عنوان مقاله:

Multi-objective optimization of nanofluid flow in microchannel heat sinks with triangular ribs using CFD and genetic algorithms

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خلاصه مقاله:

Abstract In this paper, multi-objective optimization (MOO) of Al۲O۳-water nanofluid flow in microchannel heat sinks (MCHS) with triangular ribs is performed using Computational Fluid Dynamics (CFD) techniques and Non-dominated Sorting Genetic Algorithms (NSGA II). At first, nanofluid flow is solved numerically in various MCHS with triangular ribs using CFD techniques. Finally, the CFD data will be used for Pareto based multi-objective optimization of nanofluid flow in MCHS with triangular ribs using NSGA II algorithm. In the MOO process there are seven geometrical and non-geometrical parameters and the conflicting objective functions are to simultaneously maximize the amount of heat transfer and minimize the pressure drop. Five optimum designs are determined and discussed for both nanofluid and base fluid flows. Details of design variables for each of five optimum points are deeply discussed. It is shown that the achieved Pareto solution includes important design information on nanofluid flow in MCHS with triangular ribs.

کلمات کلیدی:

Microchannel heat sink (MCHS), Nanofluid, multi-objective optimization (MOO), NSGA II