

Evaluation of flat plate solar heater filling in nanofluid under climatic of Iraq conditions

In order to assess the performance efficiency of a flat plate solar collector. The current investigation focuses on a wide range of nanoparticles suspended in basefluid to create nanofluid. Additionally, the current investigation has been carried out with the best particle volume concentration possible based on our experimental results with varied mass flow rates along three months Feb, March and April 2020 from 10 a.m. to 3 p.m. The volume fractions of solid nanoparticles dispersed in water are 0.15, 0.25 and 0.35% with size diameter of 20 nm and mass flowrate are 0.021, 0.024 and 0.03 kg/s. According to experiments, the energy efficiency of a ZnO/water nanofluid is increased by 31% for a particle volume concentration of 0.35% at a mass flow rate of 0.03 kg/s. Increased system performance in terms of effective conversion of the available energy into useful functions is highlighted by the rise of energy and exergy efficiency. ZnO/water has the highest increase in energy efficiency of a collector, at 0.35%, followed by 0.25 then 0.15%, respectively.