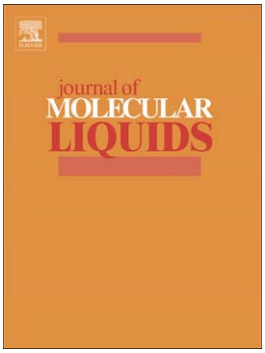

Impact of chemical processes on magneto nanoparticle for the generalized Burgers fluid

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Impact of chemical processes on magneto nanoparticle for the generalized Burgers fluid

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Abstract: This communication addresses a study for heterogeneous-homogeneous processes in generalized Burgers nanofluid flow past a stretching sheet in the presence new mass flux condition. Additionally, the impacts of magnetohydrodynamics (MHD) and nonlinear thermal radiation are taken into account. The formulated nonlinear coupled model is analytically elucidated by utilizing the homotopy analysis method (HAM). The impacts of various thermophysical parameters on magnetonanofluid temperature, concentration and local Nusselt numbers are analyzed through graphs as well as tabular form and discussed in detail. The presented results demonstrate that the thermal and concentration boundary layer thicknesses are significantly influenced by the thermophoresis and Brownian motion parameters. Appreciable growth in the rate of heat transfer is observed when the Prandtl number is augmented. Moreover, it is also found that concentration profile $g(\eta)$ is substantially influenced due to the homogeneous reaction parameter and Schmidt number.

Keywords: Magnetohydrodynamics; Generalized Burgers nanofluid ; Heterogeneous-homogeneous processes.

1 Introduction

In the rapid worldwide progress of science and technology, enhancing the efficiency of energy transfer as well as saving energy is posing new challenges. However, utilizing advanced materials with improved properties is standout amongst one of the most widely adopted approaches of heat transfer enhancement. While the traditional heat transfer liquids, such as engine oil, water or ethylene glycol, have unable to encounter the special requirements such as micro cooling and strong intensity of heat transfer. Meanwhile, the limited heat transfer capacities of the current heat transfer media based on their thermophysical properties has seriously handicapped the development of cooling technology and high-efficiency heat transfer. For instance, solar energy the richest exploitable renewable assets of energy, can adequately supplement worldwide energy demand when utilized effectively. However, major constraint in use of solar energy is low conversion of solar energy and poor collector. Although, these traditional absorbers are capable of converting the solar radiations to thermal energy and they are inefficient in transferring thermal energy to the working liquid. Therefore, heat transfer media with excellent heat transfer performance and high thermal conductivity should be developed to meet the industrial requirements. One of the

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