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Nanoparticles future in energy and mass transportation field

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Since the last few eras, numerous studies have been conducted on nanofluids research containing metal oxides, Graphene, carbon-based, and their composites/hybrid are rapidly growing in the energy-saving field. Outmoded varying heat exchanging fluids with the addition of nanoparticles sized (<100 nm) freely suspended in them are called nanofluids. Nanofluids proved their enhanced heat transfer properties as compared to conventional fluids, despite numerous inconsistencies in outcomes by different researchers. The fundamental objective to do this comprehensive research is to optimize the synthesis techniques of nanoparticles, preparation methods for nanofluids, and detailed applications in the area of the Heat exchanger, Energy, and Mass Transfer, and Heat convection with enhanced thermo physical properties. The five different nanoparticle synthesis techniques are presenting a hereafter-detailed literature review. Additionally, a brief study about preparation methods for nanofluids and their echo-friendly functionalization is also a major focus of this study. Different applications of metal oxide, carbon-based and hybrid nanofluids with their thermo-physical properties are presented here. The detailed review on synthesis and preparation of nanofluids along with thermo physical properties comprises the positive effects of different nanofluids for enhanced energy transportation in different heat different heat exchangers.

Recent Publications

1. Ahmed, W., Kazi, S. N., Chowdhury, Z. Z., Johan, M. R. B., Mehmood, S., Soudagar, M. E. M., ... & Ahmad, M. S. (2021). Heat transfer growth of sonochemically synthesized novel mixed metal oxide ZnO+ Al₂O₃+ TiO₂/DW based ternary hybrid nanofluids in a square flow conduit. *Renewable and Sustainable Energy Reviews*, 145, 111025.
2. Ahmed, W., Kazi, S. N., Chowdhury, Z. Z., Johan, M. R. B., Mehmood, S., Soudagar, M. E. M., ... & Ahmad, M. S. (2021). Experimental study on well Dispersed and Stable New ZnO-EG@DW Nanofluids for enhanced energy transportation in a Square Heat Exchanger; *Renewable and Sustainable Energy Review*
3. Ahmed, W., Chowdhury, Z. Z., Kazi, S. N., Johan, M. R. B., Abdelrazek, A. H., Fayaz, H., ... & Khan, T. Y. (2021). Experimental evaluation and numerical verification of enhanced heat transportation by using ultrasonic assisted nanofluids in a closed horizontal circular passage. *Case Studies in Thermal Engineering*, 26, 101026.
4. Ahmed, W., Chowdhury, Z. Z., Kazi, S. N., Johan, M. R., Akram, N., & Oon, C. S. (2020). Effect of ZnO-water based nanofluids from sonochemical synthesis method on heat transfer in a circular flow passage. *International Communications in Heat and Mass Transfer*, 114, 104591.
5. Ahmed, W., Kazi, S. N., Chowdhury, Z. Z., Johan, M. R. B., Soudagar, M. E. M., Mujtaba, M. A., ... & Kamangar, S. (2020). Ultrasonic assisted new Al₂O₃@TiO₂-ZnO/DW ternary composites nanofluids for enhanced energy transportation in a closed horizontal circular flow passage. *International Communications in Heat and Mass Transfer*, 105018

Biography

Waqar Ahmed has done his Ph.D. degree in Material Physics from the University of Malaya world QS ranking 65. As a Ph.D. researcher at the Institute for advanced studies at the University of Malaya, he has led his research activities to synthesize the metal oxides, graphene, carbon nanotubes, and their binary and ternary composite for energy-related varying applications like (Energy storage, sensors, energy transportation, Heat, and Mass Transfer, Heating and cooling of Electrical and electronic systems, which helps in solidified of his interest in the area of materials and nanofluids. These experiences have reinforced his research interest in material that inspired a career in synthesis and applications of nanomaterials.

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