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Sandwich diffusion model for moisture absorption of flax/glass fiber reinforced hybrid composite

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Abstract

Flax/glass fiber reinforced hybrid composites take up a high amount of moisture from humid environment due to hydrophilic nature of flax fibers. Some experimental works have been carried out to investigate the diffusion kinetic of these hybrid composites with different stacking sequences. However, few analytical efforts have been made to effectively describe their moisture diffusion behaviors thus far. In this paper, a sandwich diffusion model is established to predict the moisture absorption behavior of flax/glass hybrid composites with different stacking sequences. To deal with interface concentration problem across flax fiber layers and glass fiber layers, the continuous normalized concentration and mass-conserving condition are employed. Both finite element analysis and moisture absorption experiments are performed to validate the proposed model, and the results shows that good agreements are achieved.

Keywords

Flax fiber; Hybrid composite; Sandwich diffusion model; Moisture absorption;
Interface condition;

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