

عنوان مقاله:

Investigation of thermal performance and entropy generation in a microchannel heatsink with a wavy channel using bio nanofluid

محل انتشار:

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خلاصه مقاله:

In the present study, two cases of a microchannel heat sink are studied: i) with 50 wavy channels, and ii) with the addition of wavy tubes. Also, the effect of nanofluid Ag/water-ethylene glycol 50% is investigated. ANSYS Fluent software was used to solve the equations expressed in the problem geometry. To solve the momentum equation, the second-order UPWIND method is used. Also, the SIMPLEC algorithm with a staggered pressure grid is employed to couple velocity and pressure fields. The results show that the addition of a microtube significantly increases the overall thermal coefficient of the system because despite the microtube and having two different geometries in a heatsink at the same time, the heat exchange between the body and the fluid increases so that in a flow without a microtube with Reynolds number 300, the average surface temperature is 315, but the addition of a microtube reduces this temperature to 309, which is equal to 6 degrees. Also, as the Reynolds number (Re) increases, the effect of increasing the concentration of nanoparticles enhances. The results demonstrate that the thermal entropy generation () decreases at high values of Re. In addition, the decrease in frictional entropy generation () due to the increase in nanoparticles is directly related to their concentration and independent of Re. So that the Percentage of decrease in friction entropy due to an increase in nanoparticle concentration relative to the pure fluid is equal to 1% for a concentration of 0.1% and 9% for a concentration of 1%. It is revealed that total entropy generation () and do not exhibit the same behavior.

کلمات کلیدی:

Numerical study, Micro Heatsink, Entropy, Wavy Channel, Bio Nanofluid

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