Electronic Supplementary Material (ESI) for Green Chemistry.

Supporting information

Fully biodegradable modification of wood for improvement of dimensional stability and water absorption properties by poly(ε-caprolactone) grafting into the cell walls

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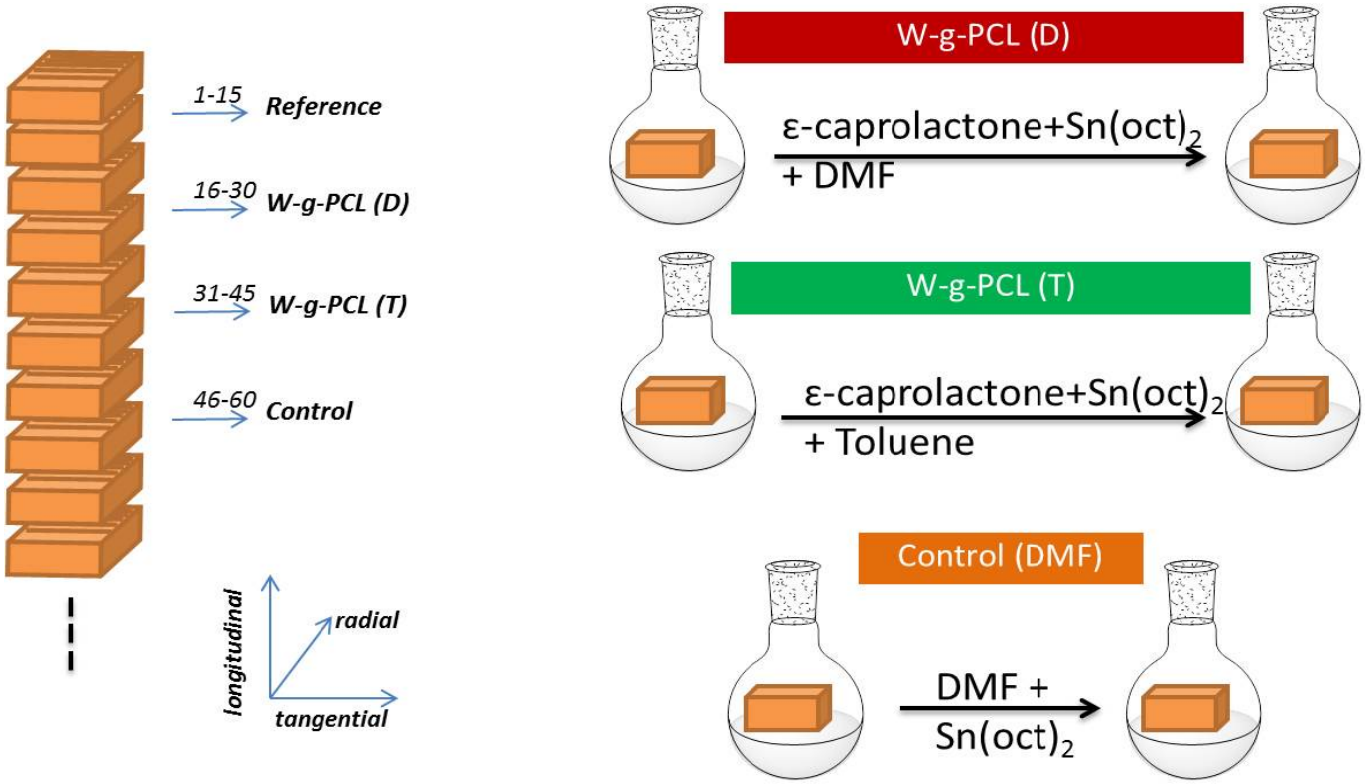


Supporting information Figure S1. On the left side: Fifteen (10x10x5 mm) wood cubes for each set which were cut perpendicular to the same longitudinal axis and categorized as shown. **On the right side**: Schematic representation of reaction flow. W-g-PCL(D) (ring opening polymerization of ε-caprolactone in DMF), W-g-PCL(T) (ring opening polymerization of ε-caprolactone in Toluene), Control (DMF) (Control reaction of wood with DMF and initiator).

Equations for swelling coefficient (S), anti-swelling efficiency (ASE), and water uptake (WU):

$$S(\%) = \frac{(V_i - V_{ii})}{V_{ii}} \times 100$$

where S(%): volumetric swelling; V_i: wood volume after wetting with liquid water; V_{ii}: wood volume of oven-dried samples before wetting

$$ASE(\%) = \frac{S_{um} - S_m}{S_{um}} \times 100$$

where ASE(%): antishrinking/antiswelling efficiency resultin from the modification; S_m: modified volumetric swelling coefficient; S_{um}: unmodified volumetric swelling coefficient.

$$WU(\%) = \frac{(w_{ii} - w_i)}{w_i} \times 100$$

where WU(%): percentage of water uptake of the samples; w_i: initial weight of the sample; w_{ii}: wet weight of the sample after water-soaking

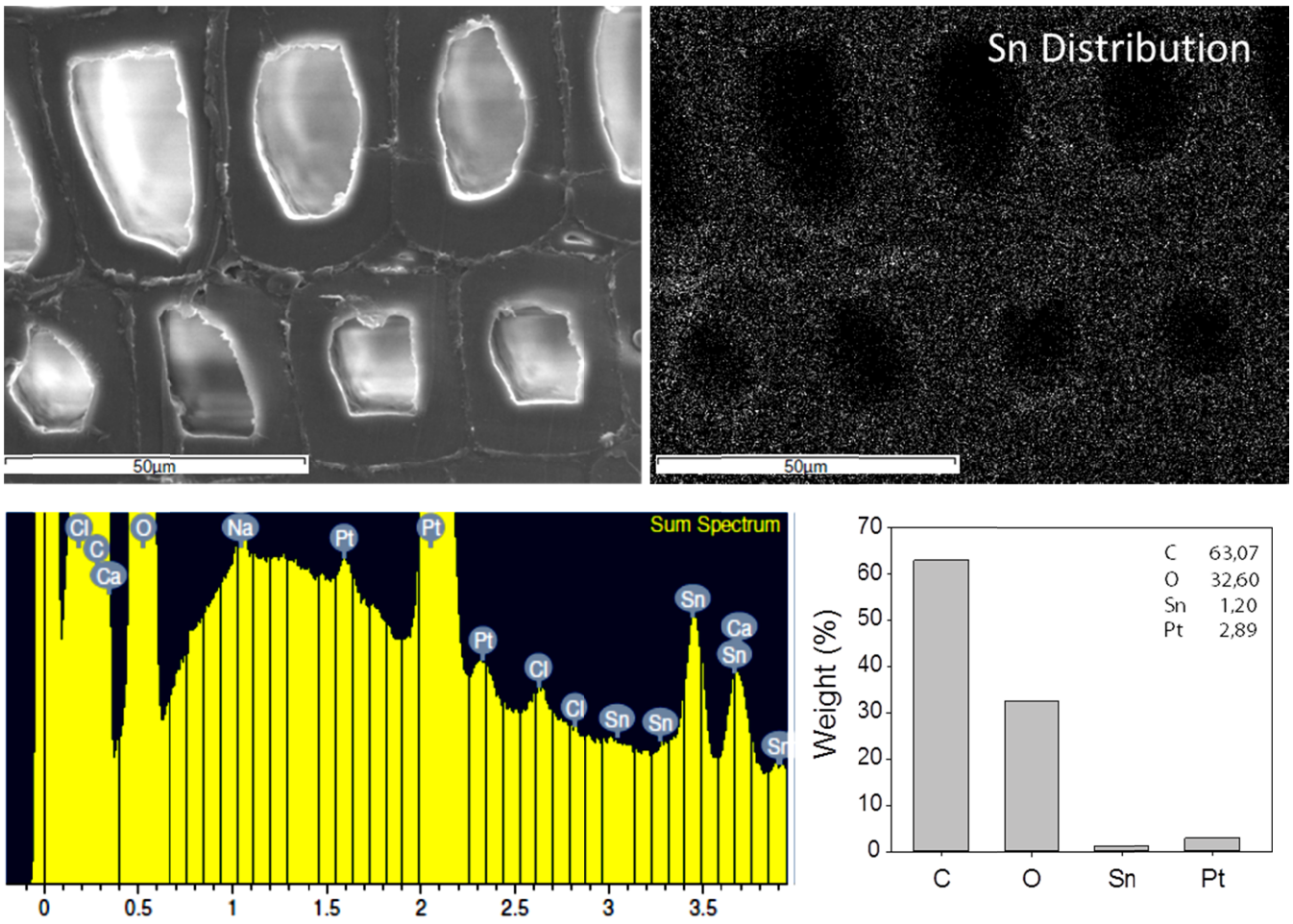
Supporting information Figure S2.

Equation for equilibrium moisture content (EMC):

$$EMC(\%) = \frac{(m - m_{od})}{m_{od}} \times 100$$

where EMC: is the moisture content;
m is the mass of the wood (with moisture) and
m_{od} is the oven-dry mass of the wood (i.e. no moisture)

Supporting information Figure S3.



Supporting information Figure S4. EDX analysis of the W-g-PCL(D) demonstrates the existence of Tin(Sn) inside the wood cell walls.