

Numerical Study of Developing Laminar Forced Convection Flow of Water/CuO Nanofluid in a Circular Tube with a 180 Degrees Curve

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Abstract : Numerical investigation into convective heat transfer of CuO-Water based nanofluid in a pipe with return bend under laminar flow conditions has been done. The impacts of Reynolds number and the volume concentration of nanoparticles on the flow and the convective heat transfer behaviour are investigated. The results indicate that the increase in Reynolds number leads to the enhancement of average Nusselt number, and the increase in specific heat in the presence of the nanofluid results in improvement in heat transfer. Also, the presence of the secondary flow in the curve plays a key role in increasing the average Nusselt number and it appears higher than the inlet and outlet tubes. However, the pressure drop curve increases significantly in the tubes with the increase in nanoparticles concentration.

Keywords : laminar forced convection, curve pipe, return bend, nanofluid, CFD

Conference Title : ICNMS 2016 : International Conference on Nanotechnology and Materials Sciences

Conference Location : Copenhagen, Denmark

Conference Dates : June 27-28, 2016