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Numerical Study on the Heat Transfer Characteristics of Composite Phase Change Materials

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Abstract : A phase change material (PCM) is a substance which absorbs a large amount of energy when undergoing a change of solid-liquid phase. The good physical and chemical properties of C or SiC foam reveal the possibility of using them as a thermal conductivity enhancer for the PCM. C or SiC foam composite PCM has a high effective conductivity and becomes one of the most interesting thermal storage techniques due to its advantage of simplicity and reliability. The paper developed a numerical method to simulate the heat transfer of SiC and C foam composite PCM, a finite volume technique was used to discretize the heat diffusion equation while the phase change process was modeled using the equivalent specific heat method. The effects of the porosity were investigated based on the numerical method, and the effects of the geometric model of the microstructure on the equivalent thermal conductivity was studies.

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