## PROCEEDINGS OF SPIE

# 2nd International Conference on Materials Chemistry and Environmental Engineering (CONF-MCEE 2022)

**Shuai Chen** *Editor* 

19–25 May 2022 ONLINE

Organized by Eliwise Academy (United Kingdom)

Published by SPIE

Volume 12326 The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings: Author(s), "Title of Paper," in 2nd International Conference on Materials Chemistry and Environmental Engineering (CONF-MCEE 2022), edited by Shuai Chen, Proc. of SPIE 12326, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510657205

ISBN: 9781510657212 (electronic)

Published by

SPIF

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

### Contents

### v Conference Committee

### MATERIALS SCIENCE AND ENGINEERING

	MAIERIALS SCIENCE AND ENGINEERING
12326 02	Biomimetic surfaces with patterned wettability for improved dehumidification/air condition efficiency [12326-20]
12326 03	The effect of coconut oil on the physical-mechanical property and the micromolecular structure of human hair [12326-13]
12326 04	Research progress of dual-model contrast based on the magnetic nano particles [12326-15]
12326 05	Zinc oxide nanotubes for high-performance lithium-ion battery anodes: experimental insights from computational results [12326-22]
12326 06	Research progress on improving the quality of lithium batteries [12326-23]
12326 07	Research and development progress of green and high-efficient heavy metal chelators [12326-24]
12326 08	The formation and application of polysaccharide-based antibacterial films [12326-33]
12326 09	Exploration of potential applications of nano-droplets according to their basic properties [12326-34]
12326 0A	The research progress of catalysts based on metal organic frameworks [12326-37]
12326 OB	A review of the cathode materials development for lithium-ion batteries [12326-45]
12326 OC	Design and applications of superhydrophobic surfaces [12326-46]
	CHEMICAL SCIENCE AND TECHNOLOGY
12326 0D	A view on electrochemical methods of determining $\beta\text{-blockers}$ by utilizing carbon-based electrodes $[12326\text{-}9]$
12326 OE	The characteristics of nitrogen compounds and oil migration for Chang-8 oil reservoir set in the Southwestern Ordos Basin [12326-18]
12326 OF	Introduction to retrosynthetic analysis: basic concepts, simplification methods, and application [12326-26]

12326 OG	Molecular dynamics simulation of PVA in alcohol-water mixed solvent [12326-30]
12326 OH	The application of mid-infrared spectroscopy in the soil properties [12326-40]
	ENVIRONMENTAL ENGINEERING
12326 01	Recent advance of biofilm mediated polycyclic aromatic hydrocarbons (PAHs) degradation [12326-12]
12326 OJ	Deep geothermal energy: physical principles, current technology implementation, economics, and environmental evaluation $[12326-14]$
12326 OK	Simulating the influence of EGR on NOx emission of the diesel engine with CHEMKIN [12326-16]
12326 OL	A preliminary study on China's territorial spatial planning under the Double Carbon goal [12326-17]
12326 OM	Methods for increasing sludge organic matter in sewage treatment plants [12326-19]
12326 ON	Wave energy: history, implementations, environmental impacts, and economics [12326-21]
12326 00	Tidal energy technologies: barrages, lagoons, streams [12326-25]
12326 OP	The research progress in the application of phase change materials for building energy conservation [12326-35]
12326 0Q	Environmental behavior and ecological impact of organo-metal complexes [12326-36]
12326 OR	Decarbonization pathways of the top 10 greenhouse gas emitters developed and developing countries [12326-38]
12326 OS	Recent advances of vertical-flow constructed wetlands for heavy metal pollution treatment [12326-39]
12326 OT	The dilemmas and countermeasures of environmental supervision in the Three Gorges Reservoir [12326-41]
12326 OU	Global climate change and China's pathway to carbon neutrality [12326-42]
12326 OV	The sponge city design proposal based on landscape design: taking Gaochun, Nanjing as an example [12326-43]