

Special Issue on Heat Transfer Analysis in Processes of Developing and Applying Renewable Energies and Novel Materials

Developing and applying renewable energies have moved to the forefront of scientific studies and industrial applications in recent years due to the rapid depletion of fossil fuel reserve. Likewise, in the last two decades, developing and applying novel materials have been pronounced as a core national strategy by many countries for both civil and military purposes. Heat transfer, a fundamental transport phenomenon, can be found in all processes of developing and applying renewable energies and novel materials. Though heat transfer problems in processes of developing and applying renewable energies and novel materials share some commons to those related to traditional energies and materials, the particularities of renewable energies and novel materials can bring several unique issues on heat transfer. For example, the heat transfer mechanisms of solar energy conversion through photovoltaic materials are very different from those in processes of developing and applying traditional energies and materials.

To highlight the up-to-date progress on heat transfer studies related to processes of developing and applying renewable energies and novel materials, a special issue is launched to serve as a platform for researchers in these fields to report their recent activities. After the strict peer-review process, 15 research articles, ranging from nanoscale to macroscale and from theoretical to numerical, have been collected to discuss the fundamental mechanisms and practical applications of heat transfer in processes of developing and applying renewable energies and novel materials. The topics of the published papers include computational fluid dynamics simulation of heat transfer in micromixer and solar cavity receiver, experimental design and measurement of thermal properties for photovoltaic systems and two-dimensional materials, and theoretical analysis of heat transfer in novel nanofluids, etc. These topics, to some extent, represent the frontiers of heat transfer analysis in processes of developing and applying renewable energies and novel materials. From these papers, we can gain an in-depth insight of the state-of-the-art status on heat transfer analysis in processes of developing and applying renewable energies and novel materials.

Finally, we would like to use this opportunity to sincerely appreciate the editorial effort of Editor-in-Chief, Professor S. A. Sherif who made this special issue seamlessly published. Professional comments and suggestions from reviewers to significantly improve the quality of each published manuscript are also acknowledged, which are indispensable to the success of this special issue. Although this special issue is unable to cover all the aspects on heat transfer studies in processes of developing and applying renewable energies and novel materials, we hope that it can provide some inspirations to readers for their future research efforts.

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