عنوان مقاله:

Multi-objective Pareto optimization of cooling of frost formation in interrupted Micro Channel Heat Sinks (MCHS) considering microfluidic effects in slip regime

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خلاصه مقاله:

In this paper, by employing the Computational Fluid Dynamics (CFD) and applying the NSGA II algorithm, the multi-objective optimization of frost formation in the interrupted Micro Channels Heat sinks (MCHS) is investigated considering microfluidic effects in slip flow regime. For numerical modeling, basic equations of humid air and frost including continuum, momentum, energy and phase change mechanism are numerically solved and results are compared with reported data and good agreements are observed. Knudsen number (Kn) is changed so that slip flow regime requirement is accomplished. The design variables are geometrical parameters of MCHSc. In the results section, the Pareto front, which simultaneously displays the changes of the heat transfer rate and the frost formation, will be presented, and it will be demonstrated that the Pareto front conveys very important results for the two phase thermal designing of MCHSc. Finally, the multi-objective optimization results computed in this paper are compared with the CFD data and very useful and valuable information is obtained.

کلمات کلیدی:

CFD, frost formation, MCHS, microchannel, microfluidic, MOO, slip regime

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