

Simulation-assisted scattering analysis of moisture-induced swelling in wood microfibril bundles (SASAMIS)

Investigators

Antti Paajanen, Jukka Ketoja VTT
Paavo Penttilä, Aleksi Zitting Aalto University

Abstract

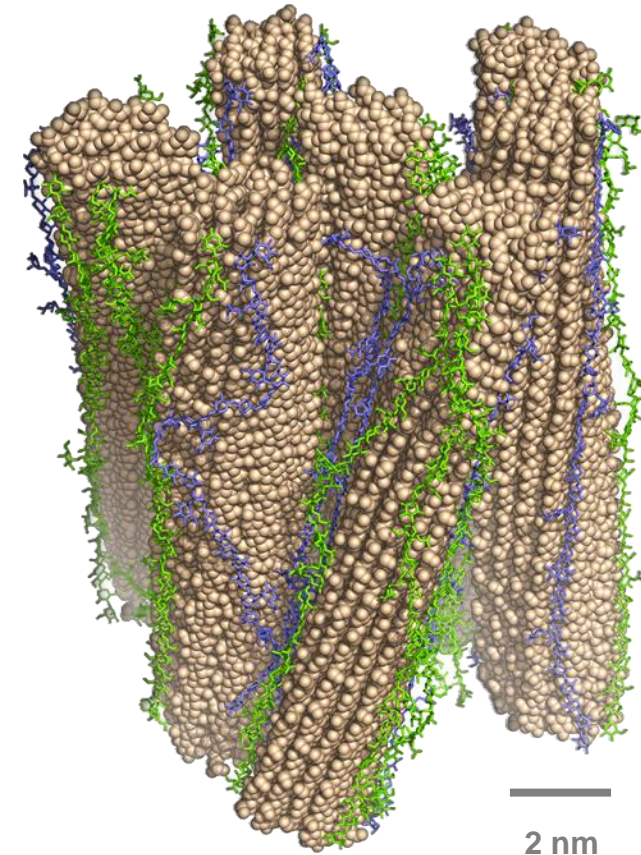
In the FinnCERES-funded project SASAMIS, researchers from VTT and Aalto University have developed a realistic model for the nanometre scale structure of spruce wood. The model's molecular architecture and behavior with moisture changes correspond well to experimental X-ray and neutron scattering results.¹ It can be used to explain the mechanisms behind wood-water interactions, to predict water mobility and structural changes with moisture, and to support the interpretation of experimental results.

Significance

The new information obtained in SASAMIS leads to a deeper understanding of the fundamental properties of wood-based materials. This can serve as a starting point for the development of new kinds of cellulosic materials that exploit the special interaction with water.

[1] A. Zitting, A. Paajanen, L. Rautkari and P. Penttilä, Deswelling of microfibril bundles in drying wood studied by small-angle neutron scattering and molecular dynamics, *Cellulose*, 28, 10765–10776 (2021) <https://doi.org/10.1007/s10570-021-04204-y>

This work was a part of the Academy of Finland's Flagship Programme under Projects No. 318890 and 318891 (Competence Center for Materials Bioeconomy, FinnCERES)



Molecular visualisation of a cellulose microfibril bundle, a key structural element in wood cell wall nanostructure.

Licensed under CC BY 4.0.