Quantifying Time Dependent Moisture Storage and Transport Properties

This paper describes an experimental and numerical approach to quantify the time dependence of sorption mechanisms for some hygroscopic building - mostly insulation - materials. Some investigations of retarded sorption and non-Fickian phenomena, mostly on wood, have given inspiration to the present analysis on these other materials. The true moisture capacity of a material cannot be described by the slope of the sorption isotherms alone, when the material is exposed to dynamic changes in the moisture conditions. Still, the assumption of an immediate equilibrium is well accepted in the simulation models. A number of small specimens are exposed to ab- and desorption steps in a controlled relative humidity and temperature. The change in the bulk moisture content is followed continuously as the specimen is directly attached to a balance. The experimental results show retarded sorption. A preliminary approach for determining a sorption coefficient, which can model retarded sorption, is encouraging.

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