Biomaterials and Soft Materials

Engaged Learning of Materials Science and Engineering in the 21st **Century**



MRS Advances: Biomaterials and Soft Materials

Associate Editors:

Roger J. Narayan, *University of North Carolina/North Carolina State University* Frank W. DelRio, *National Institute of Standards and Technology*

Principal Editors:

Darren J. Lipomi, *University of California-San Diego* Jie Zheng, *University of Akron* Clara Santato, *École Polytechnique-Montréal* Tao Deng, *Shanghai Jiao Tong University* Guillermo Ameer, *Northwestern University*

Masaaki Nagatsu, Shizuoka University Andreas Lendlein, Helmholtz-Zentrum Geesthacht GmbH Sharon Gerecht, John Hopkins University Robert Sinclair, Stanford University

MRS Advances: Engaged Learning of Materials Science and Engineering in the 21st Century

Associate Editor:

David F. Bahr, Purdue University

Principal Editors:

Zakya H. Kafafi, Lehigh University Ian Ferguson, Missouri University of Science and Technology Sergio Mejía, *University of Autonoma* Nuevo Leon Joanna Millunchick, *University of Michigan*

MRS Advances Editorial Board:

Chair: David F. Bahr, *Purdue University*Asa H. Barber, *University of Portsmouth*Frank W. DelRio, *National Institute of Standards and Technology*

Elizabeth L. Fleischer, Materials Research Society Marilyn L. Minus, Northeastern University Roger J. Narayan, University of North Carolina/North Carolina State University

Materials Research Society Editorial Office, Warrendale, PA:

Ellen W. Kracht, *Publications Manager* Susan Dittrich, *Journals Editorial Assistant* Kirby L. Morris, *Journals Production Assistant* Eileen M. Kiley, *Director of Communications*

Disclaimer

Authors of each article appearing in this Journal are solely responsible for all contents in their article(s) including accuracy of the facts, statements, and citing resources. Facts and opinions are solely the personal statements of the respective authors and do not necessarily represent the views of the editors, the Materials Research Society, or Cambridge University Press.

MRS Advances (EISSN: 2059-8521) is published by Cambridge University Press, One Liberty Plaza, Floor 20, New York, NY 10006 for the Materials Research Society.

Copyright © 2016, Materials Research Society. All rights reserved. No part of this publication may be reproduced, in any form or by any means, electronic, photocopying, or otherwise, without permission in writing from Cambridge University Press. Policies, request forms and contacts are available at: http://www.cambridge.org/rights/permissions/permission.htm. Permission to copy (for users in the USA) is available from Copyright Clearance Center at: http://www.copyright.com, email: info@copyright.com.

Purchasing Options:

Premium Subscription- Premium Subscription includes current subscription and one year's lease access to the full MRS Online Proceedings Library Archive for \$6,875.00 / £4,655.00 / €6,330.00. *Subscription*-Subscription with perpetual access to the content subscribed to in a given year, including three years of back-file lease access to content from the MRS Online Proceedings Library Archive. The price for a 2016 subscription is \$2,875.00 / £1,855.00 / €2,500.00. *MRS Members*- Access to *MRS Advances* is available to all MRS members without charge.

Contact Details:

For all inquiries about pricing and access to MRS Advances, please get in touch via the following email addresses: online@cambridge.org (for the Americas); library.sales@cambridge.org (for UK, Europe, and rest of world).

journals.cambridge.org/adv

CONTENTS

Active Learning and Student Engagement via 3D Printing and Design: Integrating Undergraduate Research, Service Learning, and Cross-disciplinary Collaborations
Toward a New Model of Science Learning, Teaching, and Communication
Summer Research Placements – State-of-the-Art Science by pre-University Students
The Continuing Effort to Enhanced Learning of Mechanical Behavior of Materials via Combined Experiments and nanoHUB Simulations: Learning Modules for Sophomore MSE Students 3721 Aisling Coughlan, Heidi A. Diefes-Dux, Kerrie A. Douglas, Tanya A. Faltens, and David Johnson
Inspiring Online Collaborative STEM Learning
Laser Ablation Synthesis of Hybrid Copper/Silver Nanocolloids for Prospective Application as Nanoantimicrobial Agents for Food Packaging
Surface-functionalizing Metal, Metal Oxide and Semiconductor Nanocrystals with a Multi-coordinating Polymer Platform 3741 Wentao Wang, Xin Ji, Anshika Kapur, and Hedi Mattoussi
Aggregation of Phospholipid Based Vesicle Using Triblock Polymer

Treatment I. Zad	Kinetic in Si Nanowire FETs: Effect of Gamma Radiation
Nicol	d Electronic Transport in Silicon Nanotube Biosensors 3761 as Hibst, Annina M. Steinbach, teffen Strehle
Nanoparti Jordi Vanes María	bility of Protein Coatings on Poly Lactic co Glycolic cles
and Polyet Carcinoma	Sytotoxicities of Red-allotrope Selenium Nanoparticles hylene Glycol Towards Head and Neck Squamous Cell in Comparison to Human Dermal Fibroblasts 3775 topher Hassan and Thomas J. Webster
Immunolo	Interrogation using Optofluidic Platforms for Systems gy