IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, August 2022
Impact Factor: 6.252

Experimental Investigation into Heat Transfer Enhancement of Phase Change Material

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Abstract: *It is known fact that thermal energy storage system is very promising technique used for storing energy. The present work investigates the performance of Latent heat storage system (LHS) using phase change material (PCM) i.e paraffin wax during charging and discharging. There are number of ways to improve thermal performance of energy storage systems. Thermal conductivity of PCM can be improved by addition of high thermal conductive nano particles. In this work, Latent heat storage experimental set up has been developed and series of experiments have been carried out. An appropriate geometry in the form of a concentric double pipe heat storage unit is chosen. Graphene Nanoparticles (GNP) are added to improve the thermal conductivity of PCM and its effect has been investigated. Charging and discharging performances have been evaluated in terms of contours of temperature and liquid fraction variation for both plain PCM and PCM with 3% GNP for process parameters such as Stephen number (St) and Reynolds number (Re). The obtained contours help in predicting and drawing concluding remarks for the effect of addition of GNP on charging and discharging performances of PCM..*

Keywords: Latent Heat Storage System.

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ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
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Impact Factor: 6.252

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