PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 10929

, "Front Matter: Volume 10929," Proc. SPIE 10929, Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XVI, 1092901 (28 May 2019); doi: 10.1117/12.2531981

SPIE.

Event: SPIE OPTO, 2019, San Francisco, California, United States

PROCEEDINGS OF SPIE

Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XVI

**Diana L. Huffaker
Holger Eisele**
Editors

**6–7 February 2019
San Francisco, California, United States**

Sponsored and Published by
SPIE

Volume 10929

Proceedings of SPIE 0277-786X, V. 10929

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

Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XVI, edited by Diana L. Huffaker, Holger Eisele,
Proc. of SPIE Vol. 10929, 1092901 · © 2019 SPIE · CCC code: 0277-786X/19/\$18 · doi: 10.1117/12.2531981

Proc. of SPIE Vol. 10929 1092901-1

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 *Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XVI*, edited by Diana L. Huffaker, Holger Eisele, Proceedings of SPIE Vol. 10929 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

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

ISBN: 9781510625006
ISBN: 9781510625013 (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 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

v	Authors
vii	Conference Committee

NANOWIRE DEVICES AND CHARACTERIZATION

10929 05	MBE-grown GaAs/AlGaAs multiple quantum wells on Ge substrate [10929-4]
----------	---

QUANTUM DOT DEVICES

10929 0C	MBE-grown InGaAs/GaAs quantum-dots on Ge substrate: An idea towards optoelectronic integration on silicon [10929-11]
----------	---

QUANTUM DOTS I

10929 0E	Effect of vertical coupling on the performance of mid-infrared InAs-QDIP [10929-13]
10929 0F	Auger recombination-induced neutralization and stretched exponential recharging in an InAs quantum dot [10929-14]
10929 0G	Improvement in operating temperature of InAs/GaAs quantum-dots-based photodetectors by varying position of localized carriers in active region [10929-15]

QUANTUM DOTS II

10929 0I	Coulomb-induced recombination dynamics in magnetically doped type-IIb quantum dots [10929-17]
10929 0K	Influence of modulation doping on p-i-p quantum-dots (InAs/GaAs)-based infrared detector performance [10929-19]

PHYSICS OF NANOSTRUCTURES

10929 0N	Tailoring and controlling fermionic properties in heterogenous quantum-dot colloidal solutions [10929-22]
----------	--

COLLOIDAL QUANTUM DOTS

- 10929 0U **Synthesis of ITO nanocrystals in mesoporous silica glasses and application for enhanced down-conversion fluorescence of $\text{Er}^{3+}/\text{Yb}^{3+}$ ions** [10929-29]
- 10929 0V **Evaluation of pH-tuned ZnO down-shifting photoluminescent quantum dots and their influence on single-crystal silicon solar cells** [10929-30]
- 10929 0X **Impact of a time gate to the purity of single photons emitted from colloidal quantum dots** [10929-32]

POSTER SESSION

- 10929 0Z **Analysis of strain relaxation and dark current minimization in $\text{In}(\text{Ga})\text{As}$ QDIP with $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}/\text{GaAs}$ capping** [10929-34]
- 10929 10 **Investigation of carrier-confinement and dark current minimization in $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ quantum dot infrared photodetector with the incorporation of $\text{In}_{0.21}\text{Al}_{0.21}\text{Ga}_{0.58}\text{As}/\text{GaAs}$ capping** [10929-35]
- 10929 11 **Impact of ultra-thin quaternary capping on modulation doped p-i-p quantum dots (InAs/GaAs) based infrared detector** [10929-36]
- 10929 12 **Impact of ternary capping on p-i-p InAs/GaAs quantum-dot infrared photodetectors** [10929-37]

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.

Aanand, Abhijeet, 0G, 0K
Álvarez-Ramos, Mario Enrique, 0V
Ayón, Arturo A., 0N, 0V
Cartwright, A. N., 0I
Chakrabarti, Subhananda, 05, 0C, 0E, 0G, 0K, 0Z,
10, 11, 12
Chatterjee, Arka, 0C
Chavan, Vinayak, 0E, 0G, 0K, 0Z, 10
Chen, Disheng, 0F
Chen, Ping, 0U
Chou, W.-C., 0I
Dai, Nengli, 0U
Das, Debabrata, 0C, 0E, 0G, 0K, 0Z, 10, 11, 12
Demircan, Samet, 0F
Deviprasad, Vidya P., 0G, 0K, 11, 12
Fan, W. C., 0I
Flagg, Edward B., 0F
Flores-Pacheco, Alvaro, 0V
García-Monge, Itzel Alexia, 0N
García-Monge, Janeth Alexandra, 0N
Ghadi, Hemant, 0G, 0K, 11, 12
Ihara, T., 0X
Isaac, Samantha D., 0F
Kumar, Raman, 05, 0C, 0E, 0Z, 10
Kumar, Ravinder, 05, 0C, 0E, 0Z, 10
Kumar Pal, Samir, 0C
Lander, Gary R., 0F
Li, Jinyan, 0U
Miki, S., 0X
Montes-Bojórquez, José Raul, 0V
Mukai, Toshikazu, 09
Panda, Debiprasad, 05, 0C, 0E, 0G, 0K, 0Z, 10, 11,
12
Raut, Pravin, 0G, 0K
Saha, Jhuma, 0C
Sheshadri, Sreedhara, 0E, 0Z, 10
Solomon, Glenn S., 0F
Tarasek, S., 0I
Terai, H., 0X
Thomay, T., 0I
Tongbram, Binita, 05, 0C
Upadhyay, Sourabh, 0C
Villa-Bracamonte, María Fernanda, 0N
Yamada, T., 0X
Yang, Lvyun, 0U
Zepeda-Galvez, Juan Adrian, 0N

Conference Committee

Symposium Chairs

Connie J. Chang-Hasnain, University of California, Berkeley
(United States)

Graham T. Reed, Optoelectronics Research Centre, University of
Southampton (United Kingdom)

Symposium Co-chairs

Sailing He, KTH Royal Institute of Technology (Sweden) and Zhejiang
University (China)

Yasuhiro Koike, Keio University (Japan)

Program Track Chair

Ali Adibi, Georgia Institute of Technology (United States)

Conference Chairs

Diana L. Huffaker, University of California, Los Angeles (United States)

Holger Eisele, Technische Universität Berlin (Germany)

Conference Program Committee

Baolai L. Liang, California NanoSystems Institute (United States)

Huiyun Liu, University College London (United Kingdom)

Zetian Mi, University of Michigan (United States)

Jeffrey C. Owrutsky, U.S. Naval Research Laboratory (United States)

Qi Hua Xiong, Nanyang Technological University (Singapore)

Session Chairs

- 1 Nanowire Devices and Characterization
Holger Eisele, Technische Universität Berlin (Germany)
- 2 Nanowires and Quantum Dots for NWs
Frank Bertram, Otto-von-Guericke-Universität Magdeburg (Germany)
- 3 Quantum Dot Devices
Ryan B. Lewis, Paul-Drude-Institut für Festkörperelektronik (Germany)
- 4 Quantum Dots I
David J. Mowbray, The University of Sheffield (United Kingdom)

- 5 Quantum Dots II
Holger Eisele, Technische Universität Berlin (Germany)
- 6 Physics of Nanostructures
Baolai Liang, California NanoSystems Institute (United States)
- 7 Novel Quantum Systems
Thi Hong Au, Laboratoire de Photonique Quantique et Moléculaire (France)
- 8 Colloidal Quantum Dots
Adam D. Dunkelberger, U.S. Naval Research Laboratory (United States)