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Title: Numerical analysis of MHD combined convective nanofluid flow in a lid driven enclosure equipped with corrugated boundary and internal heat source

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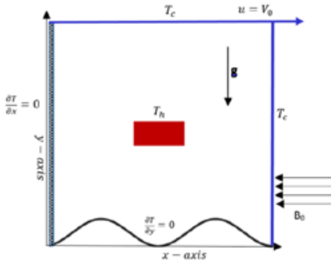
The problem of MHD combined convection is analyzed in a lid driven enclosure with corrugated wavy bottom wall filled with Cu-H2O nanofluid in presence of internal heat source. The top and right walls of the enclosure are maintained with a uniform cold temperature Tc whereas the left wall and bottom wavy wall are kept adiabatic. The top wall is moving with a constant velocity upon its lid and a rectangular heat source is placed horizontally inside the enclosure. The physical problems are characterized by 2D governing partial differential equations along with proper boundary conditions and are discretized using Galerkin's finite element formulation. The study is executed by analyzing different ranges of geometrical and physical parameters namely, the ratio of heat source and cavity height ($0.05 \leq a/H \leq 0.2$), volume fraction of nanoparticles ($0 \leq \varnothing \leq 0.09$), Hartmann number ($0 \leq Ha \leq 90$) and Richardson number ($0.1 \leq Ri \leq 10$). The numerical results show that, in the combined convection region. In absence of magnetic field, heat transfer rate decreases approximately 3%, 9% and 24% with the increasing value of the ratio (heat source height and cavity height) from 0.05 to 0.07,0.1 and 0.2 respectively. In comparison with flat wall, heat transfer rate increases about 9% and 16% respectively with the increasing wave number of corrugated wall to 2 and 4. Heat transfer rate increases about 8% and 16% and 25% respectively with the increasing value of volume fraction 3%, 6% and 9% respectively in comparison with base fluid. Heat transfer rate starts to decline with the instigation of magnetic field. It decreases approximately 26% and 53% with the increasing value of Ha from 0 to 30 and 60 respectively [Figure 1].



Biography

Kakali Chowdhury is working as a faculty member of Mathematics in the department of Electrical and Computer Engineering of Presidency University, Dhaka, Bangladesh. She obtained her B.Sc. and M.Sc. degree from Rajshahi University, Rajshahi, Bangladesh. She has obtained her M.Phil degree from Bangladesh University of Engineering & Technology (BUET), Dhaka and now she is continuing her PhD degree in BUET, Dhaka also. Besides teaching, for a long time she is engaged in the research work in the area of Computational Fluid Dynamics more specifically she has her expertise in the area of fluid flow and heat transfer. Recently she has extended her research work to Nanomaterial and Nanotechnology.

structures, depending on the stacking sequences on the close-packed planes of the ordered lattice, like 3R, 9R and 18R depending on the stacking sequences. Periodicity and unit cell is completed through 18 layers in 18R structures.

In the present contribution; x-ray and electron diffraction studies were carried out on two solution treated copper based CuZnAl and CuAlMn alloys. Electron and x-ray diffraction exhibit super lattice reflections. Specimens of these alloys were aged at room temperature and a series of x-ray diffractions were taken at different stages of aging at room temperature in a long-term interval. X-Ray diffraction profiles taken from the aged specimens in martensitic conditions reveal that crystal structures of alloys chance in diffusive manner and this result refers to the stabilization.

Keywords: Shape memory effect, Martensitic transformation, Thermo elasticity, Super elasticity, Lattice twinning detwinning.

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