PROCEEDINGS OF SPIE

Energy Harvesting and Storage: Materials, Devices, and Applications XIII

Naresh C. Das Editors

2 May 2023 Orlando, Florida, United States

Sponsored and Published by SPIE

Volume 12513

Proceedings of SPIE 0277-786X, V. 12513

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

The papers 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. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers 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 these proceedings: Author(s), "Title of Paper," in Energy Harvesting and Storage: Materials, Devices, and Applications XIII, edited by Naresh C. Das, Proc. of SPIE 12513, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510661400

ISBN: 9781510661417 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org

Copyright © 2023 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of 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 and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five 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.

Contents

v Conference Committee

SESSION 1	ENERGY HARVESTING AND STORAGE: MATERIALS, DEVICES, AND APPLICATIONS I
12513 02	Wavelength-selective thermal meta-emitters for thermophotovoltaic power generation (Invited Paper) [12513-1]
12513 04	Towards automatic characterization of nano-energetic material response to directed energy [12513-3]
12513 05	Predicting solar power and energy production over the course of a full day [12513-4]
SESSION 2	ENERGY HARVESTING AND STORAGE: MATERIALS, DEVICES, AND APPLICATIONS II
12513 07	Feasibility study of residential photovoltaic (PV) systems installation [12513-6]
12513 08	Sliding innovation filter to estimate power converters of electric vehicles [12513-12]
12513 09	Artificial intelligence-based modeling of capacitive deionization for process optimization and cost contribution analysis of electrode features [12513-13]
SESSION 3	ENERGY HARVESTING AND STORAGE: MATERIALS, DEVICES, AND APPLICATIONS III
12513 OB	Fast, computationally efficient inverse design of thin films for reflection and transmission (Invited Paper) [12513-10]
12513 0D	Automatic transfer switch and smart voltage monitoring system [12513-7]
12513 0E	Control system with electronic braking capabilities for micro wind turbines [12513-8]

POSTER SESSION 12513 0G Broadband omnidirectional antireflection (AR) coating based on inverse transfer design towards high efficiency photovoltaic cells [12513-17] DIGITAL POSTER SESSION 12513 01 Internet of Things (IoT) in solar energy: a bibliometrics analysis and global publications trends [12513-18]

Conference Committee

Symposium Chairs

Tien Pham, The MITRE Corporation (United States) **Douglas R. Droege**, L3Harris Technologies, Inc. (United States)

Symposium Co-chairs

Augustus W. Fountain III, University of South Carolina (United States) **Teresa L. Pace**, L3Harris Technologies, Inc. (United States)

Program Track Chair

Mark Itzler, Argo AI, LLC (United States)

Conference Chair

Naresh C. Das, CCDC Army Research Laboratory (United States)

Conference Co-chair

Zunaid Omair, ASML San Diego (United States)

Conference Program Committee

Palani Balaya, National University of Singapore (Singapore)

Paul Boieriu, EPISOLAR, Inc. (United States)

Deryn Chu, U.S. Army Research Laboratory (United States)

Nibir K. Dhar, Virginia Commonwealth University (United States)

Achyut K. Dutta, Banpil Photonics, Inc. (United States)

M. Saif Islam, University of California, Davis (United States)

Nobuhiko P. Kobayashi, University of California, Santa Cruz (United States)

Andrew P. Lange, Lawrence Livermore National Laboratory (United States)

Hidenori Mimura, Shizuoka University (Japan)

Jagiit Nanda, Oak Ridge National Laboratory (United States)

Vijay Parameshwaran, U.S. Army Research Laboratory (United States)

Sunmi Shin, National University of Singapore (Singapore)

Siva Sivananthan, EPIR Technologies (United States),

University of Illinois at Chicago (United States), and

Sivananthan Laboratories, Inc. (United States)

Ashok K. Sood, Magnolia Optical Technologies, Inc. (United States)

Patrick J. Taylor, U.S. Army Research Laboratory (United States)

Sudhir B. Trivedi, Brimrose Corporation of America (United States)
Chunlei Wang, Florida International University (United States)
Priyalal Wijewarnasuriya, Teledyne Imaging Sensors (United States)
Sheng Xu, University of California, San Diego (United States)