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Research outputs

Awais, M., Altgen, M., Belt, T., Teräväinen, V., Mäkelä, M., Altgen, D., Nopens, M., & Rautkari, L. (2022). Wood–Water Relations Affected by Anhydride and Formaldehyde Modification of Wood. *ACS Omega*.
<https://doi.org/10.1021/acsomega.2c04974>

Belt, T., Awais, M., & Mäkelä, M. (2022). Chemical Characterization and Visualization of Progressive Brown Rot Decay of Wood by Near Infrared Imaging and Multivariate Analysis. *FRONTIERS IN PLANT SCIENCE*, 13, [940745].
<https://doi.org/10.3389/fpls.2022.940745>

Awais, M., Altgen, M., Mäkelä, M., Belt, T., & Rautkari, L. (2022). Quantitative prediction of moisture content distribution in acetylated wood using near-infrared hyperspectral imaging. *Journal of Materials Science*, 57(5), 3416-3429.
<https://doi.org/10.1007/s10853-021-06812-2>

Spiliopoulos, P., Spirk, S., Pääkkönen, T., Viljanen, M., Svedström, K., Pitkänen, L., Awais, M., & Kontturi, E. (2021). Visualizing Degradation of Cellulose Nanofibers by Acid Hydrolysis. *Biomacromolecules*, 22(4), 1399-1405.
<https://doi.org/10.1021/acs.biomac.0c01625>

Penttilä, P. A., Altgen, M., Awais, M., Österberg, M., Rautkari, L., & Schweins, R. (2020). Bundling of cellulose microfibrils in native and polyethylene glycol-containing wood cell walls revealed by small-angle neutron scattering. *Scientific Reports*, 10(1), [20844]. <https://doi.org/10.1038/s41598-020-77755-y>

Altgen, M., Awais, M., Altgen, D., Kyyrö, S., Seppäläinen, H., & Rautkari, L. (2020). Micro-tensile behavior of Scots pine sapwood after heat treatments in superheated steam or pressurized hot water. *Journal of Materials Science*, 55(26), 12621-12635. <https://doi.org/10.1007/s10853-020-04943-6>

Awais, M., Altgen, M., Mäkelä, M., Altgen, D., & Rautkari, L. (2020). Hyperspectral Near-Infrared Image Assessment of Surface-Acetylated Solid Wood. *ACS Applied Bio Materials*, 3(8), 5223-5232. <https://doi.org/10.1021/acsbm.0c00626>

Altgen, M., Awais, M., Altgen, D., Klüppel, A., Mäkelä, M., & Rautkari, L. (2020). Distribution and curing reactions of melamine formaldehyde resin in cells of impregnation-modified wood. *Scientific Reports*, 10(1), 3366. [3366].
<https://doi.org/10.1038/s41598-020-60418-3>

Awais, M., Tanninen, P., Leppänen, T., Matthews, S., Sorvari, J., Varis, J., & Backfolk, K. (2018). A computational and experimental analysis of crease behavior in press forming process. *Procedia Manufacturing*, 17, 835 - 842.
<https://doi.org/10.1016/j.promfg.2018.10.135>

Zaheer, M., Awais, M., Rautkari, L., & Sorvari, J. (2018). Finite element analysis of paperboard package under compressional load. *Procedia Manufacturing*, 17, 1162 - 1170. <https://doi.org/10.1016/j.promfg.2018.10.008>

Awais, M., Sorvari, J., Tanninen, P., & Leppänen, T. (2017). Finite element analysis of the press forming process. *International Journal of Mechanical Sciences*, 131-132, 767-775. <https://doi.org/10.1016/j.ijmecsci.2017.07.053>

Prizes

1. **PUUMIESTEN foundation - Travel Grant**
Awais, Muhammad (Recipient), 1 Jun 2019

2. **Yrjö ja Senja Koivusen säätiö**
Awais, Muhammad (Recipient), 1 Dec 2019

Projects

Charred wood modification

Rautkari, L., Altgen, D., Awais, M., Kyyrö, S., Kymäläinen, M. & Hautamäki, S.
01/08/2017 → 31/12/2018

VERYCOAT: Novel high-performance veneer products by effective drying and nano-coating

Rautkari, L., Altgen, D., Altgen, M., Mäkelä, M., Awais, M., Valkonen, M., Vergara Lourencon, T. & Yamamoto, A.
01/06/2019 → 31/05/2022

WATERWOOD: Water vapour sorption behaviour of wood under load

Rautkari, L., Altgen, M., Valkonen, M., Vergara Lourencon, T. & Awais, M.
01/09/2021 → 20/11/2025

Wood modification using pressurized hot water

Rautkari, L., Altgen, M., Kyyrö, S., Awais, M., Hautamäki, S., Jansson, E., Hänninen, T., Vergara Lourencon, T., Valkonen, M. & Belt, T.
01/09/2017 → 31/08/2021