

Special Issue in High Temperature Materials and Processes: RECENT DEVELOPMENTS IN 3D PRINTED CARBON MATERIAL TO ADDRESS THE ENERGY-RELATED APPLICATIONS

GUEST EDITORS

Dr. Imran Khan, Department of Electrical Engineering,
University of Engineering and Technology, Mardan, Pakistan; imran_khan@uetpeshawar.edu.pk

Dr. Peerapong Uthansakul, School of Telecommunication Engineering
Suranaree University of Technology, Nakhon Ratchasima, Thailand

Dr. Doaa Samy Khafaga, Department of Computer Sciences
College of Computer and Information Science, Princess Nourah Bint Abdulrahman University,
Riyadh, Saudi Arabia; dskhafaga@pnu.edu.sa

DESCRIPTION

In recent years, businesses and academics have paid special attention to the additive production process, also called three-dimensional (3D) manufacturing. Many different uses have been developed for 3D printers. The essential component in additive manufacturing is printable inks, which affect the substances, the procedure for printing, and the building blocks of the finished items. In light of their great chemical stability and adaptable nanotechnology, carbon compounds are frequently employed in additive manufacturing for various purposes. Graphite oxide, carbon nanotubes (CNT), carbon blacks, solvents, polymers, and other components are fillers for successful inks, mostly based on hazardous liquids. Investigations into carbon compounds for additive manufacturing, particularly GO-based substances, are published extensively for energy purposes.

In such scenarios, it is necessary and crucial to comprehend the current developments in 3D-printed carbon fiber materials and their expanded potential to tackle energy-associated difficulties and provide innovative ideas for material architectures. Recent advancements in 3D printing of novel radiation-related devices include energy storage applications, electrical circuits, and extreme heat energy technologies. Analysis and forecast are given as a conclusion, highlighting the possible designs and advancements of 3D printing equipment based on carbon fiber for uses in the energy sector and beyond. The emergence of wearable electronics has sparked a rapidly developing industry involving adaptable and dependable energy preservation and transformation devices (such as supercapacitors, rechargeable batteries, and thermoelectrochemical cells).

Due to its comparatively low cost, design independence, and controllable, reproducible prototyping capabilities, 3D printing, a rapidly developing suite of manufacturing technology, is widely employed in the aforementioned energy-associated fields. However, there are still issues with manufacturing accessible ink and precise substance/device construction. The present piece is intended to serve as a manual for the sustainable manufacturing of sophisticated energy infrastructure using 3D printing techniques.

Reusable micro batteries are required for the upcoming generations of wearing and handheld gadgets to provide stored energy. With its capacity to create technically challenging geometrical forms, 3D printing makes it possible to produce micro batteries in various shapes and dimensions with high densities of power and energy. As electrode materials for battery cells, inexpensive carbon fibers offer an important advantage over other porous materials due to their substantial specific area of surface, better ability to conduct electricity, and good chemical properties.

Based on the above, in the present Special Issue, we invite researchers to contribute original research articles and review papers that will approach the complex nature of nanomaterials and assess their toxicological and environmental aspects.

KEY TOPICS

- ▶ Carbon compounds are being printed in 3D for use in applications involving energy
- ▶ Implantable electrochemical devices for power are made with 3D printing
- ▶ Advancements in technology, resources, and potential benefits for three-dimensionally manufactured carbon micro batteries
- ▶ High-temperature surprise made it possible to manufacture nanomaterials for power sector
- ▶ Recent advancements in the additive manufacturing of macrostructures made of 2D substances
- ▶ The use of materials made of graphite in three dimensions for energy storage
- ▶ A critical assessment of newly developed 3D-printed chemical energy preservation systems
- ▶ Energy storage and converting elements made of diamond that may be printed in three dimensions
- ▶ Systems of linked molecules of carbon are produced using a rigid matrix
- ▶ Employing transparent carbon produced from used containers to create a capacitor
- ▶ Diminished graphene oxide aerogels fabricated in 3D for storing energy technologies
- ▶ The development of 3D printable graphite nanotechnology and its various applications subsequently
- ▶ Multifunctional tiny particles are produced in three dimensions for electrolytic storage of energy

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: 3D printed carbon materials”**.

The deadline for submissions is **December 10th, 2023**, 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