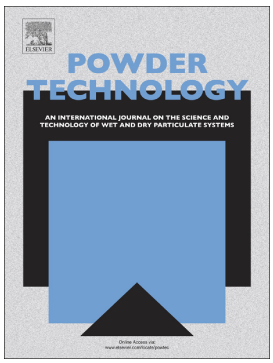

Flow of Eyring-Powell dusty fluid in a deferment of aluminum and ferrous oxide nanoparticles with and Cattaneo-Christov heat flux

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PII: S0032-5910(18)30742-3
DOI: doi:10.1016/j.powtec.2018.09.015
Reference: PTEC 13689

To appear in: *Powder Technology*

Received date: 14 December 2017
Revised date: 28 August 2018
Accepted date: 6 September 2018

Please cite this article as: S. MamathaUpadhya, C. Mahesha, C.S.K. Raju, S.A. Shehzad, F.M. Abbasi , Flow of Eyring-Powell dusty fluid in a deferment of aluminum and ferrous oxide nanoparticles with and Cattaneo-Christov heat flux. Ptec (2018), doi:10.1016/j.powtec.2018.09.015

Flow of Eyring-Powell dusty fluid in a deferment of aluminum and ferrous oxide nanoparticles with and Cattaneo-Christov heat flux

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Abstract

This is a speculative investigation of the magnetohydrodynamic flow of Eyring-Powell liquid under suspension of nano-particles and dust. A simulation is executed by fraternization of Ferrous oxide (Fe_3O_4) and aluminum oxide (Al_2O_3) nanoparticles in Eyring-Powell dusty fluid. Dispersion of ferrous oxide (Fe_3O_4) and aluminum oxide (Al_2O_3) nano-particles in dusty fluid have applications in heat exchanger system, biocompatibility, biosensors, nuclear reactor heating process, detection and cancer treatment, in monitoring stem cells differentiation etc. Ferrous oxide (Fe_3O_4) and aluminum oxide (Al_2O_3) mixtures are substantially useful in optimizing the heat transport occurrences. Implementation of similarity variables leads to the systems of ordinary differential expressions. These nonlinear systems of ODEs are tackled with the use of Runge-Kutta-Fehlberg Scheme (RKFS). The analysis of dimensionless temperature and velocity fields is given via plots. The numerical benchmarks of friction-factors and heat transport rate are for different constraints are given and examined. Obtained results are matched with previously published material and noted to be satisfactory. This model expresses that the rate of heat transportation is more in aluminum oxide nanofluid compared to ferrous oxide nanofluid with existing of viscous variation parameter. The presence of thermal and momentum slips correspond the enhancement in local Nusselt number in case of ferrous oxide nanoparticles when compared to aluminum oxide nanoparticles.