



Journal of New Materials for Electrochemical Systems

Special issue, June 2027

Journal homepage: <https://www.newmaterials.ca/>

CALL FOR PAPERS

Title of the special issue: IoT and Software-Driven Innovations in Materials for
Electrochemical Energy Applications

Guest Editors (Names, emails, affiliations, phones, links)

MGE:

Dr. Unan Yusmaniar Oktiawati

Department of Electrical Engineering and Informatics,

Universitas Gadjah Mada, Yogyakarta,

Indonesia. Email Id: Unan_yusmaniar@ugm.ac.id,

UnanYusmaniarOktiawati@outlook.com

https://scholar.google.com/citations?user=1gBC209z_UAC&hl=en

CO EDITOR: 1

Dr. Irving Vitra Paputungan

Informatics Department,

Universitas Islam Indonesia, Yogyakarta,

Indonesia. Email Id: irving@uii.ac.id

<https://scholar.google.co.id/citations?user=OA8Sa1gAAAAJ&hl=en>

CO EDITOR: 2

Dr. Vooi Voon Yap

Department of Computer Science

Aberystwyth University, Aberystwyth,

Wales. Email Id: voy@aber.ac.uk

<https://scholar.google.co.id/citations?user=NLpq400AAAAJ&hl=id>

AIMS AND SCOPE or INTRODUCTION or Description

The rapid advancement of Internet of Things (IoT) technologies and software engineering has significantly transformed research and development in materials for electrochemical energy applications. Modern electrochemical energy systems, including fuel cells, batteries, supercapacitors, and hydrogen technologies, increasingly depend on advanced materials whose performance, stability, and efficiency can be enhanced through intelligent monitoring and software-driven optimization. IoT enables real-time sensing, diagnostics, and control of material behavior under operating conditions, while software frameworks support modeling, simulation, and data-driven design of next-generation electrochemical materials. This convergence enables the development of smart, adaptive, and high-performance energy systems that integrate material innovation with digital intelligence.

Despite these advances, several challenges remain in bridging electrochemical materials with IoT and software technologies. Understanding material degradation, interfacial phenomena, and long-term durability requires continuous monitoring and advanced analytics. The integration of sensors within electrochemical materials and systems introduces complexity in data acquisition, system interoperability, and reliability. Furthermore, the development of predictive models for material performance, lifecycle analysis, and system optimization requires the application of machine learning, digital twins, and high-performance computing. Addressing these challenges demands interdisciplinary approaches that combine materials science, electrochemistry, embedded systems, and intelligent software architectures.

We invite researchers, industry practitioners, and academicians to submit original contributions focusing on innovative materials for electrochemical energy applications supported by IoT and software technologies. Submissions may include theoretical studies, experimental investigations, computational modeling, or industrial case studies. This initiative aims to foster collaboration and accelerate the development of intelligent, efficient, and sustainable electrochemical energy materials and systems.

LIST OF TOPICS:

1. IoT-enabled monitoring of material performance in fuel cells and biofuel cells
2. Software-assisted design and optimization of electrode and electrolyte materials for batteries
3. Data-driven analysis of degradation mechanisms in advanced primary and secondary batteries
4. Intelligent control and monitoring of materials in electrochemical supercapacitors
5. IoT-based systems for hydrogen production materials and catalyst performance tracking
6. Machine learning approaches for electrochemical materials discovery and characterization
7. Embedded sensing and software systems in bio electro chemical materials
8. IoT-assisted electrochemical nanomaterials synthesis and characterization
9. Smart sensors and biosensors based on advanced electrochemical materials
10. Software modeling and simulation of photoelectrochemical materials and processes
11. Predictive maintenance and durability analysis of electrochemical materials using IoT data
12. Digital twin frameworks for electrochemical material behavior and system integration

INSTRUCTIONS TO AUTHORS ARE AT:

Journal homepage: <https://www.newmaterials.ca/instructions-for-authors/>

COMMUNICATIONS AND SEND THE MANUSCRIPTS TO:

Managing guest editor emails address:

Or download the manuscript at: <https://www.newmaterials.ca/submit-your-article/>

by indicating the title of the Special issue.

The submitted manuscripts should not have been previously published, nor should they be currently under consideration for publication elsewhere.

IMPORTANT DATES:

- Manuscript submissions due: November 7, 2026
- First round of reviews completed: January 7, 2026
- Revised manuscripts due: April 8, 2027
- Final manuscripts due: May 8, 2027

