

Dissertation Release

5.12.2019

Prototyping bioproduct production processes

Title of the dissertation	Spinning and additive manufacturing of native cellulose structures Luonnonperäisten selluloosamateriaalien kehruu ja lisäävä valmistus
Contents of the dissertation	Cellulose is a versatile, abundant and performant raw material. Therefore, cellulose based raw materials show immense potential as a foundational building block in the future bioeconomy. However, many novel methods remain at the fume hood scale due to the lack of compatible process models and machinery. The research presented in this dissertation focuses on development of bioproduct manufacturing processes and associated machinery. Both spinning and additive manufacturing processes were researched and developed. The experimental research was carried out by building prototype process machinery. These prototypes were used to investigate the influence of process parameters on the properties of the ensuing structures. The processes were improved in terms of both throughput and quality. The insights from this research provide a starting point for development of pilot facilities for novel bioproducts. Furthermore, this research demonstrates a concurrent development approach of the material, process and machinery domains.
Field of the dissertation	Engineering Design, Bioproduct manufacturing processes
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Opponent	Professor Jurkka Kuusipalo, University of Tampere
Supervisor	Professor Petri Kuosmanen, Aalto University School of Engineering
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