

PROCEEDINGS OF SPIE

*9th International Symposium on Advanced
Optical Manufacturing and Testing
Technology*

Optoelectronic Materials and Devices for Sensing and Imaging

**Yadong Jiang
Xiaoliang Ma
Xiong Li
Mingbo Pu
Xue Feng
Bernard Kippelen**
Editors

**26–29 June 2018
Chengdu, China**

Organized by
Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Sponsored by
COS—The Chinese Optical Society (China)
IOE—Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Published by
SPIE

Volume 10843

Proceedings of SPIE 0277-786X, V. 10843

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

AOMATT 2018: Optoelectronic Materials and Devices for Sensing and Imaging, edited by Yadong Jiang, Xiaoliang Ma, Xiong Li, Mingbo Pu, Xue Feng, Bernard Kippelen, Proc. of SPIE Vol. 10843, 1084301
© 2019 SPIE · CCC code: 0277-786X/19/\$18 · doi: 10.1117/12.2524922

Proc. of SPIE Vol. 10843 1084301-1

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 *9th International Symposium on Advanced Optical Manufacturing and Testing Technologies: Optoelectronic Materials and Devices for Sensing and Imaging*, edited by Yadong Jiang, Xiaoliang Ma, Xiong Li, Mingbo Pu, Xue Feng, Bernard Kippelen, Proceedings of SPIE Vol. 10843 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

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

ISBN: 9781510623286
ISBN: 9781510623293 (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 \$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/19/\$18.00.

Printed in the United States of America.

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>
xi	<i>Symposium Committees</i>
xiii	<i>AOMATT 2018 Sponsors</i>

OPTOELECTRONIC MATERIALS AND DEVICES FOR SENSING AND IMAGING

10843 02	Stabilization mechanism of miniature extrinsic Fabry-Perot sensors based on micromachined diaphragm [10843-1]
10843 03	Overview of the INS/CNS integrated navigation technology [10843-2]
10843 04	8×8 format InGaAs/InP avalanche photodiode plane array for 3D imaging laser radar system [10843-5]
10843 05	Efficiency enhancement of InGaN/GaN light-emitting diodes with a p-i-n electron blocking layer [10843-6]
10843 06	Realization of erythematous UV detector using antiparallel connection of the two GaN based photodiodes [10843-7]
10843 07	Enhancement of electroluminescent properties of organic light-emitting device by using exciton adjusting layer [10843-8]
10843 08	An optical fiber pressure sensor based on duralumin grooved plate [10843-9]
10843 09	Study on optical storage of Sr₂SiO₄:Eu²⁺,Dy³⁺ [10843-10]
10843 0A	Study of AlGaIn/GaN heterostructures p-i-n ultraviolet detector [10843-11]
10843 0B	Construction and research of APD detection based on double stochastic process [10843-12]
10843 0C	A novel flexible wireless pressure sensor for diagnosis of the osteofascial compartment syndrome [10843-13]
10843 0D	Effects of wavelength on polarization correlated imaging of rough surface objects [10843-15]
10843 0E	Scan imaging of optical fiber Brillouin scattering spectra by a fixed intermediate frequency conversion for distributed temperature sensing [10843-16]

- 10843 OF **Automatic detection system for spring hook of automobile seat back based on feature detection and linear detection** [10843-17]
- 10843 OG **Hyperspectral camouflage target characteristic analysis** [10843-18]
- 10843 OH **Investigation and optimization of the emission spectrum of the top-emitting OLED device covered by thin film encapsulation** [10843-20]
- 10843 OI **The evolution of GaN photocathode surface barrier before and after activation** [10843-21]
- 10843 OJ **Single-image super-resolution reconstruction via generative adversarial network** [10843-22]
- 10843 OK **Study on rapid sensitivity of infrared radiation for the limb atmosphere based on the transport theory** [10843-23]
- 10843 OL **River detection using LBP and morphology in infrared image** [10843-24]
- 10843 OM **Evaluation of real-time object detection model based on small targets** [10843-25]
- 10843 ON **Application of neural network with discreteness analysis in pavement crack identification** [10843-26]
- 10843 OO **Aging and noise characteristics studying of Low temperature preparing Mn-Co-Ni-O thin films** [10843-27]
- 10843 OP **Automatic identification of clue cells in microscopic leucorrhea images based on texture features and combination of kernel functions of SVM** [10843-28]
- 10843 OQ **Influence of isocyanate index on the mechanical and dielectric properties of polyurea** [10843-29]
- 10843 OR **The near infrared images enhancement of teeth based on improved successive mean quantization transform** [10843-30]
- 10843 OS **Missing pins detection for power equipment firmware using unmanned aerial vehicle images** [10843-32]
- 10843 OT **A weight-based optimization algorithm of histogram equalization** [10843-36]
- 10843 OU **A novel design of α -Si based memristor with optical readout functionality utilizing silicon prism** [10843-37]
- 10843 OV **Optimum design of electron bombarded active pixel sensor for low-level light single photon imaging** [10843-39]
- 10843 OW **Ultrafast time-response characteristics of AlGaAs materials** [10843-40]
- 10843 OX **Research on integrated readout circuit of temperature, humidity and pressure sensor** [10843-42]

- 10843 0Y **Coupling characteristics of 1×4 power splitter based on multicore photonic crystal fiber with square-lattice configuration** [10843-43]
- 10843 0Z **Research on image stitching technology for focal plane array terahertz imaging** [10843-44]
- 10843 10 **Non-doped white organic light-emitting devices consisting of thermally activated delayed fluorescent emitters and ultrathin phosphorescent emitters** [10843-45]
- 10843 11 **Patterned CNT-based composite films for optoelectronic applications** [10843-46]
- 10843 12 **Study of different electron transporting layer on electroluminescent properties of perovskite light emitting diodes** [10843-50]
- 10843 13 **Efficient perovskite solar cells by doping poly-TPD into PTAA as hole transporting layer** [10843-51]
- 10843 14 **High performance N-type organic thin-film transistor based on biocompatible silk fibroin: poly(vinyl alcohol)-blended dielectric layer** [10843-53]
- 10843 15 **Efficient perovskite solar cells by using combustion SnO₂ as electron transporting layer in low temperature** [10843-54]
- 10843 16 **Morphology control effects of ternary blended C₆₀ towards high performance thick film organic solar cells** [10843-55]
- 10843 17 **High performance organic thin-film gas sensor based on graphene oxide/TIPS-pentacene hybrid organic semiconducting layer** [10843-56]
- 10843 18 **Influence of low temperature annealed ultrathin CYTOP buffer layer on the performance of single crystal organic field-effect transistors** [10843-58]
- 10843 19 **The signal processing system of a differential capacitive micro-displacement sensor for the controlling of segmented mirror** [10843-59]
- 10843 1A **Design of deviation detector for image stabilization system on space solar observation equipment** [10843-60]
- 10843 1B **Ultra-high responsivity graphene-CIS/ZnS QDs hybrid photodetector** [10843-62]
- 10843 1C **Improvement of geometric calibration algorithm with collinear constraints** [10843-63]
- 10843 1D **Automatic lung segmentation in chest CT image using morphology** [10843-64]
- 10843 1E **Design rGO/PEDOT composite network architectures for all-solid-state microsupercapacitors** [10843-65]
- 10843 1F **Weak image edge detection based on improved fuzzy inference** [10843-66]
- 10843 1G **An adjustable brightness LED driver with high efficiency, high stability and low power consumption** [10843-69]

- 10843 1H **Design of structure extending to suppress the bias voltage ripple of IRFPA** [10843-71]
- 10843 1I **Flexible self-powered ammonia sensor based on Ce-ZnO composite film** [10843-74]
- 10843 1J **Heavy metal ion detection on a surface plasmonic resonance based on the change of refractive index** [10843-75]
- 10843 1K **Flexible and high performance ammonia sensor based on self-assembled PANI-TiO₂-Au ternary composite film** [10843-76]
- 10843 1L **Influence of polymer additional modulating layer on the selectivity performance of organic field-effect transistor based gas sensor** [10843-81]
- 10843 1M **Calibration algorithm for under-display optical fingerprint sensor** [10843-86]
- 10843 1N **Efficient ternary organic solar cells with energy cascade and Förster resonance energy transfer by doping phosphorescent small molecule** [10843-93]
- 10843 1O **A thermally activated delayed fluorescence material for efficient ternary organic solar cells** [10843-96]
- 10843 1P **Composition dependence of the ultraviolet absorption edge in lithium tantalate films** [10843-97]
- 10843 1Q **Removing baseline and apodization in process of data retrieval of Doppler asymmetric spatial heterodyne spectrometer** [10843-100]
- 10843 1R **TFT with ultra-low temperature poly-silicon technology for flexible liquid crystal display** [10843-101]
- 10843 1S **A test method of CMOS image sensors in dark field based on the genetic algorithm** [10843-102]
- 10843 1T **A new blind-pixel detection method for 384×288 long-wave infrared focal plane arrays images** [10843-103]
- 10843 1U **An overview on theory and algorithm of light field imaging technology** [10843-104]
- 10843 1V **Analyzing performance of monochrome infrared LED device based on biogeography-based optimization** [10843-105]

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.

Bai, Jinzhou, 0V
Bai, Yonglin, 0V
Bu, Xiande, 0E
Cao, Weiwei, 0V
Chang, Mingchao, 1S
Chao, Guowei, 06
Chen, Guozhao, 1R
Chen, Jiejing, 1Q
Chen, Juan, 0T
Chen, Shucji, 09
Chen, Wenjian, 19
Chen, Yi, 0D
Chen, Yongjun, 08
Chen, Yurun, 1J
Cheng, XiaoMeng, 11
Cheng, Zhengdong, 0D, 0M
Cong, Shan, 1S
Cui, Zihao, 0G
Dong, Feng, 1T
Dong, Qianhui, 0Y
Dong, Xiang, 0U
Du, Xiaohui, 0P
Du, Xiaosong, 1I
Fan, Chuyi, 0C
Fan, Huidong, 14, 17
Fan, Pu, 13, 1N
Feng, Geng, 10, 1N, 1O
Feng, JunBo, 05, 06
Fu, Yu-tian, 1T
Gao, Cong, 1J
Gao, Guilong, 0W
Gao, Xiaodong, 03
Gao, Xiaorong, 1F
Gao, Xu, 0F
Gao, Xuekai, 08
Gou, Jun, 1P
Gu, Yu, 11
Guan, Zhao, 1C
Guo, Jin, 05, 06, 07, 0A
Guo, Lu, 1D
Guo, RuiKang, 0U
Guo, Weihong, 1U
Han, Jiayue, 0Z
Han, Qin, 04
Han, Shijiao, 1L
Hao, Ruqian, 0P
He, Changyu, 0N
He, Jiawei, 1A
He, Kai, 0W
He, Xin, 0Q, 1E
He, Xuan, 0B
He, Zaizhou, 1K
Hou, Lili, 04
Hu, Yang, 05, 06
Hua, Wenshen, 0G
Huai, Bingxin, 0S
Huan, Shuai, 1V
Huang, Dayong, 0I
Huang, Jipeng, 0F, 0R
Huang, Suqi, 0L
Huang, Zhiming, 0O
Jiang, Lin, 0O
Jiang, Longfeng, 18
Jiang, Xiangdong, 0U
Jiang, Yadong, 1I, 1K, 1P
Ju, Chunwu, 0J
Kuang, Cheng, 1H
Lan, Xuexin, 1R
Lei, Fanpu, 0V
Li, Binglin, 0E
Li, Cong, 0A
Li, Deng, 09
Li, Haochen, 0C
Li, Jing, 08
Li, Jinhuan, 0F
Li, Jinlong, 1F
Li, Junling, 0R
Li, Junyi, 1R
Li, Pei, 08
Li, Qinxue, 10, 1N, 1O
Li, Shaohui, 0W
Li, Wei, 0U
Li, Wusen, 19
Li, Yanmei, 1R
Li, Zhirun, 1L
Li, Zongkang, 12
Liang, Qian, 11
Liang, Zhenyu, 0D
Lin, Heng, 08
Liu, Chunhua, 1K
Liu, Hexiong, 0B
Liu, Lin, 0P
Liu, Ling, 08
Liu, Peng, 0Z
Liu, Xu, 1J
Liu, Xun, 0G
Liu, Yong, 0P
Liu, Yuhan, 0L

Liu, Yuhan, 0S
Lu, Changwen, 0N
Lu, Lidong, 0E
Lu, Ziqing, 04
Luo, Hong, 02
Luo, Lin, 1F
Lv, Baogang, 1C
Lv, Jia, 1V
Lv, Jian, 1G
Mao, Xiling, 0Q, 1E
Meng, Weiwei, 0X, 1G
Meng, Xianguo, 09
Mingzhu, Zhang, 0K
Mo, Changtao, 1V
Ning, Hailong, 0J
Ning, Tigang, 08
Pan, Rui, 1B
Peng, Jianping, 1F
Peng, Xuhui, 0H, 1M, 1R
Peng, Zhenming, 0K
Peng, Zhenming, 0L, 0S, 1D
Pu, Hong, 1D
Pu, Tian, 0L, 1D
Qi, Ma, 0M
Qi, Yongjun, 19
Qiao, Jianliang, 0I
Qiao, Weidong, 1C
Qin, Ruiheng, 15
Qin, Zheng, 0X, 1G
Que, Longcheng, 0X
Rong, Xiaoxu, 0Y
Shao, Zhengzheng, 02
Shen, Yuheng, 0X, 1G
Shi, Wei, 18
Song, Li, 0S
Song, Wenwei, 1F
Song, Xifa, 0N
Song, Zhihao, 17, 18
Su, Dan, 0V
Su, Xiuqin, 0J
Su, Yuanjie, 1I
Sun, Binwei, 1P
Sun, Lingma, 1D
Sun, Minghui, 1I
Sun, Ping, 1J
Sun, Shengnan, 0F
Sun, Xiaoyan, 0E
Tai, Huiling, 1I, 1K
Tao, Jing, 0E
Tao, Ran, 1U
Tian, Fulan, 0Z
Tong, Kai, 0Y
Wang, Bo, 0V
Wang, Fuyin, 02
Wang, Guangming, 1V
Wang, Guosheng, 05, 07, 0A
Wang, Haidi, 0M
Wang, Jimin, 0U
Wang, Jun, 05, 06, 0A, 0Z, 1B, 1P

Wang, Lianming, 0F, 0R
Wang, Ming, 1V
Wang, Nange, 1C
Wang, Ruiling, 0S
Wang, Run, 07, 0A
Wang, Shengzhao, 0I
Wang, Shuai, 04
Wang, Shuna, 1Q
Wang, Si, 1I
Wang, Tao, 0W
Wang, Wenxiu, 1T
Wang, Xiangzhou, 0P
Wang, Xiaolin, 14
Wang, Xinmei, 03
Wang, Zhenpeng, 0Y
Wang, Zhuoran, 0L, 1D
Wang, Zijun, 10, 12, 16
Wen, Jingji, 1V
Wen, Qiang, 1S
Wen, Quan, 0T
Wu, Dongxu, 13, 16
Wu, Jing, 0O
Wu, Mengge, 15
Wu, Xishan, 0G
Wu, Zhiming, 0Z
Xiang, Fan, 0D, 0M
Xiao, Shu, 0Y
Xie, Bo, 0M
Xie, Feng, 05, 07, 0A
Xie, Guangzhong, 0X, 1I
Xiong, Shuidong, 02
Xu, Hong-lie, 1H
Xu, Jianhua, 0Q, 1E
Xu, Mengnan, 1J
Xu, Xiangdong, 1I
Xu, Zhidan, 1V
Xue, Bin, 1C
Yan, Xin, 0W
Yan, Yang, 0G
Yang, Chunhua, 1H
Yang, Chunping, 0K
Yang, Genjie, 12
Yang, Haoyuan, 0J
Yang, Jianfeng, 1A, 1C
Yang, Qing, 0W
Yang, Wenyao, 0Q, 1E
Yang, Xuemei, 1J
Yang, Yajie, 0Q, 1E
Yang, Yang, 0V
Yao, Qiong, 02
Ye, Han, 04
Yin, Fangyan, 1D
Yin, Fei, 0W
Yin, Mingxin, 0Y
Yin, Yiming, 0O
Yu, Junsheng, 12, 13, 14, 15, 16, 17, 18, 1K, 1L
Yuan, Guohui, 1D
Yuan, Yingying, 10, 1N, 1O

Zeng, Yang, 1M
Zhai, Xiang, 0D
Zhai, Yingfeng, 0H
Zhang, Cheng, 0X, 1G
Zhang, Chuanbiao, 08
Zhang, Dayu, 1S
Zhang, Haiying, 1A
Zhang, Hui, 03
Zhang, Jing, 0P
Zhang, Lei, 0R
Zhang, Lili, 1V
Zhang, MinGang, 11
Zhang, Peng, 1K
Zhang, Tao, 1U
Zhang, Wenjuan, 0R
Zhang, Xiaohua, 16
Zhang, Yan, 0G
Zhao, Yuetao, 0Q, 1E
Zheng, Ding, 15
Zheng, Jingjing, 08
Zheng, Junhe, 1O
Zheng, Lihua, 1R
Zhong, Jian, 10, 1N, 1O
Zhou, Bing, 0B
Zhou, Fangfang, 0K
Zhou, Hanhan, 09
Zhou, Shijie, 0T
Zhou, Shou, 0C
Zhou, Wei, 0O
Zhou, Yujie, 0Q, 1E
Zhou, Yun, 0X
Zhu, Bin, 0M
Zhu, Juan, 0F, 0R
Zhu, Tianyou, 1T
Zhu, Xiaobo, 0C
Zhuang, Xinming, 14, 17, 1L

Symposium Committees

Symposium General Chairs

Bingkun Zhou, Tsinghua University (China)
Guangcan Guo, University of Science and Technology of China (China)
Liwei Zhou, Beijing Institute of Technology (China)
Qihuang Gong, Peking University (China)
Henri Lezec, National Institute of Standards and Technology (United States)
Minghui Hong, National University of Singapore (Singapore)
Yuwen Qin, National Natural Science Foundation of China (China)
Yudong Zhang, Chengdu Branch of Chinese Academy of Sciences (China)
Enhui Liu, Institute of Optics and Electronics (China)

International Advisory Committee

Wenhan Jiang, Institute of Optics and Electronics (China)
Yuen-Ron Shen, University of California, Berkeley (United States)
Myung K. Cho, National Optical Astronomy Observatory (United States)

Organizing Committee

Jinghua Cao, CAS Bureau of International Cooperation (China)
Yadong Jiang, University of Electronic Science and Technology of China (China)
Li Yang, Institute of Optics and Electronics (China)

Program Committee

Hu Yang, Institute of Optics and Electronics (China)
Xiaodi Tan, Beijing Institute of Technology (China)
Ting Xu, Nanjing University (China)
Qiao Xu, China Academy of Engineering Physics (China)
Xuanming Duan, Chongqing Institute of Green and Intelligent Technology (China)
Xue Feng, Tsinghua University (China)
Junsheng Yu, University of Electronic Science and Technology of China (China)
Xinbin Cheng, Tongji University (China)

Zheyu Fang, Peking University (China)
Rui Zhou, Xiamen University (China)
Changtao Wang, Institute of Optics and Electronics (China)

Conference Chairs

Wei Huang, Northwestern Polytechnical University (China)
Yonggang Huang, Northwestern University (United States)
Xue Feng, Tsinghua University (China)
Yadong Jiang, University of Electronic Science and Technology of
China (China)
Bernard Kippelen, Georgia Institute of Technology (United States)
Junsheng Yu, University of Electronic Science and Technology of
China (China)

AOMATT 2018 SPONSORS

Organized by

Institute of Optics and Electronics, Chinese Academy of Sciences (China)

Sponsored by

COS—The Chinese Optical Society (China)

IOE—Institute of Optics and Electronics, Chinese Academy of Sciences
(China)

Technical Co-sponsor

SPIE

Supported by

Ministry of Science and Technology of China (China)

Chinese Academy of Sciences (China)

National Natural Science Foundation of China (China)

