# Melting And Solidification Behavior Of PCM Embedded In Metal Foam

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## Abstract

In this paper, a numerical study is conducted on the melting and solidification process of metal foam/paraffin wax with cyclic heating and cooling. A mathematical model based on the Brinkman-Frochheimer extended Darcy equation and the local thermal non-equilibrium model (LTNE) is proposed. The paraffin phase change is modeled by enthalpy-porosity method. The numerical model is solved using a finite element analysis by the Porous Media and Subsurface flow module (Brinkman Equation (br)), and the local Thermal Non-Equilibrium module in COMSOL Multiphysics®. The steps of the numerical model can be summarized as, discretization of the domain and coupled governing equations (element, type, and size), defining the time step and relative and absolute tolerances or errors for the convergence conditions of the solution, determining the nonlinear settings for iteration sequences and selecting the appropriate solver techniques. The numerical results are validated by comparing with experimental data and other literature numerical models result. Two types of boundary conditions was studied, constant and sinusoidal heat supply. The results showed that the time of melting it's reduced with sinusoidal heating.