

Advancing Sustainable Technological with Nanofluids

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Thematic Area: Nanomaterials for Energy Systems

Abstract

Nanofluids are engineered to sustain technological evolution with due consideration toward energy efficiency and environmental sustainability in various fields. These nanofluids are specially engineered colloidal suspensions of nanoparticles within base fluids, having unique thermal, optical, and mechanical properties that are far superior to those shown by conventional fluids. In other words, this represents nanofluids in relation to sustainable development based on advances in heat transfer, refrigeration systems, and renewable energy-based systems with environmentally friendly clean technologies. It increases the energy efficiency and thermal performance in several applications such as solar panels, refrigeration units, and industrial cooling. Energy consumption and the carbon footprint are estimated to be reduced by using nanofluids, which could contribute to further eco-friendly engineering solutions. The basis for discussion will be the fundamental properties of nanofluids and their applied usage related to the sustainable development of technology. Complementary to this, the discussion will outline issues related to the problems of stability, the economic aspects, and the scalability of the processes involved in generating nanofluids and possible research and development opportunities. Nanofluids are bound to be crucial in the path toward sustainable development and energy efficiency.

Keywords: Heat Transfer, Nanofluids, Thermal conductivity, Energy Systems, Stability