PROCEEDINGS OF SPIE

International Conference on Optical Technology, Semiconductor Materials, and Devices (OTSMD 2022)

Aavishkar Katti *Editor*

28–30 October 2022 Longyan, China

Organized by Longyan University (China)

Sponsored by AEIC Academic Exchange Information Centre (China)

Published by SPIE

Volume 12589

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 International Conference on Optical Technology, Semiconductor Materials, and Devices (OTSMD 2022), edited by Aavishkar Katti, Proc. of SPIE 12589, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510663015

ISBN: 9781510663022 (electronic)

Published by

SPIF

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

Copyright © 2023 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

vii Conference Committee

CONDUCTOR MATERIAL AND OPTOELECTRONIC DEVICE DESIGN

12589 02	Certification of civil aircraft electromagnetic environmental effects protection [12589-2]
12589 03	Development and application of on-line calibration device for water injection flowmeter [12589-11]
12589 04	Hydrothermal synthesis and characterization of Zn _{0.95-x} Mn _{0.05} Cu _x O diluted magnetic semiconductor [12589-14]
12589 05	Design of a photoconductive graphene infrared sensor based on inverted fluorination [12589-19]
12589 06	Up-conversion luminescence properties of Tb $^{3+}$ doped glass ceramics containing Y $_2$ Ti $_2$ O $_7$ crystalline phase [12589-22]
12589 07	Luminescence properties of Sm³+ doped glass ceramics containing Ba₃Gd(PO₄)₃ crystal phase [12589-21]
12589 08	Design of a high performance Sn-doped ZnO thin film MSM UV photodetector [12589-36]
12589 09	Comparative analysis of silicon and gallium nitride in semiconductor materials [12589-37]
12589 0A	Design of miniaturized fiber optic gyro MIOC driving circuit [12589-38]
12589 OB	Broadband single-polarization photonic crystal fiber based on surface plasmon resonance effect [12589-25]
12589 OC	Impact of complex environment on insertion loss of optical fiber connectors [12589-33]
12589 0D	Fabrication of a hierarchical patterned sapphire substrate for GaN-based light-emitting diodes [12589-32]
12589 OE	Design of annular beam shaping system based on freeform surface [12589-24]
12589 OF	Synthesis of rare Earth fluorescent probe intermediates by homogeneous time-resolved fluorescence immunoassay [12589-29]
12589 0G	Simulation of low-frequency vortex-induced resonance triboelectric nanogenerator in low-velocity fluid $[12589-47]$

12589 OH	Highly selective epoxidation of styrene over mesoporous carbon support with titanium dioxide under ambient photocatalytic condition [12589-46]
12589 01	Research on control strategy for cathode pressures in proton exchange membrane fuel cell [12589-45]
12589 OJ	System design of ultrasonic oil production flowmeter based on time difference method [12589-54]
12589 OK	Comprehensive investigation of AICI ₃ -based electrolytes for rechargeable aluminum-ion battery [12589-42]
12589 OL	Synthesis and photoluminescence properties of a novel blue-emitting phosphor Ca ₃ TeO ₆ codoped with Tm ³⁺ , Na ⁺ [12589-49]
12589 OM	Research on a new Tm ³⁺ -doped NaCa ₃ Bi(PO ₄) ₃ F blue-emitting phosphor for w-LEDs [12589-48]
	ARTIFICIAL VISION AND OPTICAL TECHNOLOGY APPLICATION
12589 ON	Finite element analysis on longitudinal-torsional ultrasonic vibration assisted helical milling of Ti-6Al-4V [12589-12]
12589 00	Tolerance optimization design of RV reducer's cycloid-pin gear pair considering multiple targets [12589-13]
12589 OP	The design of a method for recovering degraded images of atmospheric turbulence based on deep learning $[12589-18]$
12589 0Q	Research on underwater monitoring system based on Φ -OTDR distributed fiber optic sensors [12589-20]
12589 OR	Near-infrared emission enhancement of erbium-doped glass by using silver nanowire [12589-39]
12589 OS	Underwater image restoration based on channel compensation and dark channel prior [12589-28]
12589 OT	Study on the electronic properties of In_2O_3 doped with Eu^{3+} : a first principle calculation [12589-26]
12589 OU	Deep learning based optical orbital angular momentum demultiplexing under high scattering [12589-35]
12589 OV	Synthesis and powder x-ray diffraction data analysis of quaternary single-phase alloy Al ₈ Cu ₃ FePr [12589-40]
12589 OW	The design of cable joint fault detection method based on augmented time-frequency domain reflection method [12589-27]
12589 OX	Design of a low-complexity DOA estimation method based on fourth-order cumulants [12589-30]

12589 OY	Infrared small target detection based on saliency and difference of Gaussian [12589-9]
12589 OZ	Coupled multi-physics field simulation research of magneto-rheological elastomeric magneto-shear mechanical properties based on COMSOL $[12589\text{-}34]$
12589 10	Effect of the size distribution and morphology of refractory particle on self-curing time of water-based self-curing casting coatings $[12589-31]$
12589 11	CFD analysis and optimization of constant flow water saver based on UDF program [12589-16]
12589 12	Flow and performance calculation of a new integrated form of heat exchanger [12589-4]
12589 13	Preparation of porous carbon spheres with Ni/Co co-doped for supercapacitors application [12589-50]
12589 14	Research on the performance of permanent magnet synchronous motor with stator winding fault $[12589\text{-}44]$
12589 15	An active frequency drift islanding detection method for photovoltaic microgrid [12589-43]
12589 16	Study on power fluctuation factors of photovoltaic power generation system coupled with energy storage devices $[12589\text{-}41]$
12589 17	Mine image enhancement algorithm based on bilateral filtering and gamma correction [12589-52]