

Special Issue in High Temperature Materials and Processes: ADVANCEMENTS IN SOLAR ENERGY TECHNOLOGIES AND SYSTEMS FOR SUSTAINABLE POWER GENERATION

GUEST EDITORS

Dr. Mohammad Nishat Akhtar, School of Aerospace Engineering,
Engineering Campus, Universiti Sains Malaysia, Pulau Pinang, Malaysia; nishat@usn.my

Dr. Muhammad Rafiq Khan Kakar, Department of Architecture, Wood and Civil Engineering,
Bern University of Applied Sciences (BFH), Burgdorf, Switzerland; muhammad.kakar@bfh.ch

Dr. Supavadee Aramvith, Department of Electrical Engineering
Chulalongkorn University, Bangkok, Thailand; supavadee.a@chula.ac.th

DESCRIPTION

Solar energy has emerged as a prominent source of sustainable power generation, paving the way for a greener and more environmentally friendly future. With continuous research and development efforts, solar energy technologies and systems have witnessed remarkable advancements, revolutionizing the way we harness and utilize sunlight. Traditional silicon-based photovoltaic (PV) cells have been widely used, but recent innovations have pushed the boundaries of efficiency. New materials, such as perovskite and multi-junction solar cells, have shown great promise in achieving higher conversion rates and lowering production costs. These advancements have opened up opportunities for solar panels to generate more electricity from the same amount of sunlight, making solar energy an increasingly viable option for widespread adoption.

Researchers have been exploring novel approaches to enhance the overall efficiency of solar energy systems. Concentrated solar power (CSP) systems, for instance, utilize mirrors or lenses to focus sunlight onto a small area, generating intense heat that drives power turbines. This technology enables continuous power generation even after sunset, as the concentrated heat can be stored in thermal energy storage systems. By combining the benefits of both PV and CSP technologies, hybrid solar systems offer a comprehensive solution for maximizing power output and providing uninterrupted renewable energy.

Moreover, the integration of solar panels with advanced energy storage solutions has enabled reliable and on-demand power supply, further enhancing the viability of solar energy as a primary source of electricity. Furthermore, smart grid integration and advanced control systems have played a crucial role in optimizing the performance of solar energy systems. Real-time monitoring and data analytics allow for efficient management of solar power generation, ensuring maximum utilization of available resources. While technological advancements are vital, the sustainable growth of solar energy also relies on policy support and public awareness.

This special issue aims to explore the latest advancements and innovations in solar energy technologies and systems, with more focus on sustainable power generation. This special issue invites original research papers covering a wide range of topics related to solar energy, including photovoltaic (PV) cells, thermophotovoltaic systems, energy sources, autonomous solar stations, and more.

KEY TOPICS

- ▶ Advanced materials for high-efficiency solar panels: exploring perovskite, multi-junction cells, and emerging photovoltaic technologies
- ▶ Energy storage advancements for solar power systems: innovative battery technologies, thermal energy storage, and hybrid energy solutions
- ▶ Smart grid integration and control strategies for optimized solar power generation and distribution
- ▶ Novel solar concentrator systems and their applications in power generation and industrial processes
- ▶ Integration of solar energy in urban environments: building-integrated photovoltaics, solar facades, and smart city solutions
- ▶ Solar-powered transportation systems: electric vehicles, solar charging infrastructure, and solar-powered public transportation
- ▶ Advances in solar thermal technologies: concentrating solar power (CSP), solar heating and cooling systems, and solar desalination
- ▶ Innovations in photovoltaic module design and manufacturing processes for enhanced performance and durability
- ▶ Grid-scale solar power plants and utility-scale solar installations: challenges, optimization, and case studies
- ▶ Off-grid solar energy solutions for rural and remote areas: decentralized solar systems, microgrids, and energy access initiatives
- ▶ Solar energy in buildings and architecture: passive solar design, energy-efficient building integration, and net-zero energy buildings
- ▶ Policy frameworks and regulatory mechanisms for promoting solar energy adoption and facilitating the transition to a solar-powered future

HOW TO SUBMIT

Before submission authors should carefully read the [Instruction for Authors](#). In order to make the preparation of manuscript easier, you are advised to use the [Manuscript Template](#).

All submissions to the Special Issue must be made electronically via the [Editorial Manager submission and tracking review system](#).

All manuscripts will undergo the standard peer-review process (single-blind, at least two independent reviewers). When entering your submission via online submission system please choose **“Special Issue: Solar energy technologies”**.

The deadline for submissions is **January 27th, 2024**, but individual papers will be reviewed and published online on an ongoing basis.

In case of any question please contact **Ms. Joanna Kosińska**, Managing Editor of High Temperature Materials and Processes, Joanna.Kosinska@degruyter.com