

Heat transfer enhancement in heat exchangers by metal oxide nanofluids: A Review

MALIK PARVEZ AHMED #, NAVEED AHSAN BHAT, DAWOOD RASHID

Department of Chemical Engineering, National Institute of Technology, Srinagar-190006,

Corresponding Author, Email: pkash123@yahoo.com

Abstract: Heat exchangers are used in industries and power sectors due to their simple structural design, larger heat transfer surface area and higher heat transfer capability. In recent past few years so much work has been done to improve the heat transfer rate of heat exchangers. Nanofluids are a new class of fluids engineered by dispersing nanometer-sized materials base fluids such as oil, ethylene glycol and water. Due to their small size, Nanofluids have been found to possess enhanced thermo physical properties particularly thermal conductivity, thermal diffusivity, viscosity, and convective heat transfer coefficient compared to these properties when checked for base fluids. The heat transfer enhancement using nanofluid mainly depends upon various parameters such as type of nanoparticles used, size, shape, concentration of nanoparticles plus the type of base fluid incorporated. The results seem to suggest that due to peculiar properties of nano sized materials, there is significant heat transfer augmentation in heat exchangers. Currently, research is going on to understand effects of concentration and change of base fluid on the increase in heat transfer coefficient. Transfer of nanofluid technology in heat exchangers from lab scale to the industrial scale remains a challenge as well as a research area in the current scenario. Use of nanofluids in automobile sector as coolant is also an opportunity and subject of immense research. In this paper, we will discuss the recent advances in the field of heat transfer augmentation via nanofluids: the main challenges ahead and the future prospectus of the subject matter.

Keywords: Nanofluids, Nanoparticles, Heat transfer coefficient, Heat Exchangers, Heat Transfer Enhancement.