

PROCEEDINGS OF SPIE

Organic Semiconductors in Sensors and Bioelectronics IV

Ruth Shinar
Ioannis Kymissis
Editors

24–25 August 2011
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 8118

Proceedings of SPIE, 0277-786X, v. 8118

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 Semiconductors in Sensors and Bioelectronics IV*, edited by Ruth Shinar, Ioannis Kymissis, Proceedings of SPIE Vol. 8118 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X
ISBN 9780819487285

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 © 2011, 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/11/\$18.00.

Printed in the United States of America.

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

The logo for SPIE Digital Library features the word "SPIE" in a bold, sans-serif font above the words "Digital Library" in a smaller, sans-serif font. To the right of the text is a stylized graphic consisting of three vertical bars of increasing height from left to right, with a curved line above them.

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

v *Conference Committee*

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOELECTRONICS I

- 8118 02 **Organic photodiodes as monolithically integrated detectors in micro-optical systems (Invited Paper)** [8118-01]
B. Lamprecht, E. Kraker, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); H. Dittlbacher, Karl-Franzens-Univ. Graz (Austria); G. Jakopic, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria)
- 8118 05 **Integrated organic optical sensor arrays based on ring-shaped organic photodiodes** [8118-04]
M. Sagmeister, B. Lamprecht, E. Kraker, A. Haase, G. Jakopic, S. Köstler, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); H. Dittlbacher, N. Galler, Karl-Franzens-Univ. Graz (Austria); T. Abel, T. Mayr, Technische Univ. Graz (Austria)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOELECTRONICS II

- 8118 07 **Integrated semiconductor optoelectronic devices for real-time and indicator-free detection of aqueous nitric oxide** [8118-06]
S.-P. Wang, National Chiao Tung Univ. (Taiwan); Y.-K. Cheng, National Tsing Hua Univ. (Taiwan); Y.-C. Chao, H.-W. Zan, National Chiao Tung Univ. (Taiwan); G.-F. Chang, National Tsing Hua Univ. (Taiwan) and Academia Sinica (Taiwan); H.-F. Meng, National Chiao Tung Univ. (Taiwan); C.-H. Hung, Academia Sinica (Taiwan); W.-C. Chen, National Taiwan Univ. (Taiwan)
- 8118 09 **Organic field-effect transistors: a combined study on short-channel effects and the influence of substrate pre-treatment on ambient stability (Invited Paper)** [8118-08]
A. Klug, A. Meingast, G. Wurzinger, A. Blümel, K. Schmoltner, NanoTecCenter Weiz Forschungsgesellschaft mbH (Austria); U. Scherf, Univ. of Wuppertal (Germany); E. J. W. List, NanoTecCenter Weiz Forschungsgesellschaft mbH (Austria) and Graz Univ. of Technology (Austria)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOELECTRONICS III

- 8118 0C **Wearable electrochemical sensors for monitoring performance athletes (Invited Paper)** [8118-11]
K. J. Fraser, V. F. Curto, S. Coyle, Dublin City Univ. (Ireland); B. Schazmann, Dublin Institute of Technology (Ireland); R. Byrne, F. Benito-Lopez, Dublin City Univ. (Ireland); R. M. Owens, G. G. Malliaras, Ecole Nationale Supérieure des Mines de Saint-Étienne (France); D. Diamond, Dublin City Univ. (Ireland)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOELECTRONICS IV

- 8118 0E **Conjugated polymer sensors for explosive vapor detection (Invited Paper)** [8118-13]
Y. Wang, G. A. Turnbull, I. D. W. Samuel, Univ. of St. Andrews (United Kingdom)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOELECTRONICS V

- 8118 0J **Fluorescent detection of NO₂ by free base tetraphenyl porphyrins** [8118-18]
P. A. Lane, U.S. Naval Research Lab. (United States); T. H. Richardson, The Univ. of Sheffield (United Kingdom)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOELECTRONICS VI

- 8118 0K **Correlation of charge transport and sensing behavior in organic semiconductor field-effect chemical sensors (Invited Paper)** [8118-19]
D. Duarte, A. Dodabalapur, The Univ. of Texas at Austin (United States)
- 8118 0M **Natural and nature-inspired semiconductors for organic electronics (Invited Paper)** [8118-21]
E. D. Głowacki, Johannes Kepler Univ. Linz (Austria); L. Leonat, Politehnica Univ. of Bucharest (Romania); G. Voss, Univ. of Bayreuth (Germany); M. Bodea, Johannes Kepler Univ. Linz (Austria); Z. Bozkurt, Sabanci Univ. (Turkey); M. Irimia-Vladu, S. Bauer, N. S. Sariciftci, Johannes Kepler Univ. Linz (Austria)

POSTER SESSION

- 8118 0U **Electrochemical transistors with ionic liquids for enzymatic sensing** [8118-29]
K. J. Fraser, Dublin City Univ. (Ireland); S. Y. Yang, Cornell Univ. (United States); F. Cicoira, Cornell Univ. (United States) and CNR-IFN (Italy); V. F. Curto, R. Byrne, F. Benito-Lopez, Dublin City Univ. (Ireland); D. Khodagholy, R. M. Owens, G. G. Malliaras, Ecole Nationale Supérieure des Mines de Saint-Étienne (France); D. Diamond, Dublin City Univ. (Ireland)
- 8118 0V **Luminescence decay times of PdOEP:PVK OLEDs fabricated in controlled O₂ and H₂O environments** [8118-30]
W. Cui, Ames Lab. (United States) and Iowa State Univ. (United States); R. Liu, Ames Lab. (United States); A. Smith, Iowa State Univ. (United States); J. Shinar, Ames Lab. (United States) and Iowa State Univ. (United States); R. Shinar, Iowa State Univ. (United States)

Author Index

Conference Committee

Symposium Chair

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

Conference Chairs

Ruth Shinar, Iowa State University (United States)

Ioannis Kymissis, Columbia University (United States)

Program Committee

Magnus Berggren, Linköping University (Sweden)

Sumit Chaudhary, Iowa State University (United States)

Emil J. W. List, Technische Universität Graz (Austria)

Róisín M. Owens, École Nationale Supérieure des Mines de Saint-Étienne (France)

Franky So, University of Florida (United States)

Luisa Torsi, Università degli Studi di Bari (Italy)

Session Chairs

- 1 Organic Semiconductors in Sensors and Bioelectronics I
Emil J. W. List, Technische Universität Graz (Austria)
- 2 Organic Semiconductors in Sensors and Bioelectronics II
John C. de Mello, Imperial College London (United Kingdom)
- 3 Organic Semiconductors in Sensors and Bioelectronics III
Ruth Shinar, Iowa State University (United States)
- 4 Organic Semiconductors in Sensors and Bioelectronics IV
Joseph Shinar, Ames Laboratory (United States)
- 5 Organic Semiconductors in Sensors and Bioelectronics V
Paul Burn, University of Queensland (Australia)
- 6 Organic Semiconductors in Sensors and Bioelectronics VI
Paul A. Lane, U.S. Naval Research Laboratory (United States)
- 7 Organic Semiconductors in Sensors and Bioelectronics VII
Ioannis Kymissis, Columbia University (United States)

