

MRS

Advances

Biomaterials and Soft Materials

<https://doi.org/10.1557/adv.2016.210> Published online by Cambridge University Press

MRS

MATERIALS
RESEARCH
SOCIETY®

CAMBRIDGE
UNIVERSITY PRESS

MRS Advances: Biomaterials and Soft Materials

Associate Editor: Roger J. Narayan, *University of North Carolina/North Carolina State University*

Associate Editor: Frank W. DelRio, *National Institute of Standards and Technology*

Principal Editor: Darren J. Lipomi, *University of California-San Diego*

Principal Editor: Jie Zheng, *University of Akron*

Principal Editor: Clara Santato, *École Polytechnique-Montréal*

Principal Editor: Tao Deng, *Shanghai Jiao Tong University*

Principal Editor: Guillermo Ameer, *Northwestern University*

Principal Editor: Masaaki Nagatsu, *Shizuoka University*

Principal Editor: Andreas Lendlein, *Helmholtz-Zentrum Geesthacht GmbH*

Principal Editor: Sharon Gerecht, *John Hopkins University*

Principal Editor: Robert Sinclair, *Stanford University*

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*

MRS Editorial Office:

Ellen W. Kracht, *Publications Manager, Materials Research Society, Warrendale, PA*

Susan Dittrich, *Journals Editorial Assistant, Materials Research Society, Warrendale, PA*

Kirby L. Morris, *Journals Production Assistant, Materials Research Society, Warrendale, PA*

Eileen M. Kiley, *Director of Communications, Materials Research Society, Warrendale, PA*

MRS Advances (EISSN: 2059-8521) is published by Cambridge University Press, 32 Avenue of the Americas, New York, NY 10013-2473 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

* Non-covalent Tough Hydrogels for Functional Actuators	501
Jun Fu, Guorong Gao, and Yuanna Sun	
* Cartilage: Multiscale Structure and Biomechanical Properties	509
Ferenc Horkay, Peter J. Basser, Anne-Marie Hecht, and Erik Geissler	
3D/4D Printing Hydrogel Composites: A Pathway to Functional Devices	521
Shannon E. Bakarich, Robert Gorkin III, Sina Naficy, Reece Gately, Marc in het Panhuis, and Geoffrey M. Spinks	
3D Printed Edible Hydrogel Electrodes	527
Alex Keller, Leo Stevens, Gordon G. Wallace, and Marc in het Panhuis	
Influence of 4-vinylbenzylation on the Rheological and Swelling Properties of Photo-activated Collagen Hydrogels	533
Giuseppe Tronci, Colin A. Grant, Neil H. Thomson, Stephen J. Russell, David J. Wood	
Integration of a Glutamate Sensitive Genetically Encoded Sensor Protein into Photocrosslinkable Hydrogel Optrodes	539
Leyla N. Kahyaoglu and Jenna L. Rickus	
Clinically Applicable Self-healing Dental Resin Composites.	547
George Huyang and Jirun Sun	
Tubulin Nanorings	553
Hacène Boukari and Dan L. Sackett	
Using Bacteria to Make Improved, Nacre-inspired Materials.	559
Dominik T. Schmieden, Anne S. Meyer, and Marie-Eve Aubin-Tam	

*Invited Paper