

Abstract Submitted
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Hydrodynamic alignment and assembly of nano-fibrillated cellulose in the laminar extensional flow: Effects of solidifying agents NITESH MITTAL, FREDRIK LUNDELL, DANIEL SODERBERG, Royal Inst of Tech — There are several fiber production technologies that are based on wet-spinning processes. Many such processes rely on the transformation of a liquid solution into a solid filament. The kinetics of solidification depends largely on the diffusion of the solvents, additives and polymer molecules, which make such systems quite complex and differ from a system to another as a function of the specific chemical, physical and structural features of the used material components. Moreover, tuning the orientation of the polymers in the liquid suspensions makes it further possible to control their structure, which in turn can lead to materials having improved properties. By keeping in mind the facts mentioned above, the aim of the current study is to utilize benefits of a flow focusing approach to align carboxymethylated cellulose nanofibrils (CNF), as a colloidal dispersion, with the help of a laminar elongational flow-field followed by the solidification using different solidifying agents or molecules (with dissimilar diffusion behavior based on their size and charges) to synthesize fibers with enhanced mechanical properties. CNF are charged elongated particles obtained from woods with diameter of 4-10 nm and length of 1-1.5 μm , and they are completely biodegradable.

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