

Experimental Investigation of Nanofluid Heat Transfer in a Plate Type Heat Exchanger

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Abstract : In this study, it was aimed to determine the convective heat transfer characteristics of water-based silicon dioxide nanofluids (SiO₂) with particle volume fractions of 0.2 and 0.4% vol. Nanofluids were tested in a plate type heat exchanger with six plates. Plate type heat exchanger was manufactured from stainless steel. Water was driven in the hot flow side, and nanofluids were driven in the cold flow side. The thermal energy of the hot water was taken by nanofluids. Effect of the inlet temperature of the hot water was investigated on heat transfer performance of the nanofluids while the inlet temperature of the nanofluids was fixed. In addition, the effects of the particle volume fraction and the cold flow rate on the performance of the system were tested. Results showed that increasing inlet temperature of the hot flow caused heat transfer to enhance. The suspended solid particles into the carrier fluid also remarkably enhanced heat transfer, and, an increase in the particle volume fraction resulted in an increase in heat transfer.

Keywords : heat transfer enhancement, SiO₂-water, nanofluid, plate heat exchanger

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