PROCEEDINGS OF SPIE

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

Peter Bermel Naresh C. Das Zunaid Omair Editors

14–15 April 2025 Orlando, Florida, United States

Sponsored and Published by SPIE

Volume 13450

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 XV, edited by Peter Bermel, Naresh C. Das, Zunaid Omair, Proc. of SPIE 13450, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510686892

ISBN: 9781510686908 (electronic)

Published by

SPIE

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

Copyright © 2025 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

	RENEWABLE ENERGY HARVESTING
13450 02	Study of metal electrodes in a single-cell hydrogen peroxide fuel cell (Invited Paper) [13450-1]
13450 03	Triple-cation perovskite solar cells with an inorganic two-dimensional tungsten diselenide hole transport layer for moisture stability (Invited Paper) [13450-3]
13450 04	Improving solar cell efficiency with up-conversion layer of glass-doped Ce3+/Nd3+ [13450-4]
	ADVANCED MICROELECTRONICS TECHNOLOGIES
13450 05	Ultra-high-speed integrated millimeter-wave vertical photonic NAND FLASH with multiple high-power microwave-generating diodes and VCSEL lasers: applications for high-voltage, mixed-signal ASICs, and remote-sensing technologies (Invited Paper) [13450-7]
	ENERGY HARVESTING FOR SOCIAL BENEFIT
13450 06	Comparing the effectiveness of single-compartment and dual-compartment hydrogen peroxide fuel cells [13450-16]
	ENERGY HARVESTING AND STORAGE
13450 07	Strengths, weaknesses, opportunities, and threats for energy storage systems [13450-17]
	POSTER SESSION
13450 08	Thermoelectric cooling motorcycle helmet [13450-18]
	DIGITAL POSTER SESSION
13450 OA	Axial flux permanent magnet generator for effectively harvesting low-grade heat energy driven by the shape memory alloy (Invited Paper) [13450-12]