Muataz Ali Atieh

Hamad Bin Khalifa University, Qatar

Nanofluids as an advanced heat transfer fluid

Heat transfer fluid is one of the critical parameters that affects the cost and size of thermal systems. Different research groups around the world have acknowledged the need to develop new classes of fluids with enhanced heat transfer capabilities. Many researchers have developed nanofluids using nanoparticles, and they have shown a significant enhancement in heat transfer. Due to their high thermal and physical properties, the addition of nanomaterials can remarkably improve the thermo-physical properties of a base fluid. Such a fluid contains suspended nanoparticles called "nanofluids". Nanofluids are a new generation of liquids used for heat energy transport and can be employed as heat transfer fluids in heat exchangers in place of pure single-phase fluids. The most important reason for enhancing nanofluids' heat transfer is to accommodate high heat fluxes and then reduce the size and cost of thermal systems, thus conserving energy and materials. In the last several years, many researchers have attempted to develop heat transfer enhancement methods. Many nanomaterials, such as Cu, CuO, Al_2O_3, SiO_2, CNTs and graphene have been used to improve the heat transfer properties of the base fluid. Carbon nanomaterials have gained significant attention over the last decade where the most eye-catching features of these structures are their thermal properties, which can permit future applications in thermal science and engineering. CNTs and graphene nanoparticles have unusual heat transfer properties. In the lengthwise direction, they show excellent heat transfer performance. They also possess remarkable thermal properties with ultra-high thermal conductivity (2000–3000 $Wm^{-1}K^{-1}$), which is much higher than those of metallic nanoparticles. CNTs and GN can be dispersed homogenously in conventional heat transfer fluids. Recent research has demonstrated that there is a substantial increase in the thermal conductivities of different CNT nanofluids in comparison to their base fluids. In general, research on CNTs and GN nanofluids has blossomed in many different directions and has attracted a great deal of attention.

Speaker Biography

Muataz Ali Atieh is a Full Professor at Colleague of Science and Engineering (CSE), Hamad Bin Khalifa University (HBKU) and Senior Scientist at Qatar Environment and Energy Research Institute (QEERI), Qatar Foundation. He received his Ph.D in Chemical Engineering from University Putra Malaysia in 2005. His research focuses on the production of different types of Micro and Nano materials using physical and chemical techniques for different applications. These materials is used in different applications that include, water treatment, membrane fabrications, heat transfer, nanocomposite, polymerization reaction and Nanosensors. He is the inventor of 14-awarded USA patents. He published more than 113 peer-reviewed ISI articles, and 50 conference proceedings with total citations of about 3400 and 31 h-index.

e: mhussien@hbku.edu.qa

Notes: