PROCEEDINGS OF SPIE

Asia-Pacific Conference on Fundamental Problems of Opto- and Microelectronics 2017

Yuri N. Kulchin Roman V. Romashko Jyh-Chiang Jiang Editors

5–7 November 2017 Taipei, Taiwan

Organized by

Institute of Automation and Control Processes, Far Eastern Branch of Russian Academy of Sciences (Russian Federation)

National Taiwan University of Science and Technology (Taiwan)

Sponsored by

Russian Academy of Sciences (Russian Federation)
Far-Eastern Branch of Russian Academy of Sciences (Russian Federation)
Ministry of Science and Technology of Taiwan (Taiwan)
National Taiwan University of Science and Technology (Taiwan)

Published by SPIE

Volume 11024

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 Asia-Pacific Conference on Fundamental Problems of Opto- and Microelectronics 2017, edited by Yuri N. Kulchin, Roman V. Romashko, Jyh-Chiang Jiang, Proceedings of SPIE Vol. 11024 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510627147

ISBN: 9781510627154 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)· Fax +1 360 647 1445 SPIF org

Copyright © 2019, Society of Photo-Optical Instrumentation Engineers.

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 copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online 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. The CCC fee code is 0277-786X/18/\$18.00.

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: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

ix	Authors
xi	Conference Committee
xiii	Introduction
SESSION 1	NANO-PHOTONICS AND NANOMATERIALS
11024 02	Embedding of iron silicide nanocrystals into monocrystalline silicon: suppression of emersion effect [11024-3]
11024 03	Optical properties of TiO ₂ nanostructured films [11024-25]
11024 04	Optical absorption by a nanosystem with dielectric quantum dots [11024-37]
11024 05	The development of photonic nanojet generated dielectric microstructures for local luminescence enhancement [11024-40]
11024 06	Optical beam deflection method for the diagnostics of nanosuspension [11024-7]
11024 07	Bremsstrahlung of electrons in periodic atomic structures [11024-13]
SESSION 2	MATERIALS FOR OPTOELECTRONICS AND PHOTONICS
11024 08	Interrelation between optical and radiation resistance of lithium niobate crystals of different chemical composition [11024-10]
11024 09	Nominally pure and strongly doped optically nonlinear lithium niobate crystals with low photorefractive effect and coercive field [11024-11]
11024 0A	The effect of the relative concentration of strontium in the cation sublattice of strontium bismutate on its photocatalytic properties [11024-12]
11024 OB	Influence of vacuum heating on magnetic characteristics of a-Fe2O3 ceramics obtained via spark plasma sintering $[11024-14]$
11024 0C	Mn ²⁺ and Cu ²⁺ -doped ZnS quantum dots stabilized by N-(2-carboxyethyl)chitosans [11024-21]
11024 0D	Light-induced currents in the metal-ferroelectric-metal sandwich structure [11024-19]

SESSION 3	PHOTONICS IN LIFE SCIENCES
11024 OE	Growth of Solanum tuberosum plantlets in vitro under LED light sources [11024-8]
11024 OF	Study of thermal relaxation processes in life tissues by blood pulsation imaging technique [11024-29]
11024 0G	Laser biosensor based on micromechanical oscillator [11024-36]
SESSION 4	OPTICAL MEASUREMENTS AND SENSORS
11024 0H	Dendrimeric rhodamine-derived chemosensor for Au ³⁺ [11024-15]
11024 OI	Influence of the laser repetition rate on the limits of detection in the femtosecond LIBS of the water solutions [11024-23]
11024 OJ	Rhodamine-microalgae based bionic structures for metal ions detection [11024-24]
11024 OK	Metrological performance of integrated waveguide-based SPR refractometer: eigenmode expansion perspective [11024-26]
11024 OL	Investigation of the spectral and temporal characteristics of plasma radiation in the case of breakdown on the surface of Ca aqueous solutions generated by femtosecond laser pulses [11024-31]
11024 0M	Weak seismic waves detection using ice-mounted fiber-optic accelerometers [11024-32]
11024 ON	Using the ultrasound for optical study of sea water [11024-34]
11024 00	Registration of acoustic emission waves in anisotropic composite plates by fiber-optic sensors [11024-35]
11024 OP	Sparse antenna arrays based on Costas arrays [11024-41]
SESSION 5	OPTICAL SIGNAL PROCESSING
11024 OQ	Method for automatic estimation of the electronic optical converter background signal during measurements of seawater fluorescence [11024-33]
11024 OR	Reconstruction of the average effective aerosol concentration field in the Far Eastern region by the method of fluid location of the atmosphere [11024-1]
11024 OS	Tunable phase plate in a wide wavelength range [11024-9]

SESSION 6	NONLINEAR OPTICS AND HOLOGRAPHY
11024 OT	Self-focusing of coherent light beams in photorefractive lithium niobate due to assistance of incoherent background [11024-20]
11024 OU	Modeling of the holographic formation kinetics of diffractive optical elements for light beams conversion in PDLCs [11024-28]
11024 0V	Recording of dynamic holograms in photorefractive crystals CdTe by polychromatic IR radiation [11024-30]
11024 OW	Orthogonal vectorial two-wave mixing in optically active photorefractive crystal [11024-38]
11024 OX	Characteristics of controllable holographic DOEs in PDLC for light beams conversion into Bessel-like ones [11024-39]
11024 0Y	Four-wave mixing in the transparent nanosuspension [11024-17]
SESSION 7	LASER TECHNOLOGY
11024 OZ	Laser powder fusing as an additive manufacturing process to create the ferromagnetic coatings on the basis of Fe and Sm powders on stainless steel substrate [11024-4]
11024 10	Comparative study of laser powder fusing of Sm-Co and Sm-Fe systems on the duralumin substrate: microstructure and magnetic properties [11024-5]
11024 11	An influence of laser fusing of Sm, Co and Fe powders on the Young's modulus and microhardness of fused coatings on two types of substrates [11024-6]