PROCEEDINGS OF SPIE

Organic Semiconductors in Sensors and Bioelectronics V

Ruth Shinar Ioannis Kymissis Editors

15–16 August 2012 San Diego, California, United States

Sponsored and Published by SPIF

Volume 8479

Proceedings of SPIE 0277-786-786X, V.8479

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

Organic Semiconductors in Sensors and Bioelectronics V, edited by Ruth Shinar, Ioannis Kymissis, Proc. of SPIE Vol. 8479, 847901 · © 2012 SPIE · CCC code: 0277-786/12/\$18 · doi: 10.1117/12.2011024

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 V, edited by Ruth Shinar, Ioannis Kymissis, Proceedings of SPIE Vol. 8479 (SPIE, Bellingham, WA, 2012) Article CID Number.

ISSN: 0277-786X ISBN: 9780819491961

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 0277-786X/12/\$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 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 BIOTECHNOLOGY I

8479 03 Scanning pyroelectric microscopy for characterizing large-area printed ferroelectric sensors on the nanoscale (Invited Paper) [8479-2]

B. Stadlober, J. Groten, M. Zirkl, A. Haase, A. Sawatdee, G. Scheipl, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOTECHNOLOGY III

8479 0C Polymer opto-chemical-electronic based module as a detection system for volatile analytes on a foil substrate [8479-12]

I. Bose, A. Ohlander, M. I. J. Stich, C. Kiesl, D. Hemmetzberger, G. Klink, S. Trupp, Fraunhofer-Einrichtung für Modulare Festkörper-Technologien EMFT (Germany); K. Bock, Fraunhofer-Einrichtung für Modulare Festkörper-Technologien EMFT (Germany) and Technische Univ. Berlin (Germany)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOTECHNOLOGY IV

8479 0H Opto-chemical sensors based on integrated ring-shaped organic photodiodes: progress and applications (Invited Paper) [8479-17]

T. Mayr, T. Abel, B. Ungerböck, Technische Univ. Graz (Austria); M. Sagmeister, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria); V. Charwat, P. Ertl, Austrian Institute of Technology (AIT) (Austria); E. Kraker, S. Köstler, A. Tschepp, B. Lamprecht, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOTECHNOLOGY V

Photolithographic processing and its influence on the performance of organic field-effect transistors (Invited Paper) [8479-19]

K. Schmoltner, A. Klug, J. Kofler, NanoTecCenter Weiz Forschungsgesellschaft mbH (Austria); E. J. W. List, NanoTecCenter Weiz Forschungsgesellschaft mbH (Austria) and Technische Univ. Graz (Austria)

ORGANIC SEMICONDUCTORS IN SENSORS AND BIOTECHNOLOGY VI

8479 0M Enzyme-modified electrolyte-gated organic field-effect transistors [8479-23]

F. Buth, A. Donner, M. Stutzmann, J. A. Garrido, Technische Univ. München (Germany)

Author Index

Conference Committee

Symposium Chair

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

Conference Chair

Ruth Shinar, Iowa State University (United States)

Conference CoChair

Ioannis Kymissis, Columbia University (United States)

Conference Program Committee

Magnus Berggren, Linköping University (Sweden)
Sumit Chaudhary, Iowa State University (United States)
Fabio Cicoira, Ecole Polytechnique de Montréal (Canada)
Emil J. W. List, Technische Universität Graz (Austria)
Róisín M. Owens, Ecole Nationale Supérieure des Mines de SaintÉtienne (France)
Franky So, University of Florida (United States)

Session Chairs

Organic Semiconductors in Sensors and Biotechnology I **Ioannis Kymissis**, Columbia University (United States)

Luisa Torsi, Università degli Studi di Bari (Italy)

- Organic Semiconductors in Sensors and Biotechnology II Róisín M. Owens, Ecole Nationale Supérieure des Mines de Saint-Étienne (France)
- 3 Organic Semiconductors in Sensors and Biotechnology III **Emil J. W. List**, Technische Universität Graz (Austria)
- 4 Organic Semiconductors in Sensors and Biotechnology IV **Ruth Shinar**, Iowa State University (United States)
- 5 Organic Semiconductors in Sensors and Biotechnology V Barbara Stadlober, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria)

- 6 Organic Semiconductors in Sensors and Biotechnology VI **Paul Burn**, The University of Queensland (Australia)
- 7 Organic Semiconductors in Sensors and Biotechnology VII Joseph Shinar, Ames Laboratory and Iowa State University (United States)