PROCEEDINGS OF SPIE

Behavior and Mechanics of Multifunctional Materials XVI

Ryan L. Harne Mariantonieta Gutierrez Soto Aimy Wissa Editors

6–9 March 2022 Long Beach, California, United States

4–10 April 2022 ONLINE

Sponsored and Published by SPIE

Volume 12044

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 Behavior and Mechanics of Multifunctional Materials XVI, edited by Ryan L. Harne, Mariantonieta Gutierrez Soto, Aimy Wissa, Proc. of SPIE 12044, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510649637 ISBN: 9781510649644 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) SPIE.org Copyright © 2022 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

ADAPTIVE AND PROGRAMMABLE MATERIALS AND STRUCTURES

12044 02 Shape memory through contact: introduction of MagnetoFriction Shape Memory Polymers (MF-SMPs) [12044-3]

SENSING AND ACTUATION MATERIALS

- 12044 03 Active paraffin wax phase change actuators for intelligent process control [12044-12]
- 12044 04 Kinetic bistable flaps actuated with magneto-active elastomers [12044-13]
- 12044 05 Design of a bidirectional rotational motion actuator by SMA with geometrico-static requirements [12044-14]
- 12044 06 Improved magnetoelectric response of distributed disc structured composite in aggravated thermal environment [12044-15]

MANUFACTURING AND MECHANICS OF MULTIFUNCTIONAL MATERIALS I

- 12044 07 Tuning the triboelectric polarity of PDMS film through thermal treatment [12044-5]
- 12044 08 Renyi entropy and fractional order mechanics for predicting complex mechanics of materials [12044-7]
- 12044 09 Selective laser sintering of high temperature thermoset [12044-9]

MANUFACTURING AND MECHANICS OF MULTIFUNCTIONAL MATERIALS II

- 12044 0A Characterization of fractional viscoelastic relaxation behavior of a photopolymer film [12044-16]
- 12044 0B Xerogel-based building material (XBM): potential for construction on Mars base and other resourceless sites [12044-20]
- 12044 0C Experimental framework toward 2D multiphysical model validation of components manufactured from multifunctional, degrading material [12044-22]