PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 11201

, "Front Matter: Volume 11201," Proc. SPIE 11201, SPIE Micro + Nano Materials, Devices, and Applications 2019, 1120101 (13 January 2020); doi: 10.1117/12.2565952

Event: ANZCOP, 2019, Melbourne, Australia

PROCEEDINGS OF SPIE

SPIE Micro + Nano Materials, Devices, and Applications 2019

**M. Cather Simpson
Saulius Juodkazis**
Editors

**9–12 December 2019
Melbourne, Australia**

Sponsored by
SPIE

Organized by
SPIE
The Australian Optical Society

Published by
SPIE

Volume 11201

Proceedings of SPIE 0277-786X, V. 11201

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

SPIE Micro + Nano Materials, Devices, and Applications 2019, edited by M. Cather Simpson,
Saulius Juodkazis, Proc. of SPIE Vol. 11201, 1120101 · © 2019 SPIE
CCC code: 0277-786X/19/\$21 · doi: 10.1117/12.2565952

Proc. of SPIE Vol. 11201 1120101-1

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 *SPIE Micro + Nano Materials, Devices, and Applications 2019*, edited by M. Cather Simpson, Saulius Juodkazis, Proceedings of SPIE Vol. 11201 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 0277-786X
ISSN: 1996-756X (electronic)

ISBN: 9781510631427
ISBN: 9781510631434 (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 © 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 \$21.00 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/19/\$21.00.

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.

SPIE. DIGITAL LIBRARY
SPIDigitalLibrary.org

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

vii	<i>Authors</i>
ix	<i>Conference Committee</i>

SPECIAL SESSION ON PHOTONIC CRYSTALS AND APPLICATIONS

11201 04	Femtosecond laser 3D nanoprinting for functional devices (Invited Paper) [11201-2]
11201 05	Graphene on silicon-nitride photodetector [11201-3]
11201 06	Ablation control by applying magnetic and electric fields [11201-4]

NONLINEAR PLASMONICS AND PHOTONICS

11201 07	Nonlinear plasmonics of NLO polymer/Au nanoparticle hybrid systems (Invited Paper) [11201-5]
11201 08	Frequency mixing in nonlinear interaction of one-way edge-modes of topological photonic crystals [11201-6]

METASURFACES I

11201 0A	Mid infrared metasurfaces for photo-thermal energy conversion (Invited Paper) [11201-8]
11201 0C	A simple and robust surface integral method to model light and matter interactions (Invited Paper) [11201-10]
11201 0D	Nonlinear response of surface plasmon polaritons: a systematic comparison with new insights [11201-11]

METASURFACES II

11201 0F	Plasmonic metasurfaces for optical information processing [11201-13]
11201 0G	Photon-pair generation via bound states in the continuum in nonlinear metasurfaces [11201-14]
11201 0H	Nonresonant ENZ metamaterial at visible wavelength for superior refractive index matching sensing [11201-15]

11201 0I **Dielectric metasurface based advanced image processing** [11201-16]

2D MATERIALS

11201 0J **Second harmonic generation from multilayer hexagonal boron nitride** [11201-17]

11201 0K **Engineering and application of quantum emitters in hexagonal boron nitride** [11201-19]

11201 0L **Tuning the properties of flash-reduced graphene oxide electrodes for supercapacitor applications** [11201-20]

11201 0M **Optomechanical tension and crumpling of 2D semiconductors** [11201-21]

11201 0N **Electronic and optical properties of Dirac semimetals in InAs/GaInSb superlattice nanostructures** [11201-22]

SOLAR CELL TECHNOLOGIES

11201 0O **Development of plasmonic photocatalysts for inactivation of microorganisms and decomposition of organic compounds (Invited Paper)** [11201-23]

11201 0Q **Tuning the florescence color of gradient bandgap perovskite nanoplate by direct laser writing** [11201-25]

11201 0R **Estimation of refractive index profiles of vertically aligned disordered silicon nanowires for photon management applications** [11201-26]

11201 0S **Light soak study of perovskite-based materials via scanning imaging spectroscopy** [11201-27]

DIRECT LASER WRITING I

11201 0T **Femtosecond laser writing of metallic nanostructures using silver photo-reduction (Invited Paper)** [11201-28]

11201 0U **Tightly-focused femtosecond laser interaction with water (Invited Paper)** [11201-29]

11201 0V **Response of natural muscovite to a single femtosecond laser pulse** [11201-30]

11201 0W **Direct femtosecond laser writing of low-loss waveguides in chalcogenide glasses for mid-infrared applications** [11201-31]

NANOTEXTURED SURFACES AND OPTICAL SENSORS

- 11201 0X **Hybrid two-dimensional nanostructured hydrogen gas sensors** [11201-32]
- 11201 0Y **Thermal radiation control structure obtained by anisotropic anode etching of Al** [11201-33]
- 11201 0Z **Technology for chip based optical gyroscope** [11201-34]
- 11201 10 **Revisiting high order anapole mode in single dielectric nanostructure with high refractive index** [11201-35]
- 11201 11 **Optical metagrating for one-shot polarization measurements** [11201-37]

DIRECT LASER WRITING II

- 11201 12 **Laser writing of color centers in silicon carbide (Invited Paper)** [11201-38]
- 11201 13 **The double-edged sword of femtosecond laser-induced periodic surface structures for sub-diffraction and high-efficient nanotexturing (Invited Paper)** [11201-39]
- 11201 14 **Femtosecond laser fabrication of hybrid optical element in glass: volume grating embedded inside refractive lens** [11201-40]
- 11201 15 **Evolution of femtosecond laser-induced periodic structures: from nanoholes to regular structures** [11201-41]

BIOSENSING

- 11201 16 **Towards an active micropump-mixer for rapid anti-platelet drug screening in whole blood** [11201-42]
- 11201 18 **An optical fiber microprobe for surface-enhanced Raman scattering sensing with enhanced signal-to-background ratio** [11201-45]
- 11201 1A **Ultrasensitive biosensing based on plasmonic nanostructures** [11201-47]

POSTER SESSION

- 11201 1B **Curcumin-nanodiamond-silk wound dressings for sensing infection** [11201-36]
- 11201 1D **Nonlinear imaging through magnetic dipole quasi-BIC ultra-thin resonators** [11201-49]

11201 1E	Solid-state light-emitting devices using novel green luminescent material of semiconductive nanoporous ZnMnO [11201-50]
11201 1G	Antireflective surfaces for astro-photonic applications [11201-52]
11201 1H	Enhancement of photocurrent in InGaN/pseudo-AlGaIn multi quantum wells by surface acoustic wave [11201-53]
11201 1I	Black metals [11201-54]
11201 1J	Scalable and consistent fabrication of plasmonic colors via nanoimprint lithography [11201-55]
11201 1K	Large-area mask patterning for solar cell applications [11201-56]
11201 1L	Design and optimization of broadband and transparent SERS based on transformation optics [11201-57]
11201 1M	Ultraviolet light emitting diode lamp for color perception research [11201-58]
11201 1N	Formation of micro-groove on diamond by femtosecond laser micromachining [11201-59]
11201 1P	Silicon nitride based fluidically tuned photonic crystal for bio-sensing application [11201-61]
11201 1Q	Strong Kerr nonlinearity in BiOBr nanoflakes [11201-62]
11201 1R	Deep-subwavelength metamaterial resonators operating at dual frequency regions [11201-63]
11201 1S	Infrared imaging in nonlinear GaAs metasurfaces [11201-64]
11201 1T	Silicon-based metasurfaces for vortex beam generation [11201-65]
11201 1V	Optical frequency comb by giant nonlinear capillary waves [11201-67]
11201 1W	Measuring absorption coefficient of excised animal skin exposed to THz radiation [11201-68]
11201 1X	Non-linear absorption coefficient measurement of thin films by Z-scan in near- and mid-infrared range [11201-69]
11201 1Y	Uptake study of gold nanoparticles into cancer cells using high-order image correlation spectroscopy [11201-70]
11201 1Z	Towards a deep submicron CMOS image sensor on a standard FDSOI process [11201-71]

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.

Abraham, Amanda N., 1B
Aharonovich, Igor, 0J
Akahane, Kouichi, 0N
Akbaridoust, Farzan, 16
Al Mamun, Md Abdullah, 18
Aoni, Rifat A., 0I, 1R
Aoshima, R., 07
Avdeev, Ivan D., 0M
Awasthi, Saurabh, 0V
Bao, Qiaoliang, 0Q
Beckett, Paul, 1Z
Bhattacharya, Shanti, 1T
Brazilek, Rose J., 16
Broderick, Neil, 1L
Camacho-Morales, Rocio, 1D, 1S
Cao, Guiyuan, 0Q
Carcreff, J., 0W
Castelletto, S., 12
Chan, Derek Y. C., 0C
Chen, Qi-Dai, 13, 15
Chen, Weijian, 0S
Chon, James W. M., 1X, 1Y
Clayton, A. H. A., 1Y
Cui, Dandan, 1Q
Dabirian, A., 1A
Davis, T. J., 0F
De Angelis, Costantino, 1S
de Silva, Charitha, 16
de Sterke, C. Martijn, 0D
Dharmavarapu, Raghu, 1T
Dimitrov, Nikolay, 1S
Dreischuh, Alexander, 1S
Du, Yi, 1Q
Fan, Hua, 13, 15
Feng, Haifeng, 1Q
Flanders, Stuart J., 1X
Frösch, Johannes E., 0J
Fuerbach, Alex, 0V
Fusco, Z., 0H
Gailevicius, Darius, 05
Gan, Zhixing, 0Q
Gardner, Augustine, 0J
Gibson, Brant C., 1B
Gili, Valerio Flavio, 1S
Gomez, D. E., 0F
Gong, Bill, 0V
Greentree, Andrew D., 1V
Hamilton, Justin R., 16
Han, Bing, 04

Hao, Weichang, 1Q
Hashtroudi, Hanie, 0X
Hatanaka, Koji, 0U
Hosako, Iwao, 0N
Hu, Jingwen, 1K
Huang, Lujun, 10, 1D
Inami, W., 07
Iqbal, Muhammad Hassan, 0Z
Ivanova, Elena, 1B
Jagadish, Chennupati, 1S
James, Timothy D., 1J
Jia, Baohua, 0L, 0Q, 0S, 1Q
Jia, Linnan, 1Q
Johnstone, Tom, 1M
Juodkazis, Saulius, 06, 12, 13, 15, 18, 1G, 1I, 1K, 1M, 1T
K., Narayan, 1P
Kane, Deb. M., 0V
Karouta, Fouad, 1S
Kasamatsu, Akifumi, 0N
Katkus, Tomas, 05, 06, 12, 18
Katoozi, D., 1Y
Kawata, Y., 07
Kazemzadeh, Mohammadrahim, 1L
Khalid, Asma, 1B
Kianinia, M., 0K
Kim, Deuk-Young, 1E, 1H
Kim, Moon-Deock, 1E, 1H
Kim, Sejeong, 0J
Klaseboer, Evert, 0C
Komar, Andrei, 0I, 1S
Kondo, Toshiaki, 0Y
Kowalska, Ewa, 0O
Kumagai, Takuhiro, 0A
Kumar, Manoranjan, 1P
Kumar, Rajesh, 0X
Kumar, S., 1A
Kurt, Hamza, 05
Lai, Choon Kong, 0Z
Lajevardipour, Alireza, 1W
Lan, Zhihao, 08
Le Coq, D., 0W
Le, Nguyen Hoai An, 1G
Lee, Sejoon, 1E, 1H
Lee, Youngmin, 1E
Leo, Giuseppe, 1S
Li, Chi, 0J
Li, Gordon Han Ying, 0D
Li, Zhen-Ze, 13, 15

Lin, Han, 0L
 Linklater, Denver P., 1B
 Little, Douglas J., 0V
 Liu, Mingkai, 1R
 Lundgaard, Stefan, 05, 1I, 1K
 Lung, Shaun, 1I
 Lysevych, Mykhaylo, 1S
 M., Shwetha, 1P
 Ma, Yixuan, 1D
 Maddaka, Reddeppa, 1H
 Madden, Steve, 0Z
 Makiyama, T., 07
 Maksimovic, Jovan, 06, 1K
 Maksymov, Ivan S., 1V
 Malinauskas, Mangirdas, 05
 Manjunath, Shridhar, 1R
 Marjo, Chris, 0V
 Marusic, Ivan, 16
 Maruyama, Ryoji, 1N
 Masselin, P., 0W
 Masuda, Hideki, 0Y
 Mazilu, Michael, 1I
 Miroshnichenko, Andrey E., 0I, 10, 1D, 1S
 Mitchell, Arnan, 16
 Mizeikis, Vygtantas, 05, 0T
 Moein, Tania, 05
 Moon, Mitchell, 16
 Moshkalev, Stanislav, 0X
 Moss, David J., 05, 1Q, 1Y
 Mousavi, N. S. Susan, 1A
 Mulvaney, Paul, 1J
 Nair, Rajesh V., 0R
 Nandurkar, Harshal H., 16
 Nesbitt, Warwick S., 16
 Neshev, Dragomir N., 0G, 0H, 0I, 1D, 1S
 Ng, Soon Hock, 05, 06, 1G, 1I, 1K, 1M, 1T
 Nguyen, Huu Khuong Duy, 1B
 Nishijima, Yoshiaki, 0A, 1K
 Ono, Atsushi, 07, 0T
 Ou, Qingdong, 0Q
 Panchenko, E., 0F
 Panoiu, Nicolae C., 08
 Park, Byung-Guon, 1H
 Parry, Matthew, 0G
 Patrashin, Mikhail, 0N
 Pedersen, Nicolas R. H., 1I
 Poddubny, Alexander N., 0G, 0M
 Poshakinskiy, Alexander V., 0M
 Pototsky, Andrey, 1V
 Powell, David A., 1R
 Rahmani, Mohsen, 0H, 0I, 1D, 1R, 1S
 Raj, Vidur, 1R
 Roberts, Ann, 0F, 1J
 Rocco, Davide, 1S
 Saini, Sudhir Kumar, 0R
 Savub, Raluca, 0X
 Sekine, Norihiko, 0N
 Setzpfandt, Frank, 1I
 Shadrivov, Ilya V., 1R
 Shafiei, Mahnaz, 0X
 Shahidan, M. Faris Shanin, 1J
 Singh, K., 0F
 Smirnov, Alexander, 1D
 Smith, Daniel, 1G
 Solntsev, Alexander S., 0J
 Song, Jingchao, 1J
 Spencer, Sarah J., 1B
 Staliunas, Kestutis, 05
 Stoddart, Paul R., 18
 Stoyanov, Lyubomir, 1S
 Sugita, A., 07
 Sukhorukov, Andrey A., 0G, 1I
 Sun, Hong-Bo, 04, 13, 15
 Sun, Qiang, 0C
 Sunarso, Jaka, 0L
 Szydzik, Crispin, 16
 T., Poojith, 1P
 Taheri, M., 0H
 Tamaki, Takayuki, 1N
 Tan, H. Hoe, 1S
 Terai, Seiya, 14
 To, Naoki, 0A
 Toriyama, Seiya, 0T
 Tricoli, A., 0H
 Tuniz, Alessandro, 0D
 Unnithan, Ranjith Rajasekharan, 1Z
 Varapnickas, Simonas, 05
 Venugopalan, P., 1A
 Vilagosh, Zoltan, 1W
 Vū, Yén, 0S
 Wang, Kai, 1I
 Wang, Lei, 13, 15
 Watanabe, Wataru, 14, 1N
 Weerasuriya, Charitha, 1M
 Wen, Xiaoming, 0Q, 0S
 Wesemann, L., 0F
 White, T., 0H
 Wong, Basil T., 0L
 Wong, Shao Ing, 0L
 Wood, Andrew W., 1W
 Woods, William, 1M
 Woolley, Matt, 1D
 Wu, Jiayang, 1Q
 Xing, Yifei, 0G
 Xu, Lei, 0G, 0I, 10, 1D, 1S
 Xu, Weiliang, 1L
 Yanagishita, Takashi, 0Y
 Yang, Tieshan, 1Q
 Yang, Woo-Chul, 1E, 1H
 Yang, Yunyi, 1Q
 You, Jian Wei, 08
 Yu, Yan-Hao, 13, 15
 Yuffa, Alex, 0C
 Zangeneh Kamali, Khosro, 1I, 1D
 Zargar Shoshtari, Kamran, 1L
 Zhang, Guoquan, 1D
 Zhou, Chunhua, 0Q, 0S

Conference Committee

Symposium Chair

John Harvey, The University of Auckland (New Zealand)

Conference Chairs

M. Cather Simpson, The University of Auckland (New Zealand)

Saulius Juodkazis, Swinburne University of Technology (Australia)

Conference Program Committee

James W. M. Chon, Swinburne University of Technology (Australia)

Hong-Bo Sun, Tsinghua University (China)

Session Chairs

- 1 Special Session on Photonic Crystals and Applications
Saulius Juodkazis, Swinburne University of Technology (Australia)
- 2 Nonlinear Plasmonics and Photonics
Saulius Juodkazis, Swinburne University of Technology (Australia)
- 3 Metasurfaces I
James W. M. Chon, Swinburne University of Technology (Australia)
- 4 Metasurfaces II
Atsushi Sugita, Shizuoka University (Japan)
- 5 2D Materials
Cather Simpson, The University of Auckland (New Zealand)
- 6 Solar Cell Technologies
Remo Proietti Zaccaria, Ningbo Institute of Industrial Technology, CAS (China)
- 7 Direct Laser Writing I
Stefania Castelletto, RMIT University (Australia)
- 8 Nanotextured Surfaces and Optical Sensors
Soon Hock Ng, Swinburne University of Technology (Australia)

- 9 Direct Laser Writing II
Atsushi Ono, Shizuoka University (Japan)
- 10 Biosensing
Sivashankar Krishnamoorthy, Luxembourg Institute of Science and
Technology (Luxembourg)