

PROCEEDINGS OF SPIE

# ***Advances in Optical Thin Films VIII***

**Michel Lequime**  
**Detlev Ristau**  
*Editors*

**8–11 April 2024**  
**Strasbourg, France**

*Sponsored by*  
SPIE

*Cooperating Organisations*  
Photonics 21 (Germany)  
EOS—European Optical Society

*Published by*  
SPIE

**Volume 13020**

Proceedings of SPIE 0277-786X, V. 13020

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](http://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 *Advances in Optical Thin Films VIII*, edited by Michel Lequime, Detlev Ristau, Proc. of SPIE 13020, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510673588

ISBN: 9781510673595 (electronic)

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time)

[SPIE.org](http://SPIE.org)

Copyright © 2024 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](http://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](http://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

vii *Conference Committee*

---

## DEPOSITION PROCESSES

---

- 13020 02 **Deposition of thin films on hybrid-polymer 3D micro-optics using atomic layer deposition** [13020-6]
- 13020 03 **High-precision volume manufacturing of optical interference filters on 300mm wafers** [13020-7]

---

## DESIGN OF OPTICAL COATINGS

---

- 13020 04 **Thin film black coatings based on interference and absorption** [13020-10]
- 13020 05 **Nearly percolated Au films for interference-based sensing** [13020-11]
- 13020 06 **Optimizing thin-film material combinations for immersed narrow-bandpass filters in the VIS and NIR range** [13020-12]

---

## NANOLAMINATES

---

- 13020 07 **Quantized nanolaminates: investigation of a novel type of meta materials deposited by magnetron sputtering (Invited Paper)** [13020-14]
- 13020 08 **Ellipsometric control of layer thickness during coating of nanolaminate layers** [13020-15]
- 13020 09 **Anti-reflection coatings based on quantized nanolaminates manufactured by ion beam sputtering** [13020-16]

---

## THERMAL PROPERTIES OF COATINGS

---

- 13020 0A **Development of an experimental facility for the measurement of photo-induced thermal emission in interferential filters** [13020-21]
- 13020 0B **Absorption measurement and simulation of photo induced effects in thin-film optical filters** [13020-23]

---

#### SOFT X-RAY, EUV AND VUV COATINGS

---

- 13020 OC **Narrowband mirrors based on fluorides tuned at vacuum ultraviolet wavelengths (Invited Paper)** [13020-24]

---

#### NONLINEAR OPTICAL PROPERTIES OF COATINGS

---

- 13020 OD **Tailoring the nonlinear optical response of high-entropy alloy thin films through compositional and structural modification** [13020-30]
- 13020 OE **Integrable thin-film Fabry-Pérot type electro-optic modulator** [13020-31]
- 13020 OF **Damage detection in thin films using second harmonic generation** [13020-32]

---

#### HIGH-POWER LASER APPLICATIONS

---

- 13020 OG **Recent advancements in standardization effort for laser-induced damage threshold testing (Invited Paper)** [13020-34]
- 13020 OH **Low absorption ion beam sputtered coatings on large optics for high energy laser systems** [13020-38]
- 13020 OI **Cavity enhanced reflection of a distributed Bragg reflector for high power laser applications** [13020-39]

---

#### APPLICATIONS

---

- 13020 OJ **Microwave plasma assisted sputtering of a combined Ta<sub>2</sub>O<sub>5</sub>/SiO<sub>2</sub> and a-Si:H/SiO<sub>2</sub> two stack optical coating design concept for gravitational wave detectors** [13020-42]
- 13020 OK **Sputtered optical coatings for the coaxial integration of sensors in adaptive automotive headlights** [13020-44]

---

#### STRUCTURED COATINGS

---

- 13020 OL **2D nanopillars patterning of complex shape using multiple colloidal lithography illumination on photo-patternable TiO<sub>2</sub> and ZrO<sub>2</sub> based sol-gel layers** [13020-51]
- 13020 OM **Micro-nanostructuring by optical-lithography and nitriding of photo-patternable ZrO<sub>2</sub> sol-gel to obtain micro-nanostructured ZrN** [13020-52]

---

#### OPTICAL AND SCATTERING PROPERTIES

---

- 13020 ON **Spatially and angularly resolved scatterometry for a quantitative characterization of scratches, digs, and contamination (Best Student Paper Award)** [13020-55]
- 13020 OO **Reliable substrate characterization in the broadband range of 220-1700 nm based on spectral photometric data** [13020-56]
- 13020 OP **Accurate measurement and reduction of losses in ion beam sputtering coatings** [13020-57]

---

#### PROCESS MONITORING AND OPTIMIZATION I

---

- 13020 OQ **Advances in direct monochromatic monitoring for the DUV range** [13020-60]
- 13020 OR **Advanced characterization of IBAD deposited MgF<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Si, YF<sub>3</sub>, and Ge thin films in ultra-broadband spectral region of 300-5000 nm** [13020-61]

---

#### PROCESS MONITORING AND OPTIMIZATION II

---

- 13020 OS **Reliable post-production characterization approach to TiO<sub>2</sub>/SiO<sub>2</sub> electron-beam optical coatings based on multi-sample photometric and ellipsometric data** [13020-63]
- 13020 OT **Optical and structural properties of silicon nitride thin films deposited by plasma enhanced chemical vapor deposition for high reflectance optical mirrors** [13020-64]

---

#### POSTER SESSION

---

- 13020 OV **Optical coating facilities at the Instituto de Astrofísica de Canarias** [13020-46]
- 13020 OW **Investigation of zero-angle polarizers based on periodically structured thin films** [13020-65]
- 13020 OX **Selecting materials for short-period multilayer x-ray mirrors: comparison between peak and integrated reflectivity** [13020-67]
- 13020 OY **Improved polychromatic optical monitoring strategies of thin-film optical filters** [13020-70]
- 13020 OZ **Optical design of a grazing incidence multilayer mirror for 400eV region** [13020-71]
- 13020 IO **Functional optical coatings with quantum nanolaminates prepared by ion beam sputtering technology** [13020-76]
- 13020 I1 **Pulsed DC sputter deposited hydrogenated carbon: an alternative durable infrared optical thin film material** [13020-78]

13020 12 **Optical and mechanical properties of PIAD deposited HfO<sub>2</sub> single layers** [13020-79]

13020 13 **Reactive multitarget magnetron sputtering of Sr<sub>2</sub>FeMoO<sub>6</sub> films** [13020-81]

---

**DIGITAL POSTER SESSION**

---

13020 14 **Dual-mode polarization-sensitive tunable metalens enabling bright-field and edge-enhanced imaging** [13020-72]

13020 15 **Metalens-based optical coherence tomography for high-resolution biomedical imaging** [13020-73]