Heat Transfer Enhancement of AL_2O_3/Water Nanofluid in a Double Pipe Heat Exchanger

M. Akhtari[a], M. Haghshenas Fard[a*], M.R. Talaie [b]

[a] Department of Chemical Engineering, Isfahan University of technology, Isfahan 84156-8311, Iran

[b] Department of Chemical Engineering, University of Isfahan, Isfahan, Iran

*Haghshenas@cc.iut.ac.ir

Abstract: In this study the heat transfer of Al_2O_3/water nanofluid in a double pipe counter flow heat exchanger is investigated both experimentally and numerically. Effects of hot and cold stream mass flow rates and temperature and nanoparticle concentration on the heat transfer rate have been investigated. The results indicate that the heat transfer rate increases with increasing in nanofluid temperature and increasing mass flow rate of the cold and hot fluid.

Computed heat transfer rates of nanofluid are in good agreement with the experimental data. The average relative error between the CFD predictions and experimental data is about 23%.

Keywords: Double pipe heat exchanger; Nanofluids; Heat transfer; CFD