PROCEEDINGS OF SPIE

Oxide-based Materials and Devices IX

David J. Rogers
David C. Look
Ferechteh H. Teherani
Editors

28 January – 1 February 2018
San Francisco, California, United States

Sponsored and Published by
SPIE

Volume 10533

Proceedings of SPIE 0277-786X, V. 10533

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

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 *Oxide-based Materials and Devices IX*, edited by David J. Rogers, David C. Look, Ferechteh H. Teherani, Proceedings of SPIE Vol. 10533 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

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

ISBN: 9781510615519
ISBN: 9781510615526 (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 by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIE. DIGITAL LIBRARY
SPIEDigitalLibrary.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 *Authors*
ix *Conference Committee*

GALLIUM OXIDE II: THIN FILMS AND EPITAXY

10533 0C **Modeling of Schottky barrier diode characteristics on heteroepitaxial β-gallium oxide thin films (Invited Paper)** [10533-11]

GALLIUM OXIDE III: BULK CRYSTALS AND SUBSTRATES

10533 0E **Bulk crystal growth of Ga_2O_3 (Invited Paper)** [10533-13]

OXIDE-BASED POWER ELECTRONICS

10533 0O **Latest progress in gallium-oxide electronic devices (Invited Paper)** [10533-22]

UV PHOTODETECTORS

10533 0R **A review of the growth, doping, and applications of β-Ga_2O_3 thin films (Invited Paper)** [10533-25]

10533 0V **Tin-gallium-oxide-based UV-C detectors (Invited Paper)** [10533-29]

SUPERCONDUCTORS AND HIGHLY-CORRELATED COMPLEX OXIDES

10533 0X **Microfabrication of $SrRuO_3$ thin films on various oxide substrates using $LaAlO_3/BaO_x$ sacrificial bilayers (Invited Paper)** [10533-31]

10533 0Y **Superconductor sandwiches: cuprate-manganite multilayers with a remarkable new ground state** [10533-32]

10533 0Z **Oscillation electron model superconductors: phase diagram, temperature transition, isotopic shift** [10533-33]

10533 10 **Optical ultrafast characterization of copper oxide (CuO) nanocrystal charge-carrier dynamics** [10533-34]

TRANSPARENT CONTACTS AND ELECTRONICS

10533 14 **Persistent photocurrent and deep level traps in PLD-grown In-Ga-Zn-O thin films studied by thermally stimulated current spectroscopy (Invited Paper)** [10533-36]

10533 18 **Vertical resistivity in nanocrystalline ZnO and amorphous InGaZnO** [10533-40]

PEROVSKITE-BASED MATERIALS AND DEVICES I

10533 1C **Noise characterization of perovskite solar cells (Invited Paper)** [10533-104]

ZNO-BASED MATERIALS AND DEVICES

10533 1D **Optical and magneto-optical properties of zinc-oxide nanostructures grown by the low-temperature chemical route (Invited Paper)** [10533-42]

10533 1F **Sensing based on surface-enhanced Raman scattering using self-forming ZnO nanoarrays coated with gold as substrates (Invited Paper)** [10533-95]

10533 1H **Structural and optical properties of indium-doped highly conductive ZnO bulk crystals grown by the hydrothermal technique** [10533-45]

10533 1I **Influence of annealing to the defect of inkjet-printed ZnO thin film** [10533-46]

ZNO BANDGAP ENGINEERING

10533 1K **Intersubband transitions and many body effects in ZnMgO/ZnO quantum wells (Invited Paper)** [10533-48]

10533 1O **First-principles calculations of optical transitions at native defects and impurities in ZnO (Invited Paper)** [10533-100]

MULTIFUNCTIONAL OXIDES FOR ENERGY HARVESTING

10533 1Q **Wide and ultra-wide bandgap oxides: where paradigm-shift photovoltaics meets transparent power electronics (Invited Paper)** [10533-52]

10533 1R **A review of earth abundant ZnO-based materials for thermoelectric and photovoltaic applications (Invited Paper)** [10533-53]

PEROVSKITE-BASED MATERIALS AND DEVICES II

10533 1Y **Novel growth techniques for the deposition of high-quality perovskite thin films (Invited Paper)** [10533-60]

OPTICAL STUDIES AND APPLICATIONS I

10533 20 **Optical characteristics of novel bulk and nanoengineered laser host materials (Invited Paper)** [10533-64]

10533 21 **Persistent luminescence of transition metal (Co, Ni...)-doped $ZnGa_2O_4$ phosphors for applications in the near-infrared range (Invited Paper)** [10533-65]

10533 22 **Synthesis of high-quality garnet-type $Gd_3Sc_2Al_3O_{12}:Ce^{3+}$ nanocrystals (Invited Paper)** [10533-66]

10533 25 **Non-contact temperature Raman measurement in YSZ and alumina ceramics** [10533-68]

ELECTROCHROMIC AND THERMOCHROMIC OXIDES

10533 2C **Impact of point defects on electrochromism in WO_3 (Invited Paper)** [10533-103]

POSTER SESSION

10533 2G **Thermal conductivity of bulk and thin film β-Ga_2O_3 measured by the 3ω technique** [10533-77]

10533 2I **ZnO exciton recombination radiation in a weak magnetic field** [10533-79]

10533 2K **Temperature-dependent phosphorous dopant activation in ZnO thin film deposited using plasma immersion ion implantation** [10533-81]

10533 2L **Effect of time varying phosphorus implantation on optoelectronics properties of RF sputtered ZnO thin-films** [10533-82]

10533 2N **A comparative study on omnidirectional anti-reflection SiO_2 nanostructure films coating by glancing angle deposition** [10533-84]

10533 2O **Goos-Hänchen effect on Si thin films with spherical and cylindrical pores** [10533-85]

10533 2P **Stability of perovskite solar cells on flexible substrates** [10533-86]

10533 2Q **ZnO nanostructures for organometallic halide perovskite solar cells** [10533-87]

10533 2R **Oxide hole blocking selective contacts in perovskite solar cells** [10533-88]

10533 2S **Low temperature electrodeposition of silicon layers** [10533-89]

10533 2T **Detectors based on Pd-doped and PdO-functionalized ZnO nanostructures** [10533-90]