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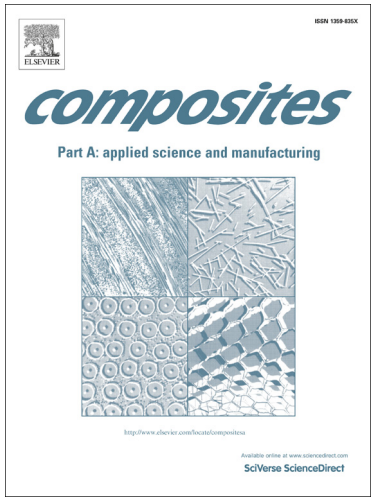

Simulation of coupling filtration and flow in a dual scale fibrous media

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Simulation of coupling filtration and flow in a dual scale fibrous media

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ABSTRACT: In this article, numerical simulation of suspension (particles filled-resin) flow through a fibrous media taking into account dual scale porosity in LCM (Liquid Composite Molding) processes is presented. During the flow, a strong interaction between the particle motion and the fluid flow takes place at the porous media wall (the fiber bundle surface). In this study, the Stokes-Darcy coupling is used to describe the resin flow at mesoscopic scale to treat the particles in suspension. A "fluid" model to describe the suspension flow, a "filtration" model to describe the particle capture and a "solid" model dedicated to the modeling of mass particles dynamics was used. The "solid" model is also operated to identify the particles retention.

For validation, the numerical results of proposed model were compared with the experimental results from the literature and found in good agreement. Then, other numerical results studying the suspension's rheological behavior are presented.

Keywords:

A. Particle-reinforcement, C. Computational Modeling, E. Resin Transfer Molding (RTM), Filtration.