PROCEEDINGS OF SPIE

Nanophotonic Materials XI

Stefano Cabrini Gilles Lérondel Adam M. Schwartzberg Taleb Mokari Editors

20–21 August 2014 San Diego, California, United States

Sponsored and Published by SPIE

Volume 9161

Proceedings of SPIE 0277-786X, V. 9161

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

Nanophotonic Materials XI, edited by Stefano Cabrini, Gilles Lérondel, Adam M. Schwartzberg, Taleb Mokari, Proc. of SPIE Vol. 9161, 916101 · © 2014 SPIE · CCC code: 0277-786X/14/\$18 · doi: 10.1117/12.2085433

The papers included 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. The papers published in these proceedings 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 this book: Author(s), "Title of Paper," in *Nanophotonic Materials XI*, edited by Stefano Cabrini, Gilles Lérondel, Adam M. Schwartzberg, Taleb Mokari, Proceedings of SPIE Vol. 9161 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X ISBN: 9781628411881

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 © 2014, 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/14/\$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, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

V AUTNORS	V	Authors
-----------	---	---------

vii Conference Committee

SESSION 1 QUANTUM CONFINEMENT

- 9161 02 Optimization of the optical properties of nanostructures through fast numerical approaches [9161-2]
- 9161 03 Influence of core-shell interfaces on exciton and multi-exciton dynamics of CdSe-Cd_xZn_{1-x}S quantum dots [9161-3]

SESSION 2 MATERIAL FOR PLASMONICS

- 9161 08 Facile synthesis of Cu₂S nanoarchitectures in application of surface enhanced Raman scattering [9161-8]
- 9161 09 Plasmon-enhanced optical properties of Au/TiO₂ core-shell nanowires studied by finite difference time domain calculation [9161-9]

SESSION 3 OPTICAL PROPERTIES OF OXIDES

- 9161 OB **Hybrid materials: a bottom-up approach for nanotechnology applications (Invited Paper)** [9161-11]
- 9161 0D Synthesis of high purity metal oxide nanoparticles for optical applications [9161-13]

SESSION 4 ENERGY-RELATED MATERIALS

9161 0J Aluminum and copper plasmonics for enhancing internal quantum efficiency of core-shell and core-multishell nanowire photoelectrodes [9161-19]

SESSION 5 APPLICATIONS OF OXIDES

- 9161 0M Surface dielectric resonance and giant enhancement of Raman scattering [9161-22]
- 9161 OP Block copolymer assisted refractive index engineering of metal oxides for applications in optical sensing [9161-25]

SESSION 6 CONTROLLING OPTICAL PROPERTIES

9161 0Q	Polymer based nanocomposites with tailorable optical properties (Invited Paper) [9161-26]
9161 OS	Spatially adjusted spontaneous emissions from photonic crystals embedded light-emitting diodes [9161-28]
9161 OT	Ultrahigh contrast and large-bandwidth thermal rectification in near-field electromagnetic thermal transfer between nanoparticles [9161-29]
9161 OU	Heating processes in plasmonic resonances: a non-linear temperature dependent permittivity model [9161-30]
	POSTER SESSION
9161 12	POSTER SESSION Luminescence studies on solid and nanostructured SiO ₂ :Eu ³⁺ spheres obtained by sol-gel route [9161-40]
9161 12 9161 13	Luminescence studies on solid and nanostructured SiO2:Eu3+ spheres obtained by sol-gel
	Luminescence studies on solid and nanostructured SiO2:Eu3+ spheres obtained by sol-gel route [9161-40]

9161 1B Nonlinear properties of IGZO thin films prepared by RF magnetron sputtering [9161-49]

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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.

Afanasiev, K. N., OM Alabastri, Alessandro, OU Baker, C., 0D Berginc, Gérard, 02 Boginskaya, I. A., OM Bozio, Renato, 03 Brigo, Laura, OB Brusatin, Giovanna, OB Budashov, I. A., OM Buric, Michael, OP Chang, Hao-Hsuan, 08 Chen, Kevin P., 0P Chen, Lung-Chien, 1A Chiang, Hai-Pang, OS Colombo, Annalisa, 0Q De Angelis, Francesco, OU Della Giustina, Gioia, OB Dubinskii, M., 0D Escoubas, Ludovic, 02 Fan, Shanhui, OT Flory, François, 02 Fontana, J., 0D Forcherio, Gregory T., 15 Franco, A., 12 Frantz, J., OD Friebele, E. J., 0D Fu, Shih-Yu, 08 García-Macedo, J. A., 12 Hospodková, Alice, 13 Hsu, Yu-Kuei, 08 Huang, JianJang, OS Jasieniak, Jacek J., 03 Jayaraj, M. K., 1B Kim, Jeongyong, 09 Kim, Min Su, 09 Kim, W., 0D Kozák, Martin, 13 Kurochkin, I. S., OM Lagarkov, A. N., OM Lee, Jubok, 09 Lee, Sun-Hee, 09 Le Rouzo, Judikaël, 02 Lin, Wun-Wei, 1A Lin, Yan-Gu, 08 Lin, Yen-Chen, 0S Lin, Yuankun, OP Liu, Yi-Chen, 0S Minotto, Alessandro, 03 Nakanishi, Yoichiro, 1A

Ohodnicki, Paul, OP Otey, Clayton R., OT Pangrác, Jiří, 13 Pokorný, Martin, 13 Poole, Zsolt L., OP Proietti Zaccaria, Remo, OU Ramadurgam, Sarath, OJ Riyadh, Shaymaa, OP Roper, D. Keith, 15 Ryzhikov, I. A., OM Sadowski, B., OD Sanal, K. C., 1B Sanghera, J., 0D Sarychev, A. K., 0M Shaw, L. B., OD Shijeesh, M. R., 1B Shin, Hyungjung, 09 Signorini, Raffaella, 03 Simonutti, Roberto, 0Q Terán H., E., 12 Thierry, François, 02 Todescato, Francesco, 03 Trojánek, František, 13 Vaskin, A. V., OM Villalobos, G., 0D Vishnu, K., 1B Wu, Jia-Ren, 1A Yan, Aidong, OP Yang, Chen, OJ Yin, Yu-Feng, OS Zanchetta, Erika, OB Zhang, J., 0D Zhu, Linxiao, OT

Conference Committee

Symposium Chairs

Satoshi Kawata, Osaka University (Japan) Manijeh Razeghi, Northwestern University (United States)

Symposium Co-chairs

David L. Andrews, University of East Anglia Norwich (United Kingdom) **James G. Grote**, Air Force Research Laboratory (United States)

Conference Chairs

Stefano Cabrini, Lawrence Berkeley National Laboratory (United States)
Gilles Lérondel, Université de Technologie Troyes (France)
Adam M. Schwartzberg, Lawrence Berkeley National Laboratory (United States)
Taleb Mokari, Ben-Gurion University of the Negev (Israel)

Conference Program Committee

David L. Andrews, University of East Anglia Norwich (United Kingdom)
Angus J. Bain, University College London (United Kingdom)
Mireille H. Blanchard-Desce, Université de Rennes 1 (France)
Robert W. Boyd, University of Rochester (United States)
Zeno Gaburro, Università degli Studi di Trento (Italy)
Aaron W. Harper, The University of Southern California (United States)
Ghassan E. Jabbour, Arizona State University (United States)
François Kajzar, University of Bath (United Kingdom)
Paras N. Prasad, University at Buffalo (United States)
Dmitri Talapin, The University of Chicago (United States)
Younan Xia, Georgia Institute of Technology (United States)

Session Chairs

- Quantum Confinement
 Stefano Cabrini, Lawrence Berkeley National Laboratory (United States)
- Material for Plasmonics
 Stefano Cabrini, Lawrence Berkeley National Laboratory (United States)

- Optical Properties of Oxides
 Adam M. Schwartzberg, Lawrence Berkeley National Laboratory (United States)
- 4 Energy-Related Materials **Taleb Mokari**, Ben-Gurion University of the Negev (Israel)
- 5 Applications of Oxides **Roberto Simonutti**, Università degli Studi di Milano-Bicocca (Italy)
- 6 Controlling Optical Properties Luca Dal Negro, Boston University (United States)