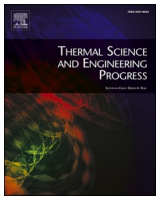
Thermal Science and Engineering Progress 51 (2024) 102653

Contents lists available at ScienceDirect

Thermal Science and Engineering Progress

journal homepage: www.sciencedirect.com/journal/thermal-science-and-engineering-progress



Editorial: Special issue on the 1st international conference on fluid, thermal and energy systems – 2022

A B S T R A C T

The first edition of the International Conference on Fluid, Thermal and Energy Systems (ICFTES) was held in hybrid mode at the National Institute of Technology Calicut, India, from June 09–11, 2022. ICFTES'22 comprised two plenary speakers, thirteen keynote speakers, and 177 contributed papers. From all keynote and contributed papers of ICFTES'22, we selected thirty technical papers for possible publication in a special issue of Thermal Science and Engineering Progress. After review as per the journal norms, twenty-five of them are selected for publication in this special issue.

1. Introduction

The first edition of ICFTES'22 serves as a platform for researchers and experts to exchange insights and innovations in thermal management and energy engineering. In this special issue, we showcase a selection of papers that delve into various aspects of energy systems, ranging from renewable energy production to heat transfer optimization. These contributions highlight the conference's dedication to advancing knowledge and solutions in fluid dynamics, thermal engineering, and energy systems. Here, we provide a summary of the articles featured in this special issue ICFTES'22.

In the study by [1], an experimental investigation of a pulsating heat pipe system was conducted to examine the influence of fill ratio and heat transfer rate on thermal resistance and heat transfer coefficients. The findings presented in [2] focus on experimental results regarding immersion quenching of aluminum alloys using nanofluid-based immersion cooling, emphasizing the impact of nanoparticle concentration on cooling efficiency and residual stress. Utilizing numerical simulations, the work described in [3] investigates bubble generation and behavior in two-phase interactions, with a particular emphasis on the influence of surface tension and orifice properties on bubble dynamics. Proposed by [4], a combined cooling, heating, and power system based on intercooled-recuperative gas turbine cycles, absorption cooling, and heat recovery steam generation is discussed, along with detailed energy, exergy, and environmental analyses.

An experimental investigation reported in [5] explores the viability of dual cooling in PV-T collector systems, utilizing both refrigerant and air to improve the performance. Results show modest enhancements in efficiency and delay in frost formation, suggesting potential for space heating applications but with a caution regarding economic feasibility. Numerical investigations outlined in [6] analyze the thermo-hydraulic characteristics of uniform flow past hydrophobic cylinders, evaluating the impact of surface hydrophobicity and inclination on drag force and heat transport. The experimental study in [7] assesses the performance of Fe_3O_4 nanofluid as a coolant in shell-and-coil heat exchangers, focusing on exergy analysis and heat transfer characteristics. Investigating NOx emissions from NH_3/CH_4 swirl flames, paper [8] employs chemical kinetic analyses to study the effect of combustion parameters on NOx formation and destruction. Paper [9] presents a linear stability analysis of plane Poiseuille flow in a channel with anisotropic and inhomogeneous porous layers, exploring stability characteristics under varying permeability and anisotropy parameters.

Paper [10] investigates the influence of second-degree velocity slip and thermal jump conditions on water-based nanofluid flow and heat transfer over a permeable bidirectional moving surface under a porous medium environment. Paper [11] introduces a novel solar-powered rotating flask oscillatory flow reactor for biodiesel production from coconut waste cooking oil, achieving high biodiesel yield without consuming non-renewable energy sources. Utilizing computational fluid dynamics, paper [12] analyzes the sequential combustion of natural gas/methane within the furnace of a steam-methane reformation unit to optimize design parameters and maximize production within the furnace.

In [13], a novel magnetized graphene oxide-modified microencapsulated phase change material is developed, demonstrating enhanced thermal energy storage properties suitable for high-temperature heat transfer applications. Paper [14] proposes a combined cycle power plant comprising a gas turbine, regenerative steam turbine, and recuperative regenerative organic Rankine cycle, with energy, exergy, and exergoeconomic analyses conducted to assess performance. A novel method for analyzing premixed flame dynamics using image processing techniques is presented in [15], providing insights for combustion control and optimization. Paper [16] demonstrates improved heat transfer coefficients in turbulent fluid flow conditions by investigating heat transfer augmentation using curved circular spines inserted into fluid flow passages.

Paper [17] investigates the evolution of velocity slip and heat transfer effects on the magnetohydrodynamic oscillatory flow of Casson

https://doi.org/10.1016/j.tsep.2024.102653

Available online 22 May 2024

fluid in a wavy channel immersed in a porous medium, providing insights into fluid behavior and heat transfer characteristics. A review of heat transfer mechanisms involved in phase-changing processes in latent heat storage system configurations is presented in [18], offering insights into system optimization. The performance of solar air heaters is enhanced by introducing artificial roughness on absorber plates, as demonstrated in [19], with computational fluid dynamics simulations revealing heat transfer augmentation.

Paper [20] proposes a novel air-based battery thermal management system utilizing wavy sidewalls to enhance cooling performance in lithium-ion battery packs. Investigating pool boiling performance of GNP/Cu-Al_2O_3 nanocomposite-coated copper surfaces, paper [21] provides insights into the role of surface morphology and wettability on heat transfer performance. The effect of perforation interval design in well configurations on reservoir depressurization and gas production is examined in [22], offering valuable insights for optimizing well design in gas reservoirs. A sharp-interface model for the solidification of nanocomposites with nanoparticle-interface interaction is presented in [23], providing insights into solidification behavior. Investigating flame propagation behavior of LPG-air mixtures in straight and curved tubes, paper [24] highlights the influence of tube curvature on flame dynamics and combustion characteristics. Paper [25] analyzes thermal convection of magnetohydrodynamic flow in modified and constraint-based recto-triangular thermal systems, exploring the impact of system geometry and operating parameters on flow structure and heat transfer characteristics.

2. Conclusions

We greatly appreciate the significant contributions made by authors to the International Conference on Fluid, Thermal, and Energy Systems (ICFTES) 2022. In particular, the papers selected for this Special Issue represent new advancements in fluid dynamics, thermal engineering, and energy systems research, addressing their importance in sustainable energy solutions. The diverse range of topics covered in these papers, from heat transfer augmentation to combustion studies and renewable energy systems, reflects the multidisciplinary nature of research in fluid, thermal, and energy systems. We believe these contributions will inspire further exploration and innovation in these fields, ultimately advancing our understanding and capabilities in addressing current and future energy challenges.

Acknowledgment

We acknowledge the conference's technical collaborator, the Department of Mechanical & Mechatronic Engineering, Stellenbosch University, as well as our partnering associations: the Indian Society of Heat and Mass Transfer, the Indian Institute of Chemical Engineers, and The Institution of Engineers (India). We extend our gratitude to all reviewers for their invaluable comments and suggestions, which significantly contributed to enhancing the quality of the papers in this special issue. Additionally, we sincerely thank Prof. David Reay and Prof. Barbara Sturm, Editors-in-Chief of Thermal Science and Engineering Progress, for their unwavering support and guidance.

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C.S. Sujith Kumar[a,*], Bidyut Baran Saha[b,c], Pradip Dutta[d]
[a] *Department of Mechanical Engineering, NIT Calicut, Kerala 673601, India*

[b] International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, 744 Motooka, Nishi-ku, Fukuoka-shi, Fukuoka 819-0395, Japan
[c] Mechanical Engineering Department, Kyushu University, 744 Motooka, Nishi-ku, Fukuoka-shi, Fukuoka 819-0395, Japan
[d] Interdisciplinary Centre for Energy Research, Indian Institute of Science, Bangalore, India

[*] Corresponding author.
E-mail address: sujithcs@nitc.ac.in (C.S. Sujith Kumar).