

Documents

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Natural Convection Flow of a Nanofluid in an Inclined Square Enclosure Partially Filled with a Porous Medium

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Abstract

This work analyses free convection flow of a nanofluid in an inclined square enclosure consisting of a porous layer and a nanofluid layer using the finite difference methodology. Sinusoidal temperature boundary conditions are imposed on the two opposing vertical walls. Nanofluids with water as base and Ag or Cu or Al₂O₃ or TiO₂ nanoparticles are considered for the problem. The related parameters of this study are the Darcy number, nanoparticle volume fraction, phase deviation, amplitude ratio, porous layer thickness and the inclination angle of the cavity. A comparison with previously published work is performed and the results are in good agreement. Detailed numerical data for the fluid flow and thermal distributions inside the square enclosure, and the Nusselt numbers are presented. The obtained results show that the heat transfer is considerably affected by the porous layer increment. Several nanoparticles depicted a diversity improvement on the convection heat transfer. © 2017 The Author(s).

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