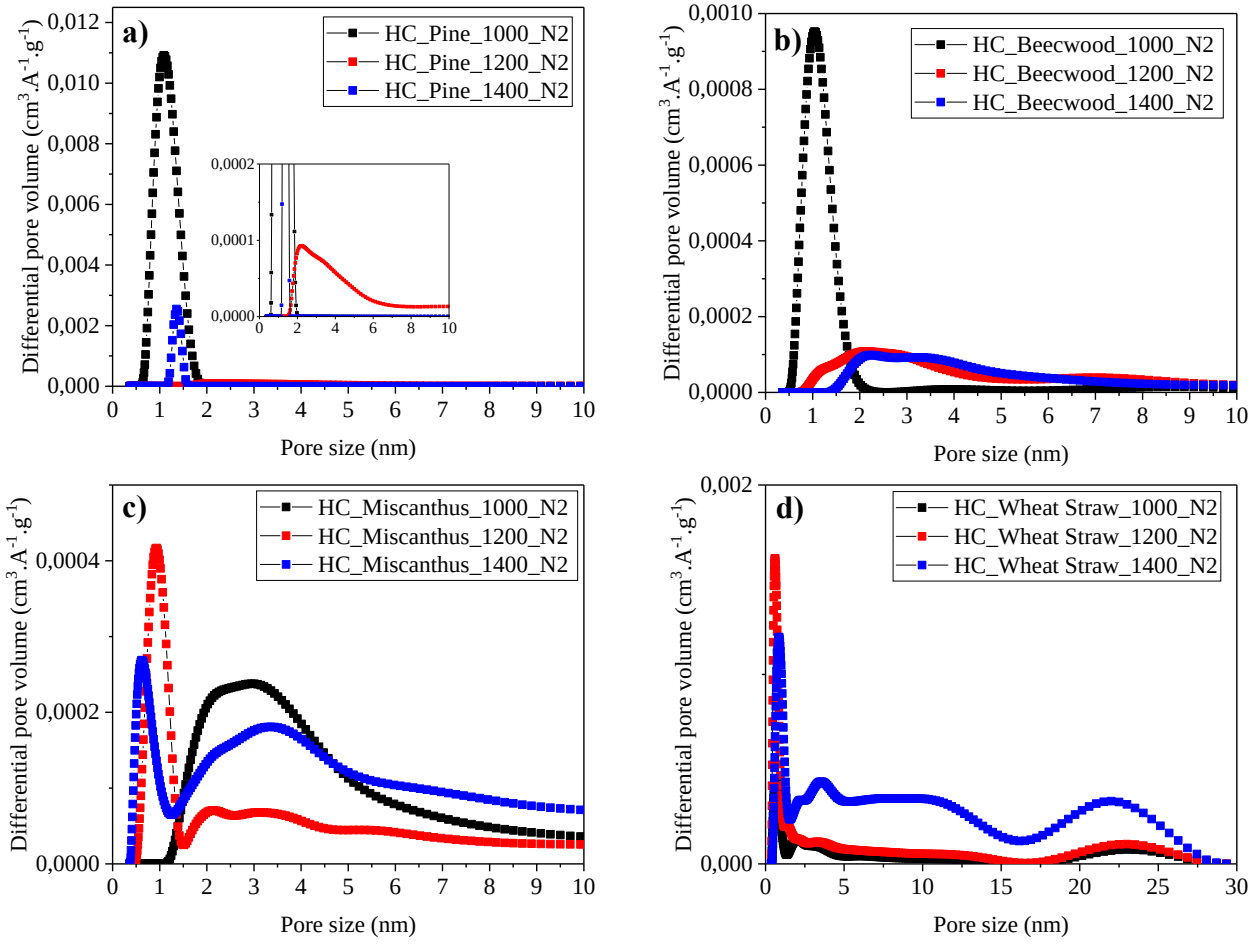


Figure S 8. *Pore size distribution curves from N_2 isotherms for a) pine, b) beechwood, c) miscanthus and d) wheat straw.*

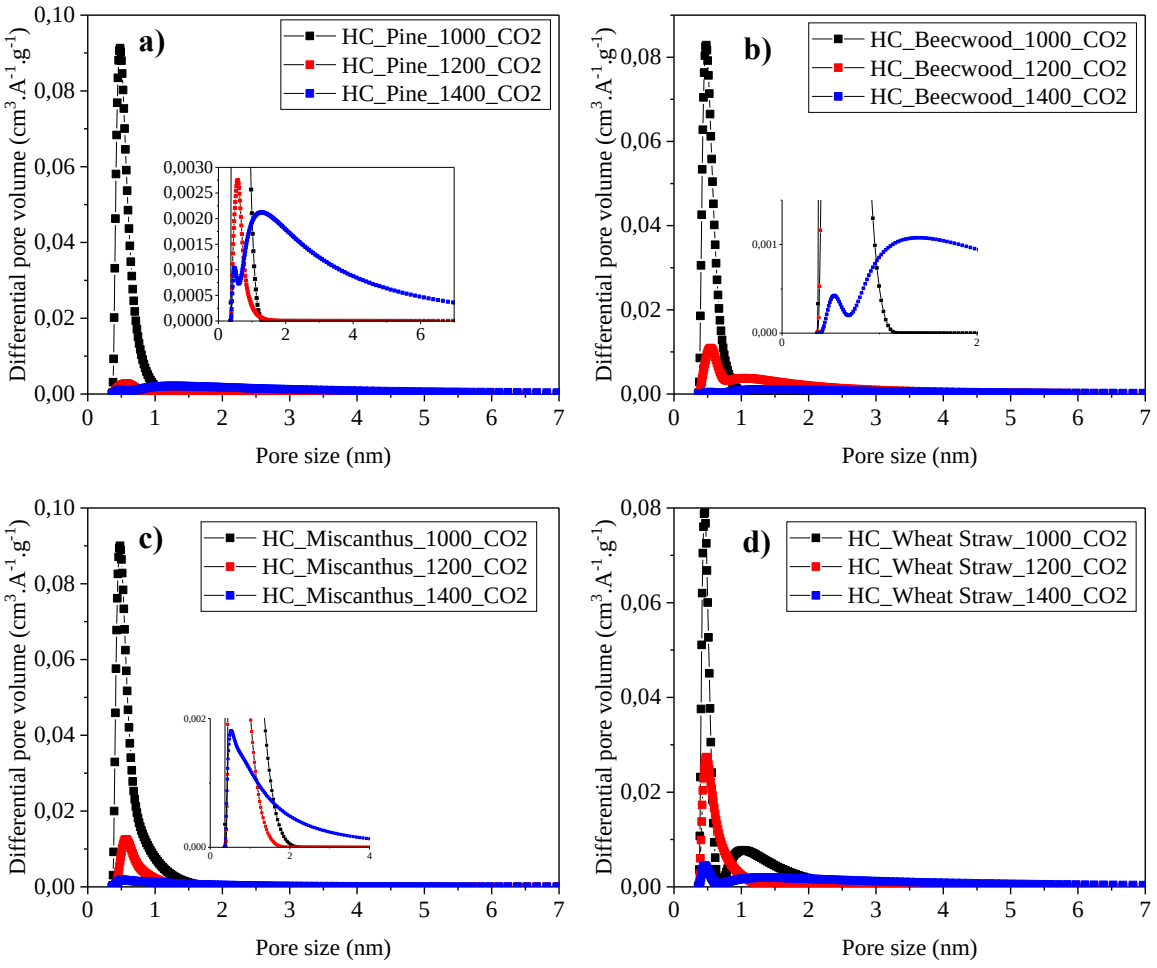


Figure S 9. *Pore size distribution curves from CO_2 isotherms for a) pine, b) beechwood, c) miscanthus and d) wheat straw.*