عنوان مقاله:

Numerical Simulation of a Rectangular Micro-Channel with Nano-Fluid Flow

محل انتشار:

دومین همایش بین المللی مهندسی مکانیک، صنایع و هوافضا (سال: 1397)

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خلاصه مقاله:

In this paper, compare the effect of nanofluid with water in average heat transfer and pressure drop in order to have better heat transfer in rectangular microchannel for cooling electrical appliances. Average heat transfer and pressure drop of the nanofulid flow inside a microchannel with rectangular cross sections is simulated. The three-dimensional steady laminar flow and heat transfer governing equations are solved using finite volume method. The computational domain is taken as the entire heat sink including the inlet/outlet ports, wall plenums, and microchannels. Heat flux, average heat transfer coefficient and pressure drop in different Reynolds number are studied. Nanoparticles of aluminum oxide, copper oxide and titanium dioxide were added to pure water with different volume fraction up to 4% . Based on the results, the present work reveals that use of nano-fluids at low Reynolds numbers and low heat flux have less effect on heat transfer but in this case the lower pressure drop they have. Aluminum oxide nano-fluids gives the best result in terms of heat transfer and pressure drop(for example compare to pure water heat transfer is 30%better and pressure drop is 40% higher).

کلمات کلیدی:

rectangular microchannel, nano-fluid, heat transfer, pressure drop.

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