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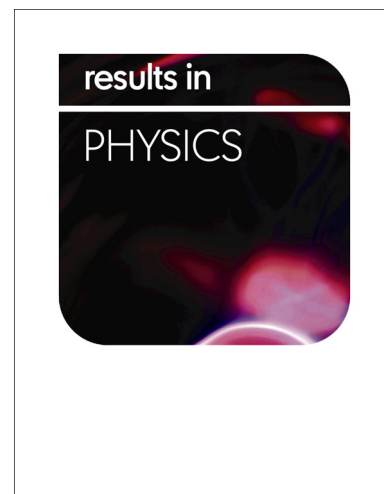
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Effects of removal of different chemical components on moisture sorption property of *populus euramericana* Cv. under dynamic hygrothermal conditions

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Abstract: Effects of chemical components on wood sorption property under dynamic condition were investigated for the first time. Hemicellulose, lignin and extractive (denoted as DHC, DL and DE, respectively) were removed from *populus euramericana* Cv., 20mm in radial (R) and tangential (T) directions with thickness of 4mm along the grain, then the wood was subjected to cyclic tests where relative humidity (RH) varied from 45% to 75% sinusoidally at 25°C. Based on measured data automatically, the results showed that, various chemical components had different effects on dynamic sorption behaviors of wood. The DL exhibited the largest moisture content and diffusion coefficient, followed by the DE, Control and DHC. This indicated lignin or extractive removal accelerated the dynamic sorption process and improved hygroscopicity of wood, while hemicellulose removal caused opposite effects. Theoretical sorption model was further applied and the modeled curves fitted satisfactorily with experimental data. Dynamic moisture gradient distribution inside the different treated wood was investigated and amplitude of moisture showed negative relation with wood element depth, while phase lag presented an opposite trend. Amplitude of DL was the largest while its phase lag was the least. Conditioning thickness for RH was greatest for DHC, about twice as much as the minimum of DL.

Key words: chemical components removal, dynamic cyclic relative humidity, sorption, conditioning property, wood

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