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A STUDY ON PERFORMANCE OF SOLAR WATER HEATER USING LAURIC ACID-WATER AS THERMAL STORAGE SYSTEM

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ABSTRACT

The energy consumption in the world is increasing greatly owing to the growing population, and to the increasing energy consumption per capita. The availability of the fossil fuels is fast declining, and the price of the fossil fuels is increasing rapidly, hence there is a great motivation to use renewable energy sources such as solar energy. Domestic water heating which constitutes a significant share of residential energy consumption is an excellent application for utilizing solar energy. In this work performance test is carried out using Phase Changing Material and water as thermal storage system. The system consists of two simultaneously functioning heat absorbing units. One of them is a solar water heater and the other a thermal energy storage unit with Lauric acid as phase changing material (PCM). Effect of adding Aluminium powder to PCM is also studied in this experiment. The performance of the system will be analysed with various modes of closed modes of charging and discharging trials. Experiments are conducted for different void fractions and mass flow rates of heat transfer fluid. The results have shown that the charging and discharging temperature will be higher by adding small quantity of Aluminium powder to PCM. Also hot water can be stored and discharged for a longer duration there by increasing the performance of solar water heater.

***KEYWORDS**: Phase Changing Material, Heat Transfer Fluid, Lauric Acid, Aluminium Powder, Solar Water Heater, Thermal Energy Storage*

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