

PROCEEDINGS OF SPIE

***Nanoengineering: Fabrication,
Properties, Optics, Thin Films,
and Devices XX***

**Balaji Panchapakesan
André-Jean Attias
Wounjhang Park**
Editors

**20–21 August 2023
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 12653

Proceedings of SPIE 0277-786X, V. 12653

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 *Nanoengineering: Fabrication, Properties, Optics, Thin Films, and Devices XX*, edited by Balaji Panchapakesan, André-Jean Attias, Wounjhang Park, Proc. of SPIE 12653, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510665200

ISBN: 9781510665217 (electronic)

Published by

SPIE

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.

**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

v *Conference Committee*

NANOSTRUCTURED THIN FILMS I

- 12653 02 **Design and fabrication of resonant grating laser mirrors for single-mode emission in microchip lasers** [12653-20]
- 12653 03 **C/Ti/C/Al/C/Si multilayer and C+Ti/C+Al/C+Si composite thin films: synthesis and characterization** [12653-21]
- 12653 04 **Nanostructured thin films for Meissner-effect transition-edge-sensor devices** [12653-24]

INNOVATIVE PATTERNING

- 12653 05 **UV-LED-based projection lithography for rapid high-resolution micro- and nanostructuring** [12653-28]
- 12653 06 **Simulation of gallium phosphide cutting mechanism in ductile regime using molecular dynamics** [12653-29]
- 12653 07 **Single-shot spectroscopy using continuously variable filters** [12653-30]

LIGHT MATTER INTERACTIONS

- 12653 08 **A novel broadband photodetector realized using graphen- based heterojunction on a silicon substrate** [12653-6]
- 12653 09 **Transverse Anderson localization of light waves through Au nanoparticles in a 3D optical waveguide** [12653-7]
- 12653 0A **Investigation on the lithographic process of a high-precision direct laser writing system** [12653-18]

DEVICES AND PROPERTIES OF NANOSTRUCTURES FOR PHOTONICS

- 12653 0B **Optical phased array with high-speed and wide steering angle using organic EO polymer and inorganic waveguide structure** [12653-3]

NANO- AND MICRO-OPTICS

- 12653 OC **Shannon's entropy and structural complexity of random antireflective nanostructures on fused silica surfaces** [12653-8]
- 12653 OD **Development of mechanical polishing methods for multilayer Laue lens fabrication** [12653-11]

INNOVATIVE PATTERNING, MATERIALS ENGINEERING, NANOFABRICATION, AND NANOLITHOGRAPHY

- 12653 OE **Injection molding process for fabricating metalens with multi-height and high-aspect ratio nanostructures** [12653-13]
- 12653 OF **3D resist master evaluation protocol for nanoimprint lithography** [12653-14]
- 12653 OG **Coupling structures between Nb₂O₅ and plasmonic waveguide for high-speed and wide-steering angle optical phased array** [12653-16]
- 12653 OH **Intelligent reticle modification enabled large-area metalens patterning** [12653-48]

POSTER SESSION

- 12653 OI **Enhancement of NIR emission varying thulium of ZrO₂:2Yb³⁺-xTm³⁺ nanoparticles by sonochemical method** [12653-39]
- 12653 OJ **HgTe colloidal quantum dot tripods for infrared photodetection** [12653-43]
- 12653 OK **Impact of UV-ozone (UVO) treatment on optical and electrical properties of RF sputtered Ga₂O₃ thin films for opto-electronic application** [12653-45]
- 12653 OL **Deposition and characterization of distributed Bragg feedback resonant-cavities with complex index active layers** [12653-46]
- 12653 OM **Optical anisotropy of NbOCl₂** [12653-49]

DIGITAL POSTER SESSION

- 12653 ON **Improvement by localized surface plasmon resonance enhancement from Ag nanoparticles in Si-based photodetector** [12653-35]