Scopus

Documents

Reddy, P.S., Chamkha, A.J.

Soret and Dufour effects on MHD convective flow of Al2O3–water and TiO2–water nanofluids past a stretching sheet in porous media with heat generation/absorption

(2016) *Advanced Powder Technology*, 27 (4), pp. 1207-1218. Cited 63 times.

Abstract
In this paper, we have presented a numerical solution to the general problem of MHD flow, heat and mass transfer of viscous incompressible nanofluid past a uniformly stretching sheet through porous media with heat generation/absorption, thermal radiation, chemical reaction, thermo-diffusion and diffusion-thermo effects. Many theoretical and experimental studies suggested that the thermal conductivity of the base fluid increases in the range of 15–40% when nanoparticles are added to the base fluid. This enhancement in the thermal conductivity of the nanofluid depend on many mechanisms of the added nanoparticles like particle agglomeration, volume fraction, Brownian motion, thermophoresis, nanoparticle size, etc. Though we have different varieties of nanofluids, we have considered Al2O3–water and TiO2–water based nanofluids in this problem. The transformed conservation equations for the nanofluid are solved numerically subject to the boundary conditions using an optimized, extensively validated, variational finite element method. The numerical code is validated with previous studies. The influence of important non-dimensional parameters, namely nanoparticles volume fraction (φ), Prandtl number (Pr), magnetic parameter (M), Soret parameter (Sr), Dufour parameter (Du), space-dependent (A1) and temperature-dependent (B1) heat source/sink parameters on the velocity, temperature and nanoparticle concentration fields as well as the skin-friction coefficient, Nusselt number and Sherwood number are examined in detail and the results are shown in graphically and in tabular form to illustrate the physical importance of the problem. © 2016 The Society of Powder Technology Japan

2-s2.0-85013683251
Document Type: Article
Publication Stage: Final
Source: Scopus