## **PROCEEDINGS OF SPIE**

# Organic 3D Photonics Materials and Devices II

Susanna Orlic Editor

12 August 2008 San Diego, California, USA

Sponsored and Published by SPIE

Volume 7053

Proceedings of SPIE, 0277-786X, v. 7053

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 Organic 3D Photonics Materials and Devices II, edited by Susanna Orlic, Proceedings of SPIE Vol. 7053 (SPIE, Bellingham, WA, 2008) Article CID Number.

ISSN 0277-786X ISBN 9780819472731

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 © 2008, 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/08/\$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 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

#### SESSION 1 MATERIALS AND EFFECTS I

7053 03 Optical characterization of photopolymer and photoresist materials for storage, sensing, and security applications [7053-02]
 T. Feid, S. Frohmann, J. Rass, C. Müller, S. Orlic, Technische Univ. Berlin (Germany)

#### SESSION 2 APPLICATIONS AND DEVICES I

Progress in two-photon 3D optical data storage (Invited Paper) [7053-07]
 E. Walker, Call/Recall, Inc. (United States); A. Dvornikov, Call/Recall, Inc. (United States) and Univ. of California, Irvine (United States); K. Coblentz, Call/Recall, Inc. (United States); P. Rentzepis, Call/Recall, Inc. (United States) and Univ. of California, Irvine (United States)

#### SESSION 3 APPLICATIONS AND DEVICES II

- 7053 09 Three-dimensional waveguide arrays via projection lithography into a moving photopolymer (Invited Paper) [7053-08]
  E. D. Moore, A. C. Sullivan, R. R. McLeod, Univ. of Colorado, Boulder (United States)
- 7053 0A **3D photonic gratings for optical sensing and image processing** [7053-09] C. Mueller, H. Markoetter, A. Schloesser, S. Orlic, Technische Univ. Berlin (Germany)
- 7053 0B Optoelectronic printed circuit board: 3D structures written by two-photon absorption (Invited Paper) [7053-11]
   R. Houbertz, Fraunhofer ISC (Germany); V. Satzinger, V. Schmid, Joanneum Research (Austria); W. Leeb, Vienna Univ. of Technology (Austria); G. Langer, Austria Technologie & Systemtechnik (Austria)

#### SESSION 4 MATERIALS AND EFFECTS II

- Absorption and bleaching dynamics of initiator in thick photopolymer exposed to Gaussian illumination [7053-13]
   M. W. Grabowski, K. M. Vogelhuber, J. H. Chen, R. R. McLeod, Univ. of Colorado at Boulder (United States)
- 7053 0E Exceeding the diffraction limit with single-photon photopolymerization and photo-induced termination [7053-14]
  B. A. Kowalski, T. F. Scott, C. N. Bowman, A. C. Sullivan, R. R. McLeod, Univ. of Colorado at Boulder (United States)

#### POSTER SESSION

- Simulation and experimental analysis of multiplexed hologram recording using photopolymer media [7053-18]
  N. Yoshida, S. Yoshida, K. Shimada, M. Yamamoto, Tokyo Univ. of Science (Japan)
- Analysis of diffraction characteristics of multiplexed hologram by using the beam propagation method [7053-19]
  S. Yoshida, M. Yamamoto, Tokyo Univ. of Science (Japan)
- Novel blue sensitive polymeric materials for optical data storage [7053-20]
  R. Castagna, L. Criante, F. Vita, D. E. Lucchetta, Univ. Politecnica delle Marche (Italy);
  S. Frohmann, T. Feid, S. Orlic, Technical Univ. of Berlin (Germany); F. Simoni, Univ. Politecnica delle Marche (Italy)

Author Index

## **Conference Committee**

#### Symposium Chair

Zakya H. Kafafi, National Science Foundation (United States)

Conference Chair

Susanna Orlic, Technische Universität Berlin (Germany)

#### Conference Cochair

Robert R. McLeod, University of Colorado at Boulder (United States)

#### Program Committee

Yasuo Tomita, The University of Electro-Communications (Japan) Michael Cole, InPhase Technologies Inc. (United States)

#### Session Chairs

- Materials and Effects I
  Susanna Orlic, Technische Universität Berlin (Germany)
- Applications and Devices I
  Robert R. McLeod, University of Colorado at Boulder (United States)
- Applications and Devices II
  Kevin Curtis, InPhase Technologies, Inc. (United States)
- 4 Materials and Effects II Susanna Orlic, Technische Universität Berlin (Germany)