

Accepted Manuscript

Numerical investigation for CuO-H₂O nanofluid flow in a porous channel with magnetic field using mesoscopic method

M. Sheikholeslami



PII: S0167-7322(17)34913-9
DOI: doi:[10.1016/j.molliq.2017.11.069](https://doi.org/10.1016/j.molliq.2017.11.069)
Reference: MOLLIQ 8185
To appear in: *Journal of Molecular Liquids*
Received date: 15 October 2017
Accepted date: 8 November 2017

Please cite this article as: M. Sheikholeslami , Numerical investigation for CuO-H₂O nanofluid flow in a porous channel with magnetic field using mesoscopic method. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), doi:[10.1016/j.molliq.2017.11.069](https://doi.org/10.1016/j.molliq.2017.11.069)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Numerical investigation for CuO-H₂O nanofluid flow in a porous channel with magnetic field using mesoscopic method

M. Sheikholeslami¹

Department of Mechanical Engineering, Babol Noshirvani University of Technology, Babol, IRAN

Abstract

CuO-H₂O nanofluid flow inside a porous channel due to magnetic field is simulated by means of Lattice Boltzmann method. Brownian motion impact added in model of nanofluid. Roles of Reynolds number (Re), CuO-water nanofluid volume fraction (ϕ), Darcy number (Da) and Hartmann number (Ha) are demonstrated. Results demonstrate that convective mode improves with increase of Da, Re . Velocity reduces with increase of Lorentz forces but rate of heat transfer enhances with rise of Hartmann number.

Keywords: CuO-H₂O Nanofluid; Porous channel; LBM; Lorentz forces; Forced convection.

Nomenclature

Ha	Hartmann number	ρ	Fluid density
f_k^{eq}	Equilibrium distribution.	ν	Kinematic viscosity
u, v	x and y-directions velocities	ϕ	Volume fraction
Nu	Nusselt number	α	Thermal diffusivity
g^{eq}	Equilibrium internal for temperature	ψ	stream function
k	Thermal conductivity	τ	Lattice relaxation time
e_α	Discrete lattice velocity in direction		

Subscripts

¹ Corresponding Author:

Email: m.sheikholeslami1367@gmail.com, mohsen.sheikholeslami@nit.ac.ir (M. Sheikholeslami)

Download English Version:

<https://daneshyari.com/en/article/7843810>

Download Persian Version:

<https://daneshyari.com/article/7843810>

[Daneshyari.com](https://daneshyari.com)