

Accepted Manuscript

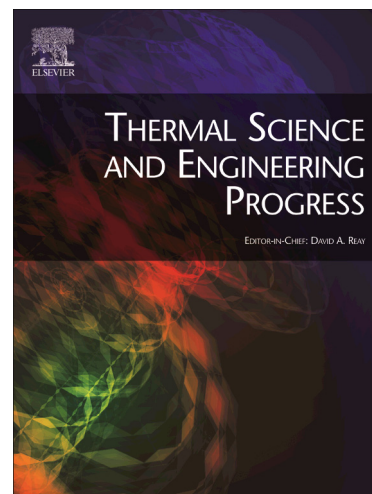
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PII: S2451-9049(17)30332-3
DOI: <https://doi.org/10.1016/j.tsep.2017.10.020>
Reference: TSEP 84

To appear in: *Thermal Science and Engineering Progress*

Received Date: 27 September 2017
Revised Date: 26 October 2017
Accepted Date: 26 October 2017



Please cite this article as: M.Z. Saghir, A.M. Bayomy, Heat Enhancement and Heat Storage for a Ternary Mixture in a Circular Pipe, *Thermal Science and Engineering Progress* (2017), doi: <https://doi.org/10.1016/j.tsep.2017.10.020>

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Heat Enhancement and Heat Storage for a Ternary Mixture in a Circular Pipe

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Abstract:

Water is among the suitable fluids for the purpose of electronic cooling. The addition of metallic nanoparticles enhances heat removal (also called nanofluid). The reason for this enhancement is due to the thermal conductivity of water. Thus, an improvement in heat removal around 6% is found by using nanofluid. For heat storage, it was demonstrated numerically that the addition of MicroEncapsulated Phase Change Material (MEPCM) nanoparticles in water further improves the heat storage capabilities of the fluid. Yet when the two nanoparticles of Al_2O_3 and MEPCM are added to water, the heat storage capability of the fluid is increased. It was demonstrated and proven that 20% concentration of MEPCM nanoparticles and 3% concentration of Al_2O_3 nanoparticles in the fluid of water is the best mixture composition for heat storage for different flow rate. Regardless whether the flow rate is high or low, however, the here-proposed ternary mixture of Al_2O_3 , MEPCM and water is the recommended fluid mixture for heat storage.

Keyword: Nanofluid, heat storage, heat enhancement, Phase change material, micro-encapsulated

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