

PROCEEDINGS OF SPIE

International Conference on Optoelectronic Materials and Devices (ICOMD 2021)

Yuan Lu
Youlin Gu
Editors

10–12 December 2021
Guangzhou, China

Organized by
National University of Defense Technology (China)

Sponsored by
AEIC Academic Exchange Information Center (China)

Published by
SPIE

Volume 12164

Proceedings of SPIE 0277-786X, V. 12164

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

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 SPIDigitalLibrary.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 *International Conference on Optoelectronic Materials and Devices (ICOMD 2021)*, edited by Yuan Lu, Youlin Gu, Proc. of SPIE 12164, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510652040

ISBN: 9781510652057 (electronic)

Published by

SPIE

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.

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.org

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

OPTOELECTRONICS TECHNOLOGY AND INTELLIGENT MONITORING AND SENSING APPLICATION

- 12164 02 **The progress of textile-based sensor** [12164-84]
- 12164 03 **Compact fluorosensor for close-range remote sensing characterization of fruits** [12164-59]
- 12164 04 **Development and testing of online multi-parameter optical water quality detection module** [12164-5]
- 12164 05 **A marine salinity sensor based on boron-doped diamond film electrode** [12164-53]
- 12164 06 **Theoretical comparison among perovskite, Si and α -Se based x-ray detectors** [12164-50]
- 12164 07 **Design of a miniature infrared spectrum detection system based on quantum cascade laser** [12164-35]
- 12164 08 **Study on rapid detection method of water heavy metals by laser-induced breakdown spectroscopy coupled with liquid-solid conversion and morphological constraints** [12164-44]
- 12164 09 **Adjustable ZnO nanoarrays/PVDF-HFP hybrid piezoelectric nanogenerators** [12164-76]
- 12164 0A **The study of novel inner cladding shape on absorption efficiency of thulium-doped fiber** [12164-55]
- 12164 0B **Spectral reflectance recovery using convolutional neural network** [12164-48]
- 12164 0C **Fourier-domain mode-locked laser-based optical coherence tomography system with large imaging depth** [12164-56]
- 12164 0D **Simulation of a MEMS cell delivery system by ultrasound** [12164-40]
- 12164 0E **Research on comprehensive benefit evaluation of photovoltaic power generation based on matter element extension model** [12164-7]
- 12164 0F **Analysis of current research status of particle thermal radiation properties** [12164-15]
- 12164 0G **Experimental study on spatial characteristics of filamentation and propagation of ultrashort pulse laser** [12164-66]
- 12164 0H **Rapid detection of low concentration nitrate in water using Raman spectroscopy coupled with spectral decomposition** [12164-26]

- 12164 0I **Adaptive filter based on FPGA implementation of LMS algorithm** [12164-68]
- 12164 0J **Research on suppression methods of ferromagnetic resonance in distributed network**
[12164-63]
- 12164 0K **Research on energy management strategy of fuel cell-battery hybrid power ship** [12164-33]
- 12164 0L **Stress-induced deformation of sandstone monitored in x-ray microscopy and its influence on permeability evolution** [12164-21]
- 12164 0M **Application of LSPR-based optical biosensors** [12164-14]
- 12164 0N **Application of visual biosensors based on gold nanoparticles for detection of target molecules**
[12164-1]
- 12164 0O **Research on global MPPT under partial shadow conditions** [12164-4]

RESEARCH ON INTELLIGENT DESIGN AND PERFORMANCE OF OPTOELECTRONIC MATERIALS

- 12164 0P **Natural material from carnauba wax to enhance the moisture stability for high-efficiency perovskite solar cells** [12164-64]
- 12164 0Q **The design of the tilt casting mold for engine intake tube** [12164-30]
- 12164 0R **Functionalized and environment-friendly carbon materials for flexible and wearable electronic devices** [12164-80]
- 12164 0S **A mathematical model for calculating the theoretical point cloud of gear surface based on line structured light** [12164-20]
- 12164 0T **Study on polyvinylidene fluoride ultrafiltration membrane for wastewater treatment by ultrasonic cleaning** [12164-78]
- 12164 0U **Analysis and research status of the cause of thermal runaway of lithium battery** [12164-9]
- 12164 0V **Research progress of phosphorus-based bimetallic catalysts in energy devices** [12164-27]
- 12164 0W **Study on photocatalytic treatment of printing and dyeing wastewater with modified TiO₂**
[12164-24]
- 12164 0X **Strategies for improving fluorescent properties of carbon quantum dots and their applications in environmental protection** [12164-73]
- 12164 0Y **Sound insulation performance of Mi-shaped mass membrane-honeycomb structure acoustic metamaterials** [12164-16]
- 12164 0Z **Enhancing power and energy density of supercapacitors using cobalt sulfide and vanadium nitride nanocrystals** [12164-79]

- 12164 10 **Extended photo-absorption properties of novel push-pull diphenylpyranilidene molecules and their photovoltaic performance** [12164-28]
- 12164 11 **Intelligent manufacturing of sanitary ceramics: structure design of automatic bottom lifting dye** [12164-87]
- 12164 12 **Spinal cord stimulators: implanted electrode materials, power transfer mechanism, and their applications** [12164-83]
- 12164 13 **Experimental study on the effect of refrigerant charging amount on the performance of CO₂-air source heat pump system** [12164-85]
- 12164 14 **Experimental study on similar materials of sand-gypsum-bentonite mixture** [12164-43]
- 12164 15 **Research on photovoltaic multi-peak MPPT based on SCA-INC** [12164-25]
- 12164 16 **Evaluation of metal-organic frameworks for natural gas storage** [12164-65]
- 12164 17 **Metal organic framework (MOFs) materials in hydrogen storage** [12164-90]
- 12164 18 **The enhancement of moisture resistance of organic-inorganic hybrid [N(CH₃)₄]₂TiF₆: Mn⁴⁺ phosphor** [12164-32]
- 12164 19 **Molecular-level insights into hydrogen bond behavior of protic ionic liquid-water mixtures at the interface of phospholipid bilayers** [12164-62]
- 12164 1A **Study on the stretching properties of rusted rebar** [12164-6]
- 12164 1B **Experimental study on the mechanical properties of hybrid fiber rubber concrete** [12164-10]
- 12164 1C **Mechanical deformation characteristics of corrugated steel pipe culvert under static load** [12164-2]
- 12164 1D **An eco-friendly and nonflammable coating fabricated by layer-by-layer technique on cotton fabrics** [12164-69]

OPTICAL DEVICE MANUFACTURING TECHNOLOGY AND MEASUREMENT CONTROL

- 12164 1E **Measurement of output power of radio frequency ablation instrument based on quality analyzer for electrosurgical generator** [12164-86]
- 12164 1F **Application of block chain technology in photovoltaic power generation** [12164-17]
- 12164 1G **Photovoltaic system modeling and primary frequency modulation technique based on DigSILENT** [12164-72]
- 12164 1H **Analysis of common failure causes in oxide VCSELs** [12164-67]

- 12164 1I **Research on thermal stress and trapping level of green mini LED** [12164-46]
- 12164 1J **Automatic evaluation and generation method of long-term stability of HgCdTe infrared focal plane array** [12164-70]
- 12164 1K **A framework for projected light intensity prediction in high dynamic range three-dimensional shape measurement** [12164-81]
- 12164 1L **Research on measurement method of cigarette combustion carbon line uniformity based on full vision** [12164-52]
- 12164 1M **Realization of pollution resistant washing device for ceramic tile** [12164-89]
- 12164 1N **Methods to achieve Ohmic contact to p-GaN** [12164-49]
- 12164 1O **Measurement of cigarette combustion ash line width on the basis of full vision** [12164-60]
- 12164 1P **Simulation of organic light-emitting diodes with CdS as buffer layer** [12164-75]
- 12164 1Q **Research on heating control method of thermal print head based on finite element simulation** [12164-47]
- 12164 1R **MPPT control of series photovoltaic array based on CSA-INC under partial shading** [12164-58]
- 12164 1S **Effect of ferric chloride on graphitization of anthracite and petroleum coke** [12164-3]
- 12164 1T **Study on quantification characterization of effect of sulfonate surfactants used in oil field on environment of mining area** [12164-45]
- 12164 1U **Optimization and simulation of vinyl acetate process based on Aspen Plus** [12164-22]
- 12164 1V **Simulation and optimization of isopropanol production by acetone hydrogenation process** [12164-51]
- 12164 1W **Preparation of sulfided hydrodesulfurization catalysts using synthesized MoS_4^{2-} solution as precursor** [12164-18]
- 12164 1X **Research on a violet dye extraction method and dye application** [12164-74]
- 12164 1Y **Preparation and electrocatalytic properties of spinel oxide FeCo_2O_4** [12164-71]
- 12164 1Z **Effect of molecular weight on amplified spontaneous emission in π -conjugated polymer solutions** [12164-34]
- 12164 20 **Analysis of comprehensive application of fiber-reinforced polymer in the seismic strengthening of column structure** [12164-8]

- 12164 21 **Study on mechanical properties of in-situ printed reinforced concrete wall with core column**
[12164-12]
- 12164 22 **Experimental study on mix ratio of new self-insulating concrete** [12164-11]