

PROCEEDINGS OF SPIE

Synthesis and Photonics of Nanoscale Materials VII

**Jan J. Dubowski
David B. Geohegan
Frank Träger**
Editors

**26–28 January 2010
San Francisco, California, United States**

Sponsored and Published by
SPIE

Volume 7586

Proceedings of SPIE, 0277-786X, v. 7586

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

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 *Synthesis and Photonics of Nanoscale Materials VII*, edited by Jan J. Dubowski, David B. Geohegan, Frank Träger, Proceedings of SPIE Vol. 7586 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 0277-786X

ISBN 9780819479822

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 © 2010, 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/10/\$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, 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 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 *Conference Committee*
- vii *Ultrafast fiber laser technology: status and prospects (Plenary Paper) [7579-102]*
A. Tünnermann, J. Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institute for Applied Optics and Precision Engineering (Germany)

PLASMONIC NANOSTRUCTURES AND PHOTONICS

- 7586 02 **Surface plasmon enhanced photoelectron emission (Invited Paper) [7586-01]**
T. Y. Hwang, A. Y. Vorobyev, C. Guo, The Institute of Optics, Univ. of Rochester (United States)
- 7586 03 **Tip-enhanced Raman spectroscopy and related techniques in studies of biological materials (Invited Paper) [7586-02]**
T. Schmid, A. Sebesta, J. Stadler, L. Opilik, R. M. Balabin, R. Zenobi, ETH Zürich (Switzerland)
- 7586 06 **Spectral modulation of single plasmonic nanostructures [7586-05]**
K. Appavoo, Vanderbilt Univ. (United States); D. Y. Lei, Y. Sonnefraud, Imperial College London (United Kingdom); D. W. Ferrara, J. Nag, Vanderbilt Univ. (United States); S. A. Maier, Imperial College London (United Kingdom); R. F. Haglund, Jr., Vanderbilt Univ. (United States)
- 7586 07 **Surface plasmon effects induced by uncollimated emission of semiconductor microstructures [7586-06]**
D. Lepage, J. J. Dubowski, Univ. de Sherbrooke (Canada)

NANOCRYSTALS AND NANOPARTICLES II

- 7586 0B **Synthesis and characterization of ZnO nanocrystals by nanoparticle-assisted pulsed laser deposition [7586-10]**
D. Nakamura, T. Matsumoto, A. Kumeda, K. Toya, K. Okazaki, M. Higashihata, Kyushu Univ. (Japan); B. Q. Cao, Univ. of Jinan (China); T. Okada, Kyushu Univ. (Japan)
- 7586 0D **Nanophotonic fabrication in sub-nm scale (Invited Paper) [7586-12]**
T. Yatsui, M. Ohtsu, The Univ. of Tokyo (Japan)

NANOSTRUCTURED SURFACES AND THIN FILMS

- 7586 0G **Nanostructured polymers by a compact laser plasma EUV source (Invited Paper) [7586-16]**
H. Fiedorowicz, A. Bartnik, R. Jarocki, J. Kostecki, M. Szczurek, Military Univ. of Technology (Poland)

- 7586 OH **Long-time feedback in self-organized nanostructures formation upon multipulse femtosecond laser ablation (Invited Paper)** [7586-17]
J. Reif, O. Varlamova, Brandenburgische Technische Univ. Cottbus (Germany) and Cottbus Joint Lab. (Germany); M. Bounhalli, Brandenburgische Technische Univ. Cottbus (Germany) and Univ. Jean Monnet Saint-Etienne (France); T. Arguirov, Cottbus Joint Lab. (Germany) and Innovations for High-Performance Microelectronics GmbH (Germany); M. Schade, H. S. Leipner, Martin-Luther-Univ. Halle-Wittenberg (Germany)
- 7586 OI **Fluence dependence of the tailoring of colloidal gold particles with nanosecond-pulsed laser light** [7586-18]
F. Hubenthal, F. Vogel, F. Träger, Univ. Kassel (Germany)
- 7586 OJ **Fabrication of Al₂O₃/TiO₂ multilayer mirrors for water-window attosecond pulses** [7586-19]
Y. Tanaka, M. Murata, H. Kumagai, A. Kobayashi, Osaka City Univ. (Japan); T. Shinagawa, Osaka Municipal Technical Research Institute (Japan)

POSTER SESSION

- 7586 OK **Generation of extended-area femtosecond laser induced periodic nanostructures on TiO₂ by moving samples through a line focus** [7586-20]
K. Dasari, VIT Univ. (India); S. K. Das, A. Rosenfeld, R. Grunwald, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany)
- 7586 OL **Nuclear spin polarization of ³He atoms with a frequency doubled Ti:sapphire laser toward nuclear magnetic resonance of porous media** [7586-21]
Y. Tabata, H. Yamada, S. Maeda, H. Morioka, H. Kumagai, A. Kobayashi, Osaka City Univ. (Japan)
- 7586 OM **Visualization of a-Se nanostructures by evanescent light microscopy** [7586-22]
N. Mirchin, S. A. Popescu, I. Lapsker, A. Peled, Holon Institute of Technology (Israel)

Author Index

Conference Committee

Symposium Chairs

Donald J. Harter, IMRA America, Inc. (United States)
Peter R. Herman, University of Toronto (Canada)

Symposium Cochairs

Alberto Piqué, Naval Research Laboratory (United States)
Friedhelm Dorsch, TRUMPF Photonics (United States)

Program Track Chairs

Henry Helvajian, The Aerospace Corporation (United States)
James S. Horwitz, U.S. Department of Energy (United States)

Conference Chairs

Jan J. Dubowski, Université de Sherbrooke (Canada)
David B. Geohegan, Oak Ridge National Laboratory (United States)
Frank Träger, Universität Kassel (Germany)

Program Committee

Carmen N. Afonso, CSIC-Madrid (Spain)
J. Thomas Dickinson, Washington State University (United States)
Costas P. Grigoropoulos, University of California, Berkeley (United States)
Richard F. Haglund, Jr., Vanderbilt University (United States)
Tony F. Heinz, Columbia University (United States)
Ilko K. Ilev, U.S. Food and Drug Administration (United States)
Hiroshi Kumagai, Osaka City University (Japan)
Thomas K. M. Lippert, Paul Scherrer Institut (Switzerland)
Vladimir M. Shalaev, Purdue University (United States)
Xianfan Xu, Purdue University (United States)

Session Chairs

- 1 Plasmonic Nanostructures and Photonics
Jan J. Dubowski, Université de Sherbrooke (Canada)
Xianfan Xu, Purdue University (United States)

- 2 Nanocrystals and Nanoparticles I
Frank Träger, Universität Kassel (Germany)
Richard F. Haglund, Jr., Vanderbilt University (United States)
- 3 Nanocrystals and Nanoparticles II
J. Thomas Dickinson, Washington State University (United States)
Thomas K. M. Lippert, Paul Scherrer Institut (Switzerland)
- 4 Nanostructured Surfaces and Thin Films
David B. Geohegan, Oak Ridge National Laboratory (United States)
Carmen N. Afonso, CSIC-Madrid (Spain)