

SPECIAL ISSUE ON SPECIAL ISSUE ON ADVANCED SENSOR MATERIALS, PROCESSES, AND APPLICATIONS

PREFACE



In response to the pressing need for sustainable development across scientific and technological domains, this Special Issue on Advanced Sensor Materials, Processes, and Applications brings together cutting-edge research that addresses environmental, health, and energy challenges through innovations in sensor technology. As sensors continue to permeate every facet of modern life—from biomedical diagnostics and food safety to environmental monitoring and smart manufacturing—the demand for sustainable, high-performance, and cost-effective sensor systems has never been greater.



This collection of articles highlights the integration of materials science, nanotechnology, and green chemistry to develop novel sensor platforms. Among the studies featured are those utilizing graphene, chitosan, cellulose nanocrystals, and other biocompatible or recyclable materials to enhance sensitivity, durability, and eco-friendliness. Equally important are the process innovations—such as 3D printing, spark plasma sintering, and low-temperature annealing—that align sensor fabrication with the principles of energy efficiency and a reduced carbon footprint.

The breadth of applications covered in this issue is equally notable. From detecting hazardous compounds like Bisphenol A using SERS-based nanosensors, to improving thermoelectric energy harvesting with graphene-enhanced materials and employing artificial intelligence to classify semiconductor chip quality, each contribution demonstrates how sustainable practices can be seamlessly integrated into sensor development without compromising performance. Furthermore, several studies address real-world challenges such as antimicrobial surfaces for healthcare and wear-resistant composites for structural sensing.

We are particularly proud of the collaborative spirit reflected in this issue, with contributions from research institutions across Taiwan, Indonesia, and the U.K. This international perspective underlines the global relevance and shared responsibility of transitioning toward more sustainable sensor technologies.

We extend our deepest gratitude to the contributing authors for their innovative work and to the reviewers for their thoughtful insights. We hope that this special issue will serve not only as a record of scientific progress but also as a source of inspiration for future research in sustainable sensor development.

Shih-Chen Shi
National Cheng Kung University
Taiwan

Tao-Hsing Chen
National Kaohsiung University of Science and Technology
Taiwan