

عنوان مقاله:

Numerical Study on Forced Convection of Slip Flow in A Microchannel with Smooth and Sinusoidal Walls

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خلاصه مقاله:

The micro-scale equipment has many advantages, including high thermal performance, high surface-to-volume ratio in heat transfer, small size, low weight, low required fluid and high design flexibility. In this study, fluid flow inside a microchannel is modeled under the assumption of laminar, incompressible, and two-dimensional flow under symmetric boundary conditions. The slip boundary condition is applied to the walls and the flow in the channel output is assumed to be fully developed. The effect of sinusoidal wall with the domain of ± 0.1 on the hydrodynamic and thermal behavior of the fluid is investigated and the results are compared with the results of smooth wall. The results show that for a constant Reynolds number, the maximum velocity decreases in the microchannel center by increasing the slip coefficient. Also, the comparison between the results of the wavy-wall microchannel and the microchannel with a smooth wall indicates that the heat transfer in the smooth microchannel is less than that in wavy-wall one. Considering the boundary conditions, the thermal behavior of the fluid is approximately the same for two cases in which both walls are sinusoidal and the only upper wall is sinusoidal.

کلمات کلیدی:

Microchannel, slip boundary condition, Slip Flow, Wavy wall

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