PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 8232

, "Front Matter: Volume 8232," Proc. SPIE 8232, Colloidal Nanocrystals for Biomedical Applications VII, 823201 (12 March 2012); doi: 10.1117/12.923378

SPIE.

Event: SPIE BiOS, 2012, San Francisco, California, United States

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 13, No. 26

Colloidal Nanocrystals for Biomedical Applications VII

Wolfgang J. Parak

Kenji Yamamoto

Marek Osiński

Editors

21–22 January 2012

San Francisco, California, United States

Sponsored and Published by

SPIE

Volume 8232

Proceedings of SPIE, 1605-7422, v. 8232

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 *Colloidal Nanocrystals for Biomedical Applications VII*, edited by Wolfgang J. Parak, Kenji Yamamoto, Marek Osinski, Proceedings of SPIE Vol. 8232 (SPIE, Bellingham, WA, 2012) Article CID Number.

ISSN 1605-7422

ISBN 9780819488756

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 © 2012, 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 1605-7422/12/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the 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 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

ix *Conference Committee*

TARGETING OF CELLULAR STRUCTURES AND SENSING

- 8232 02 **Functional nanoparticles in cells (Invited Paper)** [8232-01]
D. Bartczak, O. L. Muskens, Univ. of Southampton (United Kingdom); S. Nitti, Istituto Italiano di Tecnologia (Italy); T. Sanchez-Elsner, T. M. Millar, Southampton General Hospital (United Kingdom); A. G. Kanaras, Univ. of Southampton (United Kingdom)
- 8232 03 **Fluorescent diamond nanoparticle as a probe of intracellular traffic in primary neurons in culture (Invited Paper)** [8232-02]
X. L. Le, CNRS, Ecole Normale Supérieure de Cachan (France); A.-M. Lepagnol-Bestel, Ctr. de Psychiatrie et Neurosciences, INSERM, Univ. Paris Descartes (France) and Ctr. National de Génotypage (France); M.-P. Adam, CNRS, Ecole Normale Supérieure de Cachan (France); A. Thomas, Ctr. de Psychiatrie et Neurosciences, INSERM, Univ. Paris Descartes (France); G. Dantelle, CNRS, Ecole Polytechnique (France); C.-C. Chang, N. Mohan, H.-C. Chang, Institute of Atomic and Molecular Sciences (Taiwan) and National Taiwan Univ. (Taiwan); F. Treussart, CNRS, Ecole Normale Supérieure de Cachan (France); M. Simonneau, Ctr. de Psychiatrie et Neurosciences, INSERM, Univ. Paris Descartes (France)
- 8232 04 **Quantum dots-based nanobiosensors for simultaneous dynamic measurements of multiple intracellular ion concentrations** [8232-03]
L. B. Wong, H. Mao, Y. Wang, Cytophysics Corp. (United States)
- 8232 08 **Biodegradable polymer nanocarriers for therapeutic antisense microRNA delivery in living animals (Invited Paper)** [8232-07]
R. Paulmurugan, N. M. Sekar, T. V. Sekar, Stanford Univ. School of Medicine (United States)

LOADING OF CELLS WITH NANOPARTICLES AND TOXIC EFFECTS

- 8232 0A **Probing the interior of synaptic vesicles with internalized nanoparticles** [8232-09]
J. C. Gadd, K. L. Budzinski, Y.-H. Chan, F. Ye, D. T. Chiu, Univ. of Washington (United States)
- 8232 0B **Further progress in cytosolic cellular delivery of quantum dots** [8232-10]
K. Boeneman Gemmill, J. B. Delehanty, Ctr. for Bio/Molecular Science and Engineering (United States); M. H. Stewart, K. Susumu, U.S. Naval Research Lab. (United States); J. B. Blanco-Canosa, P. E. Dawson, The Scripps Research Institute (United States); A. Huston, U.S. Naval Research Lab. (United States); I. Medintz, Ctr. for Bio/Molecular Science and Engineering (United States)

- 8232 0D **CdTe/CdS-MPA quantum dots as fluorescent probes to label yeast cells: synthesis, characterization and conjugation with Concanavalin A** [8232-13]
I. T. Kato, C. C. Santos, E. Benetti, Instituto de Pesquisas Energéticas e Nucleares (Brazil); D. P. L. A. Tenório, P. E. Cabral Filho, Univ. Federal de Pernambuco (Brazil); C. P. Sabino, Instituto de Pesquisas Energéticas e Nucleares (Brazil); A. Fontes, B. S. Santos, Univ. Federal de Pernambuco (Brazil); R. A. Prates, M. S. Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil)
- 8232 0E **Impact of nanomaterials on *in vitro* and *in vivo* systems: role of nanoscale features in nanotoxicology (Invited Paper)** [8232-14]
L. Rizzello, G. Vecchio, V. Brunetti, G. Maiorano, M. A. Malvindi, A. Galeone, S. Sabella, P. P. Pompa, Istituto Italiano di Tecnologia (Italy)

SELECTIVE DESTRUCTION AND DELIVERY TO CELLS II

- 8232 0H **Small NIR-to-VIS upconverting nanoparticles for photodynamic therapy (Invited Paper)** [8232-17]
M. E. Lim, Y. Zhang, J. J. H. Chu, National Univ. of Singapore (Singapore)
- 8232 0I **Photosensitization of InP/ZnS quantum dots for anti-cancer and anti-microbial applications** [8232-18]
J. Nadeau, H. Chibli, L. Carlini, McGill Univ. (Canada)
- 8232 0J **Cell as a factory for humanized encapsulation** [8232-19]
Z. Mao, Zhejiang Univ. (China); D. Wang, Univ. of South Australia (Australia)

NANOPARTICLES FOR IMAGING

- 8232 0L **Synthesis and characterization of fluorescent dyes-magnetic nanoparticles for bioimaging applications** [8232-21]
S. K. Yen, D. Jańczewski, S. Bin Dolmanan, T. Sudhiranjan, S. T. Selvan, A*STAR Institute of Materials Research and Engineering (Singapore)
- 8232 0M **Multifunctional superparamagnetic nanocrystals for imaging and targeted drug delivery to the lung** [8232-22]
L. M. Armijo, Y. I. Brandt, N. J. Withers, J. B. Plumley, N. C. Cook, A. C. Rivera, The Univ. of New Mexico (United States); S. Yadav, The Univ. of New Mexico (United States) and Indian Institute of Technology (India); G. A. Smolyakov, The Univ. of New Mexico (United States); T. Monson, D. L. Huber, Sandia National Labs. (United States); H. D. C. Smyth, The Univ. of Texas at Austin (United States); M. Osiński, The Univ. of New Mexico (United States)

SURFACE MODIFICATION AND BIOCONJUGATION OF NANOPARTICLES I

- 8232 0O **High-resolution imaging of solvation structures with amplitude-modulation atomic force microscopy (Invited Paper)** [8232-24]
K. Voïtchovsky, M. Ricci, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

- 8232 OP **Stable gold nanocolloids with controllable surface modification and functionalization** [8232-25]
W. Qian, M. Murakami, Y. Ichikawa, Y. Che, IMRA America, Inc. (United States)
- 8232 OR **Effects of $\text{La}_{0.2}\text{Ce}_{0.6}\text{Eu}_{0.2}\text{F}_3$ nanoparticles capped with polyethylene glycol on human astrocytoma cells *in vitro* (Best Paper Award)** [8232-27]
N. J. Withers, Y. Brandt, A. C. Rivera, L. M. Armijo, N. C. Cook, M. Osiński, The Univ. of New Mexico (United States)
- 8232 OS **Framing the nano-biointeractions by proteomics (Invited Paper)** [8232-28]
S. Sabella, G. Maiorano, L. Rizzello, S. Kote, R. Cingolani, P. P. Pompa, Italian Institute of Technology (Italy)

SURFACE MODIFICATION AND BIOCONJUGATION OF NANOPARTICLES II

- 8232 OT **Oriented conjugates of monoclonal and single-domain antibodies with quantum dots for flow cytometry and immunohistochemistry diagnostic applications (Invited Paper)** [8232-29]
A. Sukhanova, Moscow Engineering Physics Institute (Russian Federation) and Univ. de Reims Champagne-Ardenne (France); K. Even-Desrumeaux, INSERM (France); J.-M. Millot, Univ. de Reims Champagne-Ardenne (France); P. Chames, D. Baty, INSERM (France); M. Artemyev, Moscow Engineering Physics Institute (Russian Federation) and Belarusian State Univ. (Belarus); V. Oleinikov, Moscow Engineering Physics Institute (Russian Federation) and Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation); J. H. M. Cohen, Univ. de Reims Champagne-Ardenne (France); I. Nabiev, Moscow Engineering Physics Institute (Russian Federation) and Univ. de Reims Champagne-Ardenne (France)

MAGNETIC NANOPARTICLES

- 8232 OX **Fighting cancer with magnetic nanoparticles and immunotherapy (Invited Paper)** [8232-33]
L. Gutiérrez, Instituto de Ciencia de Materiales de Madrid (Spain); R. Mejías, D. F. Barber, Consejo Superior de Investigaciones Científicas (Spain); S. Veintemillas-Verdaguer, C. J. Serna, Instituto de Ciencia de Materiales de Madrid (Spain); F. J. Lázaro, Univ. de Zaragoza (Spain); M. P. Morales, Instituto de Ciencia de Materiales de Madrid (Spain)
- 8232 OY **Magnetic vesicles as MRI-trackable biogenic nanovectors (Invited Paper)** [8232-35]
A. K. Andriola Silva, N. Luciani, F. Gazeau, C. Wilhelm, Lab. Matière et Systèmes Complexes, CNRS, Univ. Paris 7-Denis Diderot (France)
- 8232 IO **Tailoring biocompatible Fe_3O_4 nanoparticles for applications to magnetic hyperthermia (Invited Paper)** [8232-37]
M. Insausti, J. Salado, I. Castellanos, L. Lezama, I. Gil de Muro, Univ. del País Vasco (Spain); J. M. de la Fuente, Univ. of Zaragoza (Spain); E. Garayo, F. Plazaola, T. Rojo, Univ. del País Vasco (Spain)
- 8232 II **Multifunctional fluorescent and magnetic nanoparticles for biomedical applications (Invited Paper)** [8232-38]
S. T. Selvan, A*STAR Institute of Materials Research and Engineering (Singapore)

METAL NANOPARTICLES

- 8232 17 **Inorganic nanoparticles and the immune system: detection, selective activation and tolerance** [8232-44]
N. G. Bastús, Institut Català de Nanotecnologia (Spain); E. Sánchez-Tilló, Univ. of Barcelona (Spain); S. Pujals, Institute for Research in Biomedicine (Spain); J. Comenge, Institut Català de Nanotecnologia (Spain); E. Giral, Institute for Research in Biomedicine (Spain); A. Celada, J. Lloberas, Univ. of Barcelona (Spain); V. F. Puntès, Institut Català de Nanotecnologia (Spain) and Institut de Recerca i Estudis Avançats (Spain)

OPTICAL PROBES I

- 8232 19 **Are upconverting Ln³⁺ based nanoparticles any good for deep tissue imaging with retention of optical sectioning? (Invited Paper)** [8232-45]
F. C. J. M. van Veggel, J. Pichaandi, J.-C. Boyer, K. R. Delaney, Univ. of Victoria (Canada)
- 8232 1A **Glycine-coated photoluminescent silver nanoclusters** [8232-46]
V. V. Kravets, Univ. of Colorado at Colorado Springs (United States) and National Taras Shevchenko Univ. (Ukraine); K. Culhane, Univ. of Colorado at Colorado Springs (United States); I. M. Dmitruk, National Taras Shevchenko Univ. (Ukraine); A. O. Pinchuk, Univ. of Colorado at Colorado Springs (United States)

OPTICAL PROBES II

- 8232 1H **Design and study of activatable ("OFF/ON") quantum dots (Qdots): ligand selection for Qdot surface modification for controlling Qdot fluorescence quenching and restoration (Invited Paper)** [8232-53]
A. Teblum, S. Basumallick, R. Shah, R. N. Mitra, S. Banerjee, S. Santra, Univ. of Central Florida (United States)
- 8232 1I **Optical spectroscopy of single semiconductor nanocrystals close to gold nanoparticles (Invited Paper)** [8232-54]
X. Ma, H. Tan, T. Kipp, A. Mews, Univ. Hamburg (Germany)
- 8232 1J **Facile synthesis of fluorescent gold nanoclusters and their application in cellular imaging (Invited Paper)** [8232-55]
L. Shang, R. M. Dörlich, S. Brandholt, N. Azadfar, Karlsruher Institut für Technologie (Germany); G. U. Nienhaus, Karlsruher Institut für Technologie (Germany) and Univ. of Illinois at Urbana-Champaign (United States)

POSTER SESSION

- 8232 1K **Characterization and bioactivity study of nanohydroxyapatite on superhydrophilic vertically aligned carbon nanotubes using optical techniques** [8232-11]
J. A. Ferreira Irineu, T. C. Marsi, T. G. Santos, Univ. do Vale do Paraíba (Brazil); A. M. E. Santo, Univ. Federal de São Paulo (Brazil); J. L. Rangel, Univ. do Vale do Paraíba (Brazil); U. A. Mengui, Instituto Nacional de Pesquisas Espaciais (Brazil); A. A. Martin, Univ. do Vale do Paraíba (Brazil); E. J. Corat, Instituto Nacional de Pesquisas Espaciais (Brazil); F. R. Marciano, A. O. Lobo, Univ. do Vale do Paraíba (Brazil)

- 8232 1L **Preparation of functionalized Fe_{1-x}Pd_x based nanoparticles: magnetic characterization**
[8232-34]
I. Gil de Muro, I. Castellanos, L. Lezama, M. Insausti, E. Garayo, F. Plazaola, Univ. del País Vasco (Spain); T. Rojo, Univ. del País Vasco (Spain) and Parque Tecnológico de Álava (Spain)

Author Index

Conference Committee

Symposium Chairs

James G. Fujimoto, Massachusetts Institute of Technology (United States)
R. Rox Anderson, Wellman Center for Photomedicine, Massachusetts General Hospital, Harvard School of Medicine (United States)

Program Track Chairs

Paras Prasad, SUNY/Buffalo (United States)
Dan V. Nicolau, The University of Liverpool (United Kingdom)

Conference Chairs

Wolfgang J. Parak, Philipps-Universität Marburg (Germany)
Kenji Yamamoto, National Center for Global Health and Medicine (Japan)
Marek Osinski, The University of New Mexico (United States)

Program Committee

Antigoni Alexandrou, Ecole Polytechnique (France)
Maxime Dahan, Laboratoire Kastler Brossel (France)
Jesus Martinez de la Fuente, Universidad de Zaragoza (Spain)
Niko Hildebrandt, Institut d'Électronique Fondamentale (France)
Jennifer A. Hollingsworth, Los Alamos National Laboratory (United States)
Thomas M. Jovin, Max-Planck-Institut für biophysikalische Chemie (Germany)
Hedi Mattoussi, The Florida State University (United States)
Igor L. Medintz, U.S. Naval Research Laboratory (United States)
Paul Mulvaney, The University of Melbourne (Australia)
Jay L. Nadeau, McGill University (Canada)
Geoffrey F. Strouse, The Florida State University (United States)
Subramanian Tamil Selvan, A*STAR Institute of Materials Research and Engineering (Singapore)
Claudia Tortiglione, Istituto di Cibernetica Eduardo Caianiello (Italy)
Tania Q. Vu, Oregon Health & Science University (United States)
Horst Weller, Universität Hamburg (Germany)

Session Chairs

- 1 Targeting of Cellular Structures and Sensing
Marek Osiński, The University of New Mexico (United States)
- 2 Loading of Cells with Nanoparticles and Toxic Effects
Antónios G. Kanaras, University of Southampton (United Kingdom)
- 3 Selective Destruction and Delivery to Cells I
Dorleta Jimenez de Aberasturi, Universidad del País Vasco (Spain)
- 4 Selective Destruction and Delivery to Cells II
David Pozo Perez, Centro Andaluz de Biología Molecular y Medicina Regenerativa (Spain)
- 5 Nanoparticles for Imaging
M. Arturo Lopez-Quintela, Universidade de Santiago de Compostela (Spain)
- 6 Surface Modification and Bioconjugation of Nanoparticles I
Jesus Martinez de la Fuente, Universidad de Zaragoza (Spain)
- 7 Surface Modification and Bioconjugation of Nanoparticles II
Jay L. Nadeau, McGill University (Canada)
- 8 Magnetic Nanoparticles
Subramanian Tamil Selvan, A*STAR Institute of Materials Research and Engineering (Singapore)
- 9 Metal Nanoparticles
Maite Insausti, Universidad del País Vasco (Spain)
- 10 Optical Probes I
Alf Mews, Universität Hamburg (Germany)
- 11 Optical Probes II
Neus G. Bastús, Institut Català de Nanotecnologia (Spain)