PROCEEDINGS OF SPIE

2017 International Conference on Optical Instruments and Technology

Micro/Nano Photonics: Materials and Devices

Baojun Li Xingjun Wang Ya Sha Yi Editors

28–30 October 2017 Beijing, China

Sponsored by CIS — China Instrument and Control Society (China) SPIE

Published by SPIE

Volume 10622

Proceedings of SPIE 0277-786X, V. 10622

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

2017 International Conference on Optical Instruments and Technology: Micro/Nano Photonics: Materials and Devices, edited by Baojun Li, Xingjun Wang, Ya Sha Yi, Proc. of SPIE Vol. 10622, 1062201 · © 2018 SPIE · CCC code: 0277-786X/18/\$18 · doi: 10.1117/12.2317483

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 2017 International Conference on Optical Instruments and Technology: Micro/Nano Photonics: Materials and Devices, edited by Baojun Li, Xingjun Wang, Ya Sha Yi, Proceedings of SPIE Vol. 10622 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510617551

ISBN: 9781510617568 (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

SPIE.org

Copyright © 2018, 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.

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

٧	Authors
vii	Symposium Committee
ix	Conference Committee
xi	Introduction
xiii	Conference Organizers
	CECCION 1
	SESSION 1
10622 02	Light emission in quantum dots and dyes doped polymer nanofibers (Invited Paper) [10622-5]
	SESSION 2
	3L33ION 2
10622 03	Optical micro-cavities on silicon (Invited Paper) [10622-19]
10622 04	Towards on-chip spectroscopy based on a single microresonator (Invited Paper) [10622-59]
	SESSION 3
10622 05	Temporal coupled mode theory for all-dielectric perfect absorbers [10622-18]
	SESSION 4
10622 06	MoS ₂ -based nanocomposites for surface enhanced Raman scattering [10622-20]
	POSTER SESSION
10622 07	Structural and optoelectronic properties of ZnGaO thin film by pulsed laser deposition [10622-3]
10622 08	Impact of the incident light polarization on photonic spin splitting around the Brewster angle [10622-10]
10622 09	Size and shape dependent optical properties of InAs quantum dots [10622-11]

10622 0A	Numerical modelling of high efficiency InAs/GaAs intermediate band solar cell [10622-17]
10622 OB	Organic-inorganic broadband photodetector [10622-21]
10622 OC	Design of control system for optical fiber drawing machine driven by double motor [10622-23]
10622 0D	Reduction of silicon waveguide endface reflection using a taper [10622-29]
10622 OE	Research progress of infrared detecting and display integrated device based on infrared-visible up-conversion technology [10622-32]
10622 OF	A third-order silicon racetrack add-drop filter with a moderate feature size [10622-34]
10622 0G	Quantitative analysis of wide field-of-view and broadband quarter-wave plate based on metasurface [10622-36]
10622 OI	Design of bent waveguide semiconductor lasers using nonlinear equivalent chirp [10622-42]
10622 OJ	Design of polarization-independent transmission fused-silica grating with high diffraction efficiency [10622-44]
10622 OK	SU-8 optical waveguides and devices for the 2µm wavelength range [10622-45]
10622 OL	Terahertz broadband polarization converter based on metamaterials [10622-56]
10622 OM	Photonic crystal nanofiber air-mode cavity with high Q-factor and high sensitivity for refractive index sensing [10622-57]
10622 ON	Nonreciprocal optical propagation by magnetic tamm plasmon polaritons [10622-60]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Bo, Yu Ming, 0C Chen, Qian, 0D, 0F Chen, Xiangfei, Ol Chen, Xiangning, 0D, 0F Chen, Xin, 0M Chen, Xinrong, 0J Chen, Yanjun, 0G Cheng, Chang, 02 Cheng, Yushui, 0J Dai, Daoxin, 03, 0K Eric, Deborah, 09, 0A Gao, Dongwen, 07 Guo, Jingshu, 0K Guo, Yuhao, 04 Guo, Zhe, 0G Han, Xiaowei, 07 Han, Zhaohong, 04 He, Bo, 0E He, Jingsuo, 0H He, Yumeng, 0N Hu, Zuyuan, OJ

Agarwal, Anu M., 04

Huang, Qingzhong, 0D, 0F

Imran, Ali, 09, 0A Jiang, Jianliang, 09, 0A Jiang, Wei, OD, OF Jin, Xipeng, 0H Kimerling, Lionel C., 04 Lang, Yaopu, 08 Lei, Hongxiang, 06 Li, Baojun, 02, 06, 0B Li, Chaoming, 0J Li, Guifang, 04 Li, Juan, 06 Li, Lianyan, Ol Li, Shufeng, 07 Li, Weile, 0E Li, Yanqiu, 0G Li, Yonghua, OL Liu, Chao, 08 Liu, Erhu, 03 Liu, Ke, 0G Liu, Lihui, 0G Liu, Qinggang, 08 Ma, Xiaoxue, 0M Michel, Jurgen, 04

Ming, Xianshun, 05 Ni, Guogiang, 0E Nie, Hongrui, 0M

Padilla, Willie J., 05 Pan, Yong, 07 Qin, Zirui, 08 Ren, Kun, 0N Ren, Xiaobin, 0N Shan, Haifena, OK Shao, Yue, OF Shi, Yuechun, Ol Shi, Zexia, OH Song, Yong, 0E Su, Bo, OH Sun, Liqun, 05 Sun, Xueming, 0H Tan, Ying, 03 Tang, Yu, 0J Wang, Haowei, 0E Wang, Jing, 04 Wang, Jun, 0C Wang, Li, 07 Wang, Rui, 0J Wang, Ruike, 0H Wang, Ying, OD, OF Wu, Jianhong, 0J Xu, Haiyan, 0J Xu, Junfeng, 0E Yang, Daquan, 0M Yang, Huaidong, 05 Yang, Shengyi, 0E Yang, Xianguang, 02, 0B Yousaf, Muhammad, 09, 0A Yu, Jian, 0J

Yu, Yue Chen, 0C Yue, Chong, 08 Zhang, Cunlin, 0H Zhang, Lin, 04 Zhang, Shengbo, OH Zhang, Weina, 06 Zhang, Yunshan, Ol Zhao, Guozhona, OL Zhou, Xin, OD, OF

Symposium Committee

General Chairs

Tianchu Li, National Institute of Metrology (China) **H. Phillip Stahl**, NASA Marshall Space Flight Center (United States)

Conference Co-Chairs

Songlin Zhuang, Shanghai University of Science and Technology (China)
Liwei Zhou, Beijing Institute of Technology (China)
Shenghua Ye, Tianjin University (China)
Yimo Zhang, Tianjin University (China)
Zheng You, Tsinghua University (China)
Guangjun Zhang, Southeast University (China)

Technical Program Chair

Guofan Jin, Tsinghua University (China)

Technical Program Co-Chairs

Jinxue Wang, SPIE Tiegen Liu, Tianjin University (China)

Local Organizing Committee Chair

Youhua Wu, China Instrument and Control Society (China)

Local Organizing Committee Co-Chairs

Guoqiang Ni, Beijing Institute of Technology (China) **Daoyin Yu**, Tianjin University (China)

General Secretary

Tong Zhang, China Instrument and Control Society (China)

Administrative Vice General Secretary

Yu-nan Sun, Beijing Institute of Technology (China)

Vice General Secretaries

Qun Hao, Beijing Institute of Technology (China) **Yuejin Zhao**, Beijing Institute of Technology (China) **Cunlin Zhang**, Capital Normal University (China) **Liquan Dong**, Beijing Institute of Technology (China)

Local Organizing Committee

Hongda Chen, Institute of Semiconductors, CAS (China)
Xuping Zhang, Nanjing University (China)
Shangzhong Jin, China Jiliang University (China)
Libo Yuan, Harbin Engineering University (China)
Yumei Wen, Chongqing University (China)
Tian Lan, Beijing Institute of Technology (China)
Cuiling Li, Beijing Institute of Technology (China)

Conference Committee

Conference Chairs

Baojun Li, Sun Yat-Sen University (China) **Xingjun Wang**, Peking University (China) **Ya Sha Yi**, University of Michigan (United States)

Program Committee

Renmin Ma, Peking University (China)

Di Liang, HP, Inc. (United States)

Daoxin Dai, Zhejiang University (China)

Hideo Isshiki, The University of Electro-Communications (Japan)

Yun-Feng Xiao, Peking University (China)

Chongjun Jin, Sun Yat-Sen University (China)

Yuchao Li, Jinan University (China)

Hongbao Xin, National University of Singapore (Singapore)

Youngfeng Mei, Fudan University (China)

Xiangping Li, Jinan University (China)

Weiwen Zou, Shanghai Jiao Tong University (China)

Bin Dong, Dalian Nationalities University (China)

Xiaochen Sun, LaXense, Inc. (United States)

Qiaoqiang Gan, University at Buffalo (United States)

Ruitao Wen, Massachusetts Institute of Technology (United States)

Secretary

Haowen Shu, Peking University (China)

Session Chairs

- 1 Micro/Nano Photonics
 - Xingjun Wang, Peking University (China)
- 2 Micro/Nano Photonics

Baojun Li, Jinan University (China)

3 Micro/Nano Photonics

Lei Bi, University of Electronic Science and Technology of China (China)

- 4 Micro/Nano Photonics
 Renmin Ma, Peking University (China)
- 5 Micro/Nano PhotonicsChongjun Jin, Sun Yat-Sen University (China)

Introduction

Micro/Nano photonics is a rising interdisciplinary field which is focused on the study of the behavior of light on the micro/nano meter scale. It is considered a branch of optical engineering which deals with optics, or the interaction of light with particles or substances, at deep subwavelength length scales. Micro/Nano photonics can provide high bandwidth, high speed and ultra-small optoelectronic components. This technology has the potential to revolutionize telecommunications, computation, sensing, optical storage, optical display, optical manipulation, solar energy utilization, and lithography, etc.

With the importance of this technology in mind, the Micro/Nano photonics, Materials and Devices Conference of OIT 2017 was organized. The conference accepted over 50 papers from different countries/areas of the world, which are focused on the design, fabrication, and application of micro/nanostructures, and crossed many research disciplines including silicon photonics integration, active nanomaterials, plasmonics, biophotonics, nonlinear optics, nanostructure device, and fabrication technology. We also invited renowned scholars to present their cutting-edge breakthroughs. These experts and contributors added to an intellectually stimulating environment.

As the Conference Chairs, we would like to express our appreciation to the committee members for their support, to the presenters for devoting their precious time to writing intriguing articles, and to the reviewers for their helpful comments. We are also grateful to the staff of SPIE for their efforts in publishing these Proceedings.

Baojun Li Xingjun Wang Yasha Yi

Conference Organizers

Organized by

Opto-Electronic-Mechanic Technology and System Integration Chapter, CIS (China)

Committee on Optoelectronic Technology, COS (China)

Committee on Optics, China Ordnance Society (China)

Optical Instrument Chapter, CIS (China)

Beijing Institute of Technology (China)

Tianjin University (China)

Tsinghua University (China)

Peking University (China)

Nanjing University (China)

Shanghai Jiao Tong University (China)

Zhejiang University (China)

Nankai University (China)

Capital Normal University (China)

Beijing University of Posts and Telecommunications (China)

Chongqing University (China)

University of Shanghai for Science and Technology (China)

Instrument Society of America (United States)

Institute of Measurement and Control (United Kingdom)

Hong Kong Institution of Engineers (Hong Kong, China)

The Society of Measurement and Control (Japan)