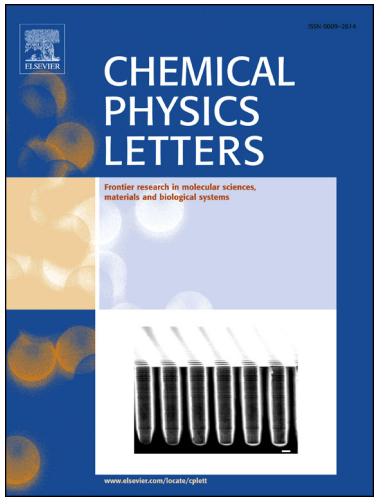

Research paper

Numerical investigation of nanofluid transportation in a curved cavity in existence of magnetic source

Mohsen Sheikholeslami, Davood Domiri Ganji

PII: S0009-2614(16)30895-8
DOI: http://dx.doi.org/10.1016/j.cplett.2016.11.013
Reference: CPLETT 34320

To appear in: *Chemical Physics Letters*

Received Date: 24 September 2016
Revised Date: 5 November 2016
Accepted Date: 8 November 2016

Please cite this article as: M. Sheikholeslami, D.D. Ganji, Numerical investigation of nanofluid transportation in a curved cavity in existence of magnetic source, *Chemical Physics Letters* (2016), doi: http://dx.doi.org/10.1016/j.cplett.2016.11.013

Numerical investigation of nanofluid transportation in a curved cavity in existence of magnetic source

Mohsen Sheikholeslami[1], Davood Domiri Ganji

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

Abstract

Thermal radiation impact on magnetic nanofluid heat transfer in a curved cavity is studied. Impact of external magnetic source is taken into account. Innovative numerical method is chosen namely CVFEM. Impacts of radiation parameter (Rd), Rayleigh (Ra), Hartmann (Ha) numbers and volume fraction of Fe_3O_4 (ϕ) on hydrothermal treatment are examined. Results indicate that temperature gradient enhances with augment of Ra, ϕ, but it reduces with rise of Rd, Ha. Lorentz forces cause the nanofluid velocity to reduce and augment the thermal boundary layer thickness. Impact of radiation becomes stronger for higher buoyancy forces.

***Keywords*:** Thermal radiation; Magnetic Nanofluid; Heat transfer; Free convection.

Nomenclature

B	Magnetic induction	α	Thermal diffusivity
Ec	Eckert number	$\Omega \& \Psi$	dimensionless vorticity & stream function
H	The magnetic field strength	Θ	dimensionless temperature
$\vec{g}$	Gravitational acceleration vector	ρ	Fluid density
Nu	Nusselt number	μ	Dynamic viscosity
Ha	Hartmann number	σ	Electrical conductivity
T	Fluid temperature	***Subscripts***	
Ra	Rayleigh number	nf	Nanofluid
V, U	Vertical and horizontal dimensionless velocity	f	Base fluid
Y, X	Vertical and horizontal space	loc	Local

[1] Corresponding Author:
Email: mohsen.sheikholeslami@yahoo.com (Mohsen Sheikholeslami), mirgang@nit.ac.ir (Davood Domiri Ganji)