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Characteristic of TiO₂-SiO₂ Nanofluid With Water/Ethylene Glycol Mixture for Solar Application

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[Fikri, Mohd Amiruddin](#)^{a,e} ; [Faizal, Wan Mohd](#)^a; [Adli, Hasyiya Karimah](#)^a; [Mamat, Rizalman](#)^b; [Azmi, Wan Hamzah](#)^b; +2 authors

^a Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan, 17600, Malaysia

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Abstract

Solar energy is a sustainable energy supply technology due to the renewable nature of solar radiation and the ability of solar energy conversion systems to generate greenhouse gas-free heat and electricity during their lifetime. In this study, an experimental investigation was conducted to explore the effect of hybrid nanofluids on heat transfer for solar application. An experiment was conducted for hybrid nanofluid concentrations starting from 0.3, 0.5, 0.7 and 1.0%. Each setup was exposed to short wavelength radiation under a solar simulator with 300, 500 and 700 W/m² for 30 minutes, of which 15 minutes is the heating period and the next 15 minutes is for cooling. For solar radiation of 300 W/m² within 15 minutes of charging process are 51.9 °C, 52.8 °C, 53.4 °C and 54.2 °C for concentration of nanofluids 0.3, 0.5, 0.7 and 1.0% respectively. The results for solar radiation of 500 and 700 W/m² within 15 minutes almost the same pattern which is increasing during the charging process. It can be concluded that the higher concentrations of nanofluid give ample time to the test tube to transfer the heat and thus increased its temperature during the charging process. © 2021. All rights reserved.

Author keywords

composite nanofluids; heat transfer; solar radiation; water-ethylene glycol

Corresponding authors

Corresponding
author

M.A. Fikri

Affiliation

Faculty of Bioengineering and Technology, Universiti Malaysia Kelantan, 17600,
Malaysia

Email address

moamfik.selehor@gmail.com

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