World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:11, No:07, 2017

Effects of Heat Source Position on Heat Transfer in an Inclined Square Enclosure Filled with Nanofluids

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Abstract : The effects of a uniform heat source position on the heat transfer flow inside an inclined square enclosure filled with different types of nanofluids having various shapes of the nanoparticles are investigated numerically following one component thermal equilibrium model. The effects of the Brownian diffusion of the nanoparticles, magnetic field intensity and orientation are taken into consideration in nanofluid modeling. The heat source is placed in the middle of a wall of the enclosure while the opposite wall of it is kept at different temperature. The other walls of the enclosure are kept insulated. The results indicate that the heat source position significantly controls the heat transfer rates of the nanofluids. The distributions of the average heat transfer rates varying the position of the heat source with respect to the geometry inclination angle are calculated for the first time. The outcomes of the present research may be helpful for designing solar thermal collectors, radiators, building insulators and advanced cooling of a nuclear system.

Keywords : heat source, inclined, square enclosure, nanofluids
Conference Title : ICMN 2017 : International Conference on Microfluidics and Nanofluidics
Conference Location : Prague, Czechia
Conference Dates : July 09-10, 2017