PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 6641

, "Front Matter: Volume 6641," Proc. SPIE 6641, Plasmonics: Metallic Nanostructures and Their Optical Properties V, 664101 (2 October 2007); doi: 10.1117/12.774280

SPIE.

Event: NanoScience + Engineering, 2007, San Diego, California, United States

PROCEEDINGS OF SPIE

Plasmonics: Metallic Nanostructures and Their Optical Properties V

Mark I. Stockman
Editor

26–29 August 2007
San Diego, California, USA

Sponsored and Published by
SPIE

Volume 6641

Proceedings of SPIE, 0277-786X, v. 6641

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 *Plasmonics: Metallic Nanostructures and Their Optical Properties V*, edited by Mark I. Stockman, Proceedings of SPIE Vol. 6641 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X

ISBN 9780819467898

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 © 2007, 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/07/\$18.00.

Printed in the United States of America.

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

SPIEDigitalLibrary.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

vii Conference Committee

SPECIAL INVITED SESSION: TRENDS IN NANOPLASMONICS

- 6641 03 **Tailoring the parameters of nanohole arrays in gold films for sensing applications (Invited Paper)** [6641-02]
G. C. Schatz, Northwestern Univ. (USA); J. M. McMahon, Northwestern Univ. (USA) and Argonne National Lab. (USA); S. K. Gray, Argonne National Lab. (USA)

DEVELOPMENTS IN SERS AND SURFACE ENHANCEMENT

- 6641 08 **Analysis of metal enhanced fluorescence on near-IR fluorophores** [6641-07]
J. P. Anderson, M. Griffiths, J. G. Williams, D. L. Grone, D. L. Lamb, V. R. Boveia, LI-COR Biosciences Inc. (USA)
- 6641 09 **Plasmon enhancement of organic photovoltaic efficiency in tandem cells of pentacene/C₆₀ (Invited Paper)** [6641-08]
S. Pan, L. J. Rothberg, Univ. of Rochester (USA)

NONLINEAR AND ACTIVE NANOPLASMONICS

- 6641 0C **Sum frequency generation from alkanethiol capped metallic nanoparticles and vibrational mode specific enhancement in nanoparticle aggregates** [6641-11]
A. N. Bordenyuk, Photon Dynamics Inc. (USA); C. Weeraman, A. V. Benderskii, Wayne State Univ. (USA)

PROPAGATION PHENOMENA AND NANOPLASMONICS I

- 6641 0G **Novel metal-dielectric structures for guiding ultra-long-range surface plasmon-polaritons at optical frequencies** [6641-16]
R. Adato, J. Guo, Univ. of Alabama in Huntsville (USA)

NONLINEAR AND CONTROLLED NANOPLASMONIC PHENOMENA

- 6641 0O **Gold nanorods for optimized two-photon luminescence imaging of cancerous tissue** [6641-24]
N. J. Durr, B. A. Holfeld, T. Larson, D. K. Smith, B. A. Korgel, The Univ. of Texas at Austin (USA); K. Sokolova, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); A. Ben-Yakar, The Univ. of Texas at Austin (USA)

- 6641 OP **Local-field and multipole effects in second-harmonic generation from gold nanoparticles and nanodimers (Invited Paper)** [6641-26]
M. Kauranen, B. K. Canfield, S. Kujala, H. Husu, Tampere Univ. of Technology (Finland); B. Bai, J. Laukkanen, M. Kuittinen, Y. Svirko, J. Turunen, Univ. of Joensuu (Finland)
- 6641 OQ **Second-harmonic generation driven by asymmetric local fields in T-shaped gold nanodimers** [6641-27]
B. K. Canfield, H. Husu, Tampere Univ. of Technology (Finland); B. Bai, J. Laukkanen, M. Kuittinen, J. Turunen, Univ. of Joensuu (Finland); M. Kauranen, Tampere Univ. of Technology (Finland)

PROPAGATION PHENOMENA AND NANOPLASMONICS II

- 6641 OV **Plasmonic endoscope: guiding, magnifying, and focusing of infrared radiation on a nanoscale (Invited Paper)** [6641-33]
G. Shvets, S. Trendafilov, The Univ. of Texas at Austin (USA)

CONCENTRATION AND TRANSFORMATION OF ENERGY ON NANOSCALE

- 6641 OY **Enhanced Förster resonance energy transfer between the CdTe quantum dots in proximity to gold nanoparticles** [6641-36]
V. K. Komarala, A. L. Bradley, Y. P. Rakovich, S. J. Byrne, Y. K. Gun'ko, Trinity College Dublin (Ireland); A. L. Rogach, Ludwig-Maximilians-Univ. Munich (Germany)

CONTROL AND MANIPULATION OF NANOPLASMONIC PHENOMENA

- 6641 12 **Time-resolved second-harmonic generation from gold nanoparticle arrays** [6641-40]
D. W. Ferrara, K. A. Tetz, M. D. McMahon, R. F. Haglund, Jr., Vanderbilt Univ. (USA)
- 6641 13 **Surface plasmon waveguiding and detection: dielectric-loaded metal surfaces (Invited Paper)** [6641-41]
J. R. Krenn, A. Hohenau, Univ. of Graz (Austria)

NANOPLASMONIC EIGENMODES AND NANOSCALE PHENOMENA

- 6641 16 **Plasmon confinement in atomically thin and flat metallic films** [6641-44]
T. Nagao, National Institute for Materials Science (Japan) and ICORP, JST (Japan); S. Yaginuma, C. Liu, National Institute for Materials Science (Japan); T. Inaoka, Iwate Univ. (Japan); V. U. Nazarov, Research Ctr. for Applied Sciences, Academia Sinica (Taiwan); T. Nakayama, M. Aono, National Institute for Materials Science (Japan) and ICORP, JST (Japan)
- 6641 19 **Optimization of surface plasmon excitation using resonant nanoparticle arrays above a silver film** [6641-47]
A. Ghoshal, P. G. Kik, College of Optics and Photonics, Univ. of Central Florida (USA)

NANOCIRCUITS AND ENERGY LOCALIZATION

- 6641 1C **Unifying model for giant enhancement and quenching of light emission from Au/CdSe nanocomposites** [6641-50]
Y.-P. Hsieh, J.-W. Chen, C.-T. Liang, Y.-F. Chen, C.-W. Lai, P.-T. Chou, National Taiwan Univ. (Taiwan)
- 6641 1E **Mapping local field distribution at metal nanostructures by near-field second-harmonic generation (Invited Paper)** [6641-53]
M. Celebrano, M. Zavelani-Rossi, Istituto di Fotonica e Nanotecnologie, CNR, Politecnico di Milano (Italy); P. Biagioni, Politecnico di Milano (Italy); D. Polli, Istituto di Fotonica e Nanotecnologie, CNR, Politecnico di Milano (Italy); M. Finazzi, L. Duò, Politecnico di Milano (Italy); G. Cerullo, Istituto di Fotonica e Nanotecnologie, CNR, Politecnico di Milano (Italy); M. Labardi, M. Allegrini, CNR-INFM, Univ. di Pisa (Italy); J. Grand, P. Royer, P.-M. Adam, Institut Charles Delaunay, CNRS, LNIO, Univ. de Technologie de Troyes (France)

MAGNETIC PHENOMENA AND MOLECULAR NANOPLASMONICS

- 6641 1F **Electromagnetic eigenstates of finite cylinders and their possible exploitation for calculating the macroscopic response of an array of such cylinders (Invited Paper)** [6641-54]
D. J. Bergman, Tel Aviv Univ. (Israel)
- 6641 1H **Optical properties of nanostructured metallic films containing magnetic media** [6641-56]
A. B. Khanikaev, A. V. Baryshev, Toyohashi Univ. of Technology (Japan); A. A. Fedyanin, A. B. Granovsky, M.V. Lomonosov Moscow State Univ. (Russia); M. Inoue, Toyohashi Univ. of Technology (Japan) and M.V. Lomonosov Moscow State Univ. (Russia)
- 6641 1I **Spinplasmonics: a new route for active plasmonics (Invited Paper)** [6641-57]
A. Y. Elezzabi, Univ. of Alberta (Canada)

PROPAGATION PHENOMENA AND NANOPLASMONICS III

- 6641 1J **Nanoscale fabrication of a plasmonic dimple lens for nano-focusing of light (Invited Paper)** [6641-58]
S. Vedantam, H. Lee, J. Tang, J. Conway, M. Staffaroni, J. Lu, Univ. of California, Los Angeles (USA); E. Yablonovitch, Univ. of California, Los Angeles (USA) and Univ. of California, Berkeley (USA)
- 6641 1M **Surface-plasmon enhancement of Brillouin light scattering from gold-nanodisk arrays on glass** [6641-61]
Z. N. Utegulov, National Institute of Standards and Technology (USA) and Univ. of Cincinnati (USA); J. M. Shaw, National Institute of Standards and Technology (USA); B. T. Draine, Princeton Univ. (USA); S. A. Kim, W. L. Johnson, National Institute of Standards and Technology (USA)

- 6641 1N **Comparisons of the surface plasmon sensitivities for nanohole and nanoslit arrays** [6641-62]
K.-L. Lee, Research Ctr. for Applied Sciences, Academia Sinica (Taiwan) and National Taiwan Univ. (Taiwan); C.-W. Lee, Research Ctr. for Applied Sciences, Academia Sinica (Taiwan); P.-K. Wei, Research Ctr. for Applied Sciences, Academia Sinica (Taiwan) and National Taiwan Ocean Univ. (Taiwan)

NEW DEVELOPMENTS IN NANOPLASMONICS

- 6641 1S **Bloch mode analysis of transmission through periodic slit arrays in finite thickness metallic slabs** [6641-67]
Y. Xie, A. R. Zakharian, J. V. Moloney, M. Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA)
- 6641 1T **Modeling of core-shell silver nanoparticles in nanostructured sol-gel thin films** [6641-68]
G. Valverde-Aguilar, V. Rentería, J. A. García-Macedo, Univ. Nacional Autónoma de México (Mexico)
- 6641 1U **Design and fabrication of gold nanostructures with nanosphere lithography for LSPR applications** [6641-69]
X. Zhou, W. Knoll, S. S. Y. Oh, Institute of Materials Research and Engineering (Singapore); S. Virasawmy, National Univ. of Singapore (Singapore); L. W. Yen, N. Zhang, Institute of Materials Research and Engineering (Singapore)

POSTER SESSION

- 6641 1W **Synthesis, optical properties, and modeling of silver core/silver oxide shell nanostructures in silica films** [6641-72]
V. M. Rentería-Tapia, G. Valverde-Aguilar, J. A. García-Macedo, Univ. Nacional Autónoma de México (Mexico)
- 6641 1X **Surface enhanced Raman spectroscopy on the tip of a plastic optical fiber** [6641-73]
J. M. Taguenang, A. Kassu, A. Sharma, Alabama A&M Univ. (USA); D. Diggs, Air Force Research Lab. (USA)
- 6641 1Y **Application of Kramers-Kronig method for analysis Fe-based alloys** [6641-75]
O. Fedosenko, Kyiv National Taras Shevchenko Univ. (Ukraine); E. Loza, National Antarctic Scientific Ctr. (Ukraine); L. V. Poperenko, Kyiv National Taras Shevchenko Univ. (Ukraine)
- 6641 1Z **Analysis of Bragg gratings for long-range surface plasmon polaritons using the bidirectional beam propagation method based on scattering operators** [6641-76]
H. Zhang, J. Mu, W.-P. Huang, McMaster Univ. (Canada)
- 6641 20 **Light focusing with tip formed array of plasmon-polariton waveguides** [6641-77]
W. M. Saj, Univ. of Warsaw (Poland)

Author Index

Conference Committee

Symposium Chairs

David L. Andrews, University of East Anglia Norwich (United Kingdom)
James G. Grote, Air Force Research Laboratory (USA)
Kevin J. Liddane, Oerlikon Optics USA Inc. (USA)

Conference Chair

Mark I. Stockman, Georgia State University (USA)

Program Committee

David J. Bergman, Tel Aviv University (Israel)
Sergey I. Bozhevolnyi, Aalborg University (Denmark)
Jochen Feldmann, Ludwig-Maximilians-Universität München (Germany)
Naomi J. Halas, Rice University (USA)
Teruya Ishihara, The Institute of Physical and Chemical Research (Japan)
Satoshi Kawata, Osaka University (Japan)
Fritz Keilmann, Max-Planck-Institut für Biochemie (Germany)
Victor I. Klimov, Los Alamos National Laboratory (USA)
Aaron Lewis, The Hebrew University of Jerusalem (Israel)
Olivier J. F. Martin, École Polytechnique Fédérale de Lausanne (Switzerland)
Martin Moskovits, University of California, Santa Barbara (USA)
Peter J. Nordlander, Rice University (USA)
Lukas Novotny, University of Rochester (USA)
Motoichi Ohtsu, The University of Tokyo (Japan)
John B. Pendry, Imperial College London (United Kingdom)
Lewis J. Rothberg, University of Rochester (USA)
Vahid Sandoghdar, ETH Zürich (Switzerland)
George C. Schatz, Northwestern University (USA)
Tigran V. Shahbazyan, Jackson State University (USA)
Vladimir M. Shalaev, Purdue University (USA)
Gennady Shvets, The University of Texas at Austin (USA)
Yung Doug Suh, Korea Research Institute of Chemical Technology (South Korea)
Din-Ping Tsai, National Taiwan University (Taiwan)
Nikolay I. Zheludev, University of Southampton (United Kingdom)

Session Chairs

- 1 Special Invited Session: Trends in Nanoplasmonics
Mark I. Stockman, Georgia State University (USA)
- 2 Developments in SERS and Surface Enhancement
Lukas Novotny, University of Rochester (USA)
- 3 Nonlinear and Active Nanoplasmonics
Martti Kauranen, Tampere University of Technology (Finland)
- 4 Propagation Phenomena and Nanoplasmonics I
Harry A. Atwater, Jr., California Institute of Technology (USA)
- 5 Spatial Control and Subwavelength Localization
Nikolay I. Zheludev, University of Southampton (United Kingdom)
- 6 Nonlinear and Controlled Nanoplasmonic Phenomena
Mathias Fink, École Supérieure de Physique et de Chimie Industrielles (France)
- 7 Propagation Phenomena and Nanoplasmonics II
Lewis J. Rothberg, University of Rochester (USA)
- 8 Concentration and Transformation of Energy on Nanoscale
Yehiaiahu Fainman, University of California, San Diego (USA)
- 9 Control and Manipulation of Nanoplasmonic Phenomena
Andrey L. Rogach, Ludwig-Maximilians-Universität München (Germany)
- 10 Nanoplasmonic Eigenmodes and Nanoscale Phenomena
Mark L. Brongersma, Stanford University (USA)
- 11 Nanocircuits and Energy Localization
Peter J. Nordlander, Rice University (USA)
- 12 Magnetic Phenomena and Molecular Nanoplasmonics
Nader Engheta, University of Pennsylvania (USA)
- 13 Propagation Phenomena and Nanoplasmonics III
Abdulahakem Y. Elezzabi, University of Alberta (Canada)
- 14 New Developments in Nanoplasmonics
Tigran V. Shahbazyan, Jackson State University (USA)