

TiO₂-SiO₂ Nanofluids mixture with W/EG for Solar Water Heating System: Thermal Conductivity Analysis Based on Different Ratios

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Abstract. Renewable energy, also considered clean energy, comes from continuously replenishing natural sources and processes. The thermal-physical properties of TiO₂-SiO₂, a 60:40 volume ratio of nanoparticles suspended in water (W) and Ethylene Glycol (EG) were investigated. Experiments were carried out to varied mixing ratios of 70:30 and 30:70 for volume concentrations of 0.3 to 0.7 % TiO₂-SiO₂ nanofluids. The thermal conductivity and dynamic viscosity at from 30 to 70 °C were determined. Taken together, the results showed that the highest thermal conductivity for TiO₂-SiO₂ nanofluids produced throughout the ratios of 30:70 while 70:30 exhibited the lowest. The nature enhancement ratio indicates that a 0.7 % volume concentration of TiO₂-SiO₂ nanofluid would further facilitate heat transmission throughout all mixture ratios. In comparison with the base fluid, the amalgamation of increased thermal conductivity and dynamic viscosity generates more benefits for heat transmission.

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