

Numerical Study of Natural Convection of a Localized Heat Source at the up of a Nanofluid-Filled Enclosure

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Abstract : This article presents a numerical study of natural convection of a heat source embedded on the up wall of an enclosure filled with nanofluid. The bottom and vertical walls of the enclosure are maintained at a relatively low temperature. The type of nanofluid and solid volume fraction of nanoparticle on the heat transfer performance is studied. The results indicated that adding nanoparticle into pure paraffin improves heat transfer. The results are presented over a wide range of Rayleigh numbers ($Ra = 10^3 - 10^5$), the volume fraction of nanoparticles ($0 \leq \phi \leq 0.4\%$). For an enclosure, the Nusselt number of a cu-paraffin nanofluid was reduced by increasing the volume fraction of nanoparticles above 0.2%.

Keywords : nanofluid, heat transfer, heat source, enclosure

Conference Title : ICME 2015 : International Conference on Mechanical Engineering

Conference Location : Cape Town, South Africa

Conference Dates : November 05-06, 2015