PROCEEDINGS OF SPIE

Nanoengineering: Fabrication, Properties, Optics, and Devices XIII

Eva M. Campo Elizabeth A. Dobisz Louay A. Eldada Editors

30–31 August 2016 San Diego, California, United States

Sponsored and Published by SPIE

Volume 9927

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 Nanoengineering: Fabrication, Properties, Optics, and Devices XIII, edited by Eva M. Campo, Elizabeth A. Dobisz, Louay A. Eldada, Proceedings of SPIE Vol. 9927 (SPIE, Bellingham, WA, 2016) Six-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-786X (electronic)

ISBN: 9781510602458

ISBN: 9781510602465 (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

Copyright © 2016, 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/16/\$18.00.

Printed in the United States of America Vm7 i ffUb 5 gpc WJUhY gž & Wži bXY f JW bgY Zfca CD-9.

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 six-digit CID article numbering system structured as follows:

- The first four 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 Authors
- ix Conference Committee

SESSION 1	NANOPHOTONICS
9927 02	Guided-mode resonance nanophotonics: fundamentals and applications (Invited Paper) [9927-1]
9927 04	Self-organized, effective medium black silicon antireflection structures for silicon optics in the mid-infrared [9927-3]
9927 06	Design and fabrication of titanium dioxide wire grid polarizer for the far ultraviolet spectral range [9927-5]
9927 07	Silicon nanowire photodetectors made by metal-assisted chemical etching [9927-6]
SESSION 2	INNOVATIVE PATTERNING
9927 08	Nanofabrication of low extinction coefficient and high-aspect-ratio Si structures for metaphotonic applications [9927-8]
9927 09	Dual-width plasmonic gratings with sub-10 nm gaps for biosensor applications [9927-9]
SESSION 3	ENERGY HARVEST
9927 OC	Conversion of infrared light into usable energy [9927-12]
9927 OE	Modified Richardson-Dushman equation and modeling thermionic emission from monolayer graphene [9927-14]
9927 OF	Active control of nano dimers response using piezoelectric effect [9927-20]
SESSION 4	METROLOGY AND PRECISION
9927 0G	Nanomanufacturing concerns about measurements made in the SEM Part V: dealing with noise (Invited Paper) [9927-15]
9927 01	Scanned laser inspection of SOI wafers for HVM [9927-17]
9927 OK	Characterization of one-dimensional gratings fabricated by laser-focused atomic deposition [9927-19]

9927 OM	Fabrication and characterization of one-dimensional multilayer gratings for nanoscale microscope calibration [9927-22]
SESSION 5	NANOENGINEERED MATERIALS
9927 OR	Tapered optical fiber tip probes based on focused ion beam-milled Fabry-Perot microcavities [9927-27]
SESSION 6	NANODEVICE ENGINEERING
9927 0V	Nanofabrication and test of novel diffractive optics for OAM-mode division multiplexing in optical fibers [9927-31]
9927 OW	Design and fabrication of Fourier spectral filter array for multispectral imaging [9927-32]
SESSION 7	NANO-OPTIC DEVICES
9927 OZ	Improved optical enhancement in binary plasmonic gratings with nanogap spacing [9927-35]
9927 11	Surface characterization of nanostructured 'black silicon' using impedance spectroscopy [9927-37]
9927 12	Characterization of random anti-reflecting surface structures and their polarization response at off-normal angles of incidence [9927-38]
9927 13	Holographic imaging with single pixel sensor [9927-39]
SESSION 8	NANOSTRUCTURE PROPERTIES
9927 15	Silver nanorod structures for metal enhanced fluorescence [9927-41]
9927 16	Modeling thermionic emission from carbon nanotubes with modified Richardson-Dushman equation [9927-43]
	POSTER SESSION
9927 1B	Photovoltaic effects as the physical basis of a new generation of microelectromechanical sensors and systems (MEMS) [9927-48]
9927 11	Growth technique and effect of post growth annealing on the optical properties of In(Ga)As/GaAs quantum dot heterostructures [9927-55]
9927 1J	A detailed investigation of the impact of varying number of dot layers in strain-coupled multistacked InAs/GaAs quantum dot heterostructures [9927-56]

9927 1K	High resolution measurement of water levels in optical components [9927-57]
9927 1M	Cliché fabrication method using precise roll printing process with 5 um pattern width [9927-59]
9927 1N	A characterization method for the metal thin film [9927-60]
9927 1Q	Ion-assisted evaporation of vanadium dioxide thin films [9927-63]
9927 1R	Raman spectral analysis of high efficiency PVDF: nanocomposite films doped with MWCNT [9927-64]
9927 1S	Induced changes in refractive index, optical band gap, and absorption edge of polycarbonate-SiO ₂ thin films by Vis-IR lasers [9927-66]
9927 1T	Excitation of silicon microspheres resonances with femtosecond laser fabricated glass waveguides [9927-67]