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Kinetics of wood pretreatment using ionic liquids

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It is known that ionic liquids enhance the exploit of resources from pretreated wood. More cellulose and lignin is made available as valuable chemicals for biodegradable products. We monitored the pretreatment process of beech wood by an ionic liquid in operando using small angle neutron scattering. In this dynamic process we could identify three stages: (1) the impregnation, i.e. the flooding of the wood by the liquid, (2) the formation of small voids on the nanoscale, and (3) the formation of restructured nanocellulose fibrils on larger scales. In the first two stages the ionic liquid is rather confined that finally leads to swelling and the fracture of the cell walls. All of this is set in context with findings from other authors, and with the next step of enzymatic hydrolysis.

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