



**5th INTERNATIONAL CONFERENCE ON
NANOMATERIALS, MATERIALS AND
MANUFACTURING ENGINEERING &
7th INTERNATIONAL CONFERENCE ON
SENSORS, MATERIALS AND MANUFACTURING**

**SELECTED PEER-REVIEWED EXTENDED ARTICLES
BASED ON ABSTRACTS PRESENTED AT THE
5th INTERNATIONAL CONFERENCE ON NANOMATERIALS,
MATERIALS AND MANUFACTURING ENGINEERING &
7th INTERNATIONAL CONFERENCE ON SENSORS, MATERIALS AND
MANUFACTURING (ICNMM & ICMM 2023)**

**EDITED BY
PROF. DAO HUA ZHANG
PROF. PARAMES CHUTIMA**

**5th International Conference on
Nanomaterials, Materials and
Manufacturing Engineering &
7th International Conference on Sensors,
Materials and Manufacturing**

Selected peer-reviewed extended articles
based on abstracts presented at the
5th International Conference on Nanomaterials,
Materials and Manufacturing Engineering &
7th International Conference on Sensors, Materials and
Manufacturing (ICNMM & ICSMM 2023)

Edited by
Prof. Dao Hua Zhang
Prof. Parames Chutima

5th International Conference on Nanomaterials, Materials and Manufacturing Engineering & 7th International Conference on Sensors, Materials and Manufacturing

Selected peer-reviewed extended articles
based on abstracts presented at the
5th International Conference on Nanomaterials,
Materials and Manufacturing Engineering &
7th International Conference on Sensors, Materials and
Manufacturing (ICNMM & ICSMM 2023)

Aggregated Book

Edited by

Prof. Dao Hua Zhang and Prof. Parames Chutima

 **Scientific.Net**

Copyright © 2024 Trans Tech Publications Ltd, Switzerland

All rights reserved. No part of the contents of this publication may be reproduced or transmitted in any form or by any means without the written permission of the publisher.

Trans Tech Publications Ltd
Seestrasse 24c
CH-8806 Baech
Switzerland
<https://www.scientific.net>

Volume 127 of
Scientific Books Collection
ISBN 978-3-0364-0474-5

Full text available online at <https://www.scientific.net>

Distributed worldwide by

Trans Tech Publications Ltd
Seestrasse 24c
CH-8806 Baech
Switzerland

Phone: +41 (44) 922 10 22
e-mail: sales@scientific.net

Preface

2023 5th International Conference on Nanomaterials, Materials and Manufacturing Engineering (ICNMM 2023) and 2023 7th International Conference on Sensors, Materials and Manufacturing (ICSMM 2023) were successfully held in Tokyo, Japan, during October 16-18, 2023, and in Chiang Mai, Thailand, during November 22-24, 2023, respectively.

The events brought together researchers from the Asian Pacific region, North America, Europe, and around the world to exchange their research results and address open issues in nanomaterials, sensors, carbon materials, biomaterials, manufacturing engineering, and other fields.

This book comprises 23 selected papers from the Conferences presented in five chapters. The first chapter investigates nanomaterials for sensors; the second is dedicated to advanced composite materials; the third and fourth chapters focus on additive manufacturing and friction welding; and the last fifth chapter showcases research results in materials used for water and wastewater treatment. We believe that the readers will benefit from the insights showcased in this collection of scientific articles.

The Conference Committee would like to express thanks to all authors who contributed their latest research outputs and prepared brilliant presentations for the Conferences. Sincere thanks are also extended to the Program Committee members who dedicated their time to promoting and organizing this event. Appreciation is given to the Technical Committee members as well for their careful and fair reviews of all the submissions. The efforts of all Committees toward the success of the Conferences are hard to underestimate.

We thank all those involved in ICNMM 2023 & ICSMM 2023 and hope to meet next year!

Conference Chairs,

Prof. Daohua Zhang, Nanyang Technological University, Singapore

Prof. Parames Chutima, Chulalongkorn University, Thailand

Conference Committees

Advisory Chair

Prof. Norbert Schwesinger, Technical University of Munich, Germany

Conference Chairs

Prof. Daohua Zhang (FSAEng, FInstP, FIET), Nanyang Technological University, Singapore

Prof. Xiaoqing Wen (FIEEE), Kyushu Institute of Technology, Japan

Prof. Zongjin Li, Macau University of Science and Technology, China

Prof. Steven Y. Liang, Georgia Institute of Technology, USA

Conference Co-Chairs

Prof. Parames Chutima, Chulalongkorn University, Thailand

Prof. Shen-Ming Chen, National Taipei University of Technology, Taiwan

Program Chairs

Prof. Masahiro Nomura, The University of Tokyo, Japan

Assoc. Prof. Jun Wu, Southeast University, China

Prof. Kwang Leong Choy, Duke Kunshan University, China

Prof. Han-Yong Jeon, Inha University, South Korea

Prof. Ashok Srivastava, Louisiana State University, USA

Assoc. Prof. Yulong Sun, Northwestern Polytechnical University, China

Steering Committee

Prof. Sergei Alexandrov, Beihang University, China

Program Co-Chairs

Prof. Shumin Xiao, Harbin Institute of Technology, Shenzhen, China

Prof. Letian Huang, University of Electronic Science and Technology of China, China

International Technical Committee

Dr. Hieu Pham Trung Nguyen, University Heights, USA

Dr. Sujun Guan, Tokyo University of Science, Japan

Prof. Alexander M. Gaskov, Moscow State University, Russia

Prof. Ridvan Durak, Ataturk University, Turkey

Dr. Suraya Kamil, Universiti Teknologi MARA, Malaysia

Prof. Poi Sim Khiew, The University of Nottingham, Malaysia

Prof. Sotirios Baskoutas, University of Patras, Greece

Assoc. Prof. Sha Shiong Ng, Universiti Sains Malaysia, Malaysia

Prof. Ajay Kumar, Manipal University Jaipur, India

Prof. Duu Sheng Ong, Multimedia University, Malaysia

Prof. Hai Han Lu, National Taipei University of Technology, Taiwan, China

Dr. Mas Ayu Hassan, Universiti Malaysia Pahang, Malaysia

Dr. Shin Yee Khoo, University of Malaya, Malaysia

Dr. Ari Handono Ramelan, Sebelas Maret University, Indonesia

Dr. Rahul Davis, Sam Higginbottom University of Agriculture, Technology & Sciences (SHUATS), India

Dr. Ramadhansyah Putra Jaya, Universiti Teknologi Malaysia, Malaysia

Prof. Jingwei Zhao, Taiyuan University of Technology, China

Prof. Jaroslaw Jakubowicz, Poznan University of Technology, Poland

Assoc. Prof. Rusdi Nur, Politeknik Negeri Ujung Pandang, Indonesia

Prof. Ramesh Singh, University of Malaya, Malaysia

Prof. R. S. Jadoun, G. B. Pant University of Agriculture and Technology, Pantnagar, India

Prof. Rafiq Noorani, Loyola Marymount University, USA

Prof. Pavlo Maruschak, Ternopil Ivan Pul'uj National Technical University, Ukraine

Prof. Patrick Townsend, ESPOL, Guayaquil, Ecuador
Prof. Chang Woo Lee, Kyung Hee University, South Korea
Assoc. Prof. Zhengji Xu, Sun Yat-sen University, China
Prof. Osman Adiguzel, Firat University, Turkey
Prof. Faris Tarlochan, Qatar University, Qatar
Anukorn Phuruangrat, Prince of Songkla University, Thailand
Crispin Dass, Curtin University, Australia
Edgar Clyde R. Lopez, University of the Philippines Diliman, Philippines
Enoch Nifise Ogunmuyiwa, Botswana International University of Science & Technology, Botswana
Erwin Oliver V. Fundador, University of the Philippines Mindanao, Philippines
Guohua Xie, Wuhan University, China
Jem Valerie Perez, University of the Philippines Diliman, Philippines
Jong Won Yun, Daegu University, Republic of Korea
Jose Angel Roldan Lopez, Universidad Privada de Antenor Orrego, Peru
José Rodríguez, Universidad Peruana de Ciencias Aplicadas, Peru
Khaled Abou-El-Hossein, Nelson Mandela University, South Africa
Kowit Piyamongkala, King Mongkut's University of Technology North Bangkok, Thailand
Lee Te Chuan, Universiti Tun Hussein Onn Malaysia, Malaysia
Luis Manuel Angelats Silva, Universidad Privada de Antenor Orrego, Peru
Mainul Islam, University of Southern Queensland, Australia
Manoharan T N, University of Kerala, India
Marwa F. El-Kady, University of Science and Technology, Egypt
Mona Sari, Universitas Gadjah Mada, Yogyakarta, Indonesia
Nasrul Azuan Alang, Universiti Malaysia Pahang, Malaysia
Nik Ahmad Nizam Nik Malek, Universiti Teknologi Malaysia, Malaysia
Noreen Grace V. Fundador, University of the Philippines Mindanao, Philippines
Phanphong Kongphan, Rajamangala University of Technology Thanyaburi, Thailand
Priastuti Wulandari, Institut Teknologi Bandung, Indonesia
Qifeng Zhang, North Dakota State University, USA
Qing Hong, Midwestern University, USA
Reymark De Mesa Maalihan, Batangas State University, Philippines
Rohani Mustapha, University Malaysia Terengganu, Malaysia
Saravana Prakash Thirumuruganandham, Universidad Tecnologica Indoamerica, Ecuador
Songling Huang, Tsinghua University, China
Sroisiri Thaweboon, Mahidol University, Thailand
Supattarachai Sudsawat, King Mongkut's University of Technology North Bangkok, Thailand
Suppachai Sinthaworn, Srinakharinwirot University, Thailand
Tebogo Mashifana, University of Johannesburg, South Africa
Tutik Setianingsih, Brawijaya University, Indonesia
Wael Zaki, Khalifa University, Abu Dhabi, UAE
Xin Zhu, Zhejiang University, China
Yang Xi, II-VI Corp., USA

Table of Contents

Preface

Chapter 1: Nanomaterials for Applications in Sensor Devices

Direct Detection of Green-Synthesized Fe₃O₄ Magnetic Nanotag Using Double-Chip Configuration of Commercial Giant Magnetoresistance Sensor H. Ardiyanti, N. Mabarroh, N.A. Wibowo, N.I. Istiqomah, M.A.U. Absor and E. Suharyadi	3
Detection of Green-Synthesized Fe₃O₄/ Chitosan Using Spin Valve GMR Sensor with Wheatstone Bridge Circuit S. Garcia, N. Mabarroh, R. Cuana, H. Ardiyanti, N.I. Istiqomah and E. Suharyadi	9
Enhanced Magnetic Properties of Gd-Doped ZnO by Varying the Gd Concentration via Co-Sputtering Technique N.A. Raship, S.N.M. Tawil and N. Nayan	15
Green Synthesis of Magnetite Nanoparticles Using <i>Moringa oleifera</i> and their Electro-Optic Surface Plasmon Resonance Properties S. Wahyuni, M. Riswan, R.M. Tumbelaka, R. Cuana, N.I. Istiqomah and E. Suharyadi	21

Chapter 2: Preparation and Properties of Advanced Composite Materials

Evaluation of Marine Atmospheric Environmental Adaptability of 3238A/CCF300 Composite Material J.K. Wang, J.M. Wang and M. Liu	29
Enhanced the Bagasse Corrugated Fiber Composite Roofing Properties with Adhesive Substances P. Bharuedha, S. Prayoon and B. Kittisak	35
Flexural Strength of Kenaf Fibers/Epoxy Bio-Composites: Content of Kenaf Fiber, Curing Times and Curing Temperatures H. Suherman, I. Vatra, T.A. Suherman and I. Irmayani	41
Comparative Examination of Cellulose Nanosphere from Corn Husk and Rice Straw R.C. Tilwani, P.A.N. de Yro and H. Nakano	47

Chapter 3: Additive Manufacturing

Mechanical Properties of FDM Fabricated PLA Parts: Effect of 3D Printing Parameter Optimization Using Taguchi Method C.E. Alviar and B.A. Basilia	57
Evaluating the Accuracy of Finite Element Analysis in Predicting Mechanical Properties of Additively Manufactured Parts C. Promae, S. Das and A. Nassehi	65
Development of 3D Printing Filaments from Recycled PLA Reinforced with Nanoclay B.A. Basilia, J.N. Concepcion and J.J. Prila	73
3D-Printed Polymer Spare Parts for Various Applications J.R.C. Dizon	79
Towards Smart Additive Manufacturing: Cost and Component Complexity F. Tarlochan and S. Alsendibad	85
Effect of Nano-Alumina (Al₂O₃) Loading on the Thermo-Mechanical Properties of Poly(Lactic Acid) for Fused Deposition Modeling 3D Printing Applications M.S. Tolentino, B.A. Basilia and P.A.N. de Yro	91
Fatigue Resistance Assessment of WAAM Carbon Steel M. Hietala, T. Rautio, M. Jaskari, M. Keskitalo and A. Järvenpää	99

Chapter 4: Friction Welding

- Studying Effects of Heat Treatment on Friction Stir Welding of Al 7075**
D.M. Nhat, P.Q. Trung and B.D. Khanh 109
- A Study on Optimizing the Parameters of the Heat Treatment Process on Rotary Friction Welding of Aluminum Alloy A6061**
P.B.H. Nam, P.Q. Trung and B.D. Khanh 117

Chapter 5: Materials for Water and Wastewater Treatment

- Graphitic Carbon Nitride (g-C₃N₄) Microrods and Nanosheets Photocatalysts Immobilized on Water Hyacinth Cellulose Sponge for Photodegradation**
B. Pattanasiri and S. Sangjan 127
- Effects of Cupric Ion Adsorption onto the Modified Pineapple Pulp as a Biochar Adsorbent**
P. Charnkeitkong and S. Sripiboon 137
- Removal of Copper(Cu) from Wastewater Using Modified Recycle Carbon Black (RCB) Waste Tyre**
M.A.I. Nordin, N.A.H. Ab Aziz, U.F. Md Ali, A.A. Ahmad and M.I.H.M. Dzahir 143
- Effects of Halloysite Nanotube (HNT) on the Cd²⁺ Adsorption Capacity of Cellulose Acetate (CA) Thin Film Membranes**
M.J. Llana, K.J.J.L. Tabucan, J.A.M.C. Cosico, P.E.C. Maglalang and J.C. Millare 149
- Fabrication of Polysulfone - Zeolite Nanocomposite Membrane for Water and Wastewater Treatment Applications**
J.C. Millare, J.C.T. Enriquez, L.K.M. Domingo and V.U. Lagura 157
- Structural and Magnetic Behavior of MFe₂O₄ Nanopowders for Water Treatment**
G. Sugurbekova, E. Sugurbekov, G. Demeuova, A. Gabdullina and R. Kudaibergenova 163