

PROCEEDINGS OF SPIE

***Energy Harvesting and Storage:
Materials, Devices, and
Applications X***

**Palani Balaya
Achyut K. Dutta**
Editors

**27 April – 8 May 2020
Online Only, United States**

Sponsored and Published by
SPIE

Volume 11387

Proceedings of SPIE 0277-786X, V. 11387

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 SPIDigitalLibrary.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 X*, edited by Palani Balaya, Achyut K. Dutta, Proceedings of SPIE Vol. 11387 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510635517

ISBN: 9781510635524 (electronic)

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 © 2020, 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 \$21.00 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/20/\$21.00.

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.

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org

Paper Numbering: *Proceedings of SPIE* follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

ENERGY STORAGE: LI-ION, NA-ION AND ZINC BATTERY

11387 08 **Material research for photovoltaics: from lab to market (Invited Paper)** [11387-7]

ENERGY HARVESTING AND STORAGE: ADVANCED CHARACTERIZATION

11387 0D **Cathode electrolyte diagnostics based on scanning probe microscopy (Invited Paper)**
[11387-12]

ENERGY HARVESTING: THERMOELECTRIC MATERIALS II

11387 0K **Development of a sensitized “thermal” cell (Invited Paper)** [11387-19]

ENERGY HARVESTING AND STORAGE: MATERIALS DESIGN

11387 0N **Fourier imaging microscopy of light-emitting hybrid perovskite nanostructures (Invited Paper)**
[11387-22]

11387 0P **Design guidelines and parametric study of nonlinear magnetic springs for vibration systems**
[11387-24]

ENERGY HARVESTING AND STORAGE: MATERIALS AND DEVICES

11387 0U **Optical energy harvesting in a smart materials-based micro-actuator using a vertical multi-junction PV cell** [11387-30]

ENERGY HARVESTING AND STORAGE: DEVICES AND SYSTEMS

11387 10 **Meso-, micro-, and nano-structures induced in bismuth telluride thermoelectric materials by laser additive manufacturing** [11387-35]

11387 12 **Exploring solar energy charge station for electric vehicles in Puerto Rico** [11387-37]

11387 14 **Desalination as an energy storage alternative for nuclear power plants: Barakah power plant as a case study** [11387-40]

POSTER SESSION

- 11387 15 **Analysis of hybrid geo-solar power plant [11387-41]**
- 11387 16 **Geothermal energy use in seawater desalination [11387-42]**