

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

**Materials and Devices for
Smart Systems III**

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

**MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 1129**

Materials and Devices for Smart Systems III

Symposium held December 1–4, 2008, Boston, Massachusetts, U.S.A.

EDITORS:

Ji Su (acting Editor)

NASA Langley Research Center
Hampton, Virginia, U.S.A.

Li-Peng Wang

TricornTech Corporation
San Jose BioCenter
San Jose, California, U.S.A.

Yasubumi Furuya

Hirosaki University
Hirosaki, Japan

Susan Trolier-McKinstry

The Pennsylvania State University
University Park, Pennsylvania, U.S.A.

Jinsong Leng

Harbin Institute of Technology
Harbin, China



Materials Research Society
Warrendale, Pennsylvania

Cambridge University Press
978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials
Research Society Symposium Proceedings: Volume 1129
Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng
Frontmatter
[More information](#)

CAMBRIDGE UNIVERSITY PRESS
Cambridge, New York, Melbourne, Madrid, Cape Town,
Singapore, São Paulo, Delhi, Mexico City

Cambridge University Press
32 Avenue of the Americas, New York NY 10013-2473, USA

Published in the United States of America by Cambridge University Press, New York

www.cambridge.org
Information on this title: www.cambridge.org/9781107408418

Materials Research Society
506 Keystone Drive, Warrendale, PA 15086
<http://www.mrs.org>

© Materials Research Society 2009

This publication is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without the written
permission of Cambridge University Press.

This publication has been registered with Copyright Clearance Center, Inc.
For further information please contact the Copyright Clearance Center,
Salem, Massachusetts.

First published 2009
First paperback edition 2012

Single article reprints from this publication are available through
University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, MI 48106

CODEN: MRSPDH

ISBN 978-1-107-40841-8 Paperback

Cambridge University Press has no responsibility for the persistence or
accuracy of URLs for external or third-party internet websites referred to in
this publication, and does not guarantee that any content on such websites is,
or will remain, accurate or appropriate.

This work was supported in part by the Army Research Office under
Grant Number W911NF-09-1-0053. The views, opinions, and/or findings
contained in this report are those of the author(s) and should not be construed
as an official Department of the Army position, policy, or decision,
unless so designated by other documentation.

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

CONTENTS

Preface	xiii
Acknowledgments	xv
Materials Research Society Symposium Proceedings	xvi

FERROELECTRICS AND PIEZOELECTRICS

* Ferroelectric Random Access Memory as a Non-Volatile Cache Solution in a Multimedia Storage System	3
Dong Jin Jung and Kinam Kim	
Harmonic Analysis of AlN Piezoelectric Mesa Structures	15
Madhulika Mazumdar, A. Kabulski, R. Farrell, Sridhar Kuchibhatla, V.R. Pagán, and D. Korakakis	
Erbium Alloyed Aluminum Nitride Films for Piezoelectric Applications	21
A. Kabulski, V.R. Pagán, and D. Korakakis	
Piezoelectric Response of Lanthanum Doped Lead Zirconate Titanate Films for Micro Actuators Application	27
Takashi Iijima, Bong-Yeon Lee, and Seiji Fukuyama	
Wireless Remote 2-D Strain Sensor Using SAW Delay Line	33
Toru Nomura and Atushi Saitoh	
Growth of Epitaxial Pb(Zr,Ti)O₃ Thick Films on (100)CaF₂ Substrates with Perfect Polar-Axis-Orientation and Their Electrical and Mechanical Property Characterization	39
Takashi Fujisawa, Hiroshi Nakaki, Rikyu Ikariyama, Mitsumasa Nakajima, Tomoaki Yamada, Mutsuo Ishikawa, Hitoshi Morioka, Takashi Iijima, and Hiroshi Funakubo	

*Invited Paper

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)*NANO-MATERIALS AND NANO-FABRICATION*

Investigation of the Crystalline Orientations and Substrates Dependence on Mechanical Properties of PZT Thin Films by Nanoindentation.....	47
Dan Liu, Sang H. Yoon, Bo Zhou, Barton C. Prorok, and Dong-Joo Kim	
Carbon Nanofiber-Network Sensor Films for Strain Measurement in Composites.....	53
Nguyen Q. Nguyen, Sangyoon Lee, and Nikhil Gupta	
Absorption-Induced Deformations of Nanofiber Yarns and Webs.....	61
Daria Monaenkova, Taras Andruk, and Konstantin G. Kornev	
Study of the Conduction Mechanism and the Electrical Response of Strained Nano-Thin 3C-SiC Films on Si Used as Surface Sensors.....	67
Ronak Rahimi, Christopher M. Miller, Alan Munger, Srikanth Raghavan, C.D. Stinespring, and D. Korakakis	
Electrical and Optical Properties of Gold-Strontium Titanate Nano-Composite Thin Films.....	73
S. Ganti, Y. Dhopade, Ram Gupta, K. Ghosh, and P.K. Kahol	
Pb(Zr,Ti)O₃ Nanofibers Produced by Electrospinning Process.....	79
Ebru Mensur Alkoy, Canan Dagdeviren, and Melih Papila	
Thermal, Mechanical, and Electric Properties of Exfoliated Graphite Nanoplate Reinforced Poly(vinylidene fluoride) Nanocomposites.....	85
Fuan He and Jintu Fan	
Controlled Assemble and Microfabrication of Zeolite Particles on SiO₂ Substrates for Potential Biosensor Applications.....	91
Seckin Ozturk, Kubra Kamisoglu, Rasit Turan, and Burcu Akata	

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

6 Watt Segmented Power Generator Modules Using Bi_2Te_3 and $(\text{InGaAs})_{1-x}(\text{InAlAs})_x$ Elements Embedded with ErAs Nanoparticles 97

Gehong Zeng, Je-Hyeong Bahk, Ashok T. Ramu,
John E. Bowers, Hong Lu, Arthur C. Gossard,
Zhixi Bian, Mona Zebarjadi, and Ali Shakouri

Multiple Duplication of Electroformed Nano-Ni Stamps From Si Mother Mold 103

Si-Hyeong Cho, Jung-Ki Lee, Jung-Ho Seo,
Hyun-Woo Lim, and Jin-Goo Park

***SHAPE MEMORY ALLOYS AND
MAGNETO-MATERIALS***

*** Microstructures and Enhanced Properties of SPD-Processed TiNi Shape Memory Alloy 113**

Koichi Tsuchiya, Masato Ohnuma,
Kiyomi Nakajima, Tadahiro Koike,
Yasufumi Hada, Yoshikazu Todaka,
and Minoru Umemoto

Sensing Shape Recovery Using Conductivity Noise in Thin Films of NiTi Shape Memory Alloys 125

U. Chandni, M.V. Manjula, Arindam Ghosh,
H.S. Vijaya, and S. Mohan

Magnetoelastic Material as a Biosensor for the Detection of Salmonella Typhimurium 131

Ramji S. Lakshmanan, Rajesh Guntupalli,
S. Huang, M.L. Johnson, Leslie C. Mathison,
I-Hsuan Chen, V.A. Petrenko, Zhong-Yang Cheng,
and B.A. Chin

Multiple Phage-Based Magnetoelastic Biosensors System for the Detection of *Salmonella typhimurium* and *Bacillus anthracis* Spores 137

S. Huang, S. Li, H. Yang, M.L. Johnson,
Ramji S. Lakshmanan, I.-H. Chen,
V.A. Petrenko, J.M. Barbaree, and B.A. Chin

*Invited Paper

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

Magnetostrictive Fe-Ga Wires with <100> Fiber Texture.....	143
Shannon P. Farrell, Patti E. Quigley, Kyle J. Avery, Tim D. Hatchard, Richard A. Dunlap, and Stephanie E. Flynn	
Hysteresis in Temperature- and Magnetic Field- Induced Martensitic Phase Transitions in Ni-Mn-Sn Heusler Alloys	149
Patrick Shamberger and Fumio Ohuchi	
Shape Memory Actuation by Resistive Heating in Polyurethane Composites of Carbonaceous Conductive Fillers.....	155
I. Sedat Gunes, Guillermo A. Jimenez, and Sadhan C. Jana	
Numerical Study on Fretting Fatigue Life of NiTi Shape Memory Alloys.....	161
Xiao Xue Wang and Rong Qiao Wang	
Rapid-Solidified Magnetostrictive Polycrystalline Strong-Textured Galfenol (Fe-Ga) Alloy and Its Applications for Micro Gas-Valve.....	169
Yasubumi Furuya, Chihiro Saito, Masamune Tanaka, and Teiko Okazaki	
Development of Fe-Ga-Al Based Alloys with Large Magnetostriction and High Strength by Precipitation Hardening of the Dispersed Carbides	175
Toshiya Takahashi, Teiko Okazaki, and Yasubumi Furuya	

ACTIVE POLYMERS AND SOFT MATTERS

* Durable Dielectric Elastomer Actuators via Self-Clearable Compliant Electrode Materials	183
Qibing Pei, Wei Yuan, and Tuling Lam	
Bending Behavior of Polymer Films in Strongly Interacting Solvents	191
Jianxia Zhang and John Wiley	

*Invited Paper

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

Formation of Wrinkle Patterns on Porous Elastomeric Membrane and Their Fabrication of Hierarchical Architectures	197
Yue Cui and Shu Yang	
Cross Linkable Phosphorescent Polymer-LEDs Based on a Soluble New Iridium Complex ((Btp)₂Ir(III)(acac)-Ox)	203
Young-Jun Yu, Olga Solomeshch, Vladislav Medvedev, Alexey Razin, Nir Tessler, Kyu-Nam Kim, Dong Hoon Choi, and Jung-Il Jin	
Variable Thickness IPMC: Capacitance Effect on Energy Harvesting	213
Rashi Tiwari, Sang-Mun Kim, and Kwang Kim	
Preparation of Asymmetric Thermosensitive Double-Layer Gel	225
Takashi Iizawa and Akihiro Terao	
Rheology and Electrorheology of Nanorod-Loaded Liquid Crystalline Polymers	231
Ana R. Cameron-Soto, Sonia L. Aviles-Barreto, and Aldo Acevedo-Rullan	
Cellulose Electroactive Paper (EAPap): The Potential for a Novel Electronic Material	237
Joo-Hyung Kim, Kwangsun Kang, Sungryul Yun, Sangyeul Yang, Min-Hee Lee, Jung-Hwan Kim, and Jaehwan Kim	
Shape-Memory Polymer Composite and Its Application	243
Yanju Liu, Haibao Lu, Jinsong Leng, and Shanyi Du	

**OTHER MATERIALS, DEVICES AND
CHARACTERIZATION**

* Development of Multifunctional Structural Material Systems by Innovative Design and Processing	251
Hiroshi Asanuma, Jun Kunikata, and Mitsuhiro Kibe	

*Invited Paper

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

Finite Element Analysis of Aluminum Nitride Bimorph Actuators — The Influence of Contact Geometry and Position.....	263
V.R. Pagán and D. Korakakis	
In-Plane Poisson's Ratio Measurement Method for Thin Film Materials by On-Chip Bending Test with Optical Interference Image Analysis.....	269
Mitsuhiro Tanaka, Takahiro Namazu, and Shozo Inoue	
* RF Microwave Switches Based On Reversible Metal-Semiconductor Transition Properties of VO₂ Thin Films: An Attractive Way To Realise Simple RF Microelectronic Devices.....	275
Frederic Dumas-Bouchiat, Corinne Champeaux, Alain Catherinot, Julien Givernaud, Aurelian Crunteanu, and Pierre Blondy	
Microstructure and Service Life of Silver Copper Oxide Contact Materials After Reactive Synthesis Fabrication and Severe Plastic Deformation.....	287
XiaoLong Zhou, Jingchun Cao, Jialing Sun, Jingchao Chen, Yan Du, and Kunhua Zhang	
Temperature Dependent SPR Study of ZnO Thin Film.....	293
Shibu Saha, K. Sreenivas, and Vinay Gupta	
* Metal Hydride Fluidic Artificial Muscle Actuation System.....	299
Alexandra Vanderhoff and Kwang Kim	
Mechanical Characteristics of Al-Si-Cu Structural Films by Uniaxial Tensile Test with Elongation Measurement Image Analysis.....	311
Hiroyuki Fujii, Takahiro Namazu, Yasushi Tomizawa, and Shozo Inoue	
Optical Fiber Loop-Sensors for Structural Health Monitoring of Composites.....	317
Nguyen Q. Nguyen and Nikhil Gupta	

*Invited Paper

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

Controlled Synthesis and Structure-Property Correlations in Vanadium Based Oxides.....	325
Tsung-Han Yang, Wei Wei, Chuming Jin, and Jagdish Narayan	
Properties of Intermetallic Compound Joint Made From Evaporated Ag/Cu/Sn Films.....	335
Toshihide Takahashi, Shuichi Komatsu, and Tatsuoki Kono	
Conformal Passive Sensors for Wireless Structural Health Monitoring	341
Sharavanan Balasubramaniam, Jung-Rae Park, Tarisha Mistry, Niwat Angkawisittpan, Alkim Akyurtlu, Tenneti Rao, and Ramaswamy Nagarajan	
Microstructure Characterization of Thin Structures After Deformation	349
Sabine Weiss, Tim Schnauber, and Alfons Fischer	
Author Index.....	355
Subject Index.....	359

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

PREFACE

This volume is a record of Symposium V, “Materials, Devices, and Characterization for Smart Systems,” held December 1–4 at the 2008 MRS Fall Meeting in Boston, Massachusetts. This symposium is the third MRS symposium on the rapidly developing research field of materials and devices for smart systems; the successful first and second were held by the Materials Research Society at the 2003 Fall Meeting and the 2005 Fall Meeting, respectively. These symposia have functioned as a bridge to connect new development and achievements in the areas of smart materials, sensing and actuating devices, and intelligent/smart systems. They have also provided a public forum for communication and have enhanced the cooperation among the researchers from related disciplines to build an interdisciplinary research field and community.

Smart/intelligent systems have been recognized as one of the primary and critical technologies for the present and the future. They are demanded in every facet of applications: from everyday life to space exploration missions, from civilian products to military needs, from robots to information technology (IT)/communication technology, etc. Smart devices are fundamental components to realize smart systems. Smart materials are the critical foundation for high-performance smart devices. Materials, devices, and systems cannot be separated. The right way to achieve significant progress in this field is to conduct research as a coherent interdisciplinary field.

The organizers hope this effort will keep inspiring future cooperative and interdisciplinary research and promoting applications of Smart Materials And Related Technologies (SMART).

Ji Su (acting Editor)
Li-Peng Wang
Yasubumi Furuya
Susan Trolier-McKinstry
Jinsong Leng

February 2009

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)

ACKNOWLEDGMENTS

The organizers would like to take this opportunity to thank the U.S. Army Research Office (ARO), and the Hirosaki University, Japan, for funding the symposium. The organizers would also like to thank the following people for their help with the manuscript peer-review process and/or for serving as symposium technical session chairs, and/or for presenting invited presentations. We are grateful to them for volunteering their time and expertise, which contributed significantly to the success of the symposium and to the quality of the proceedings.

Hiroshi Asanuma (Japan)
Jayasimha Atulasimha (USA)
Frederic Dumas-Bouchiat (France)
Shanyi Du (China)
Kwang Kim (USA)
Qing Ma (USA)
Esashi Masayoshi (Japan)
Shuichi Miyazaki (Japan)
Paul Mulvaney (Australia)
Paul Murali (Switzerland)
Qibing Pei (USA)
Ramamoorthy Ramesh (USA)
Koukou Suu (Japan)
Ichiro Takeuchi (USA)
Koichi Tsuchiya (Japan)
Baoliang Wang (Norway)

The organizers are grateful to the 2008 MRS Fall Meeting Chairs, especially Dr. Young-Chang Joo for his encouragement and support, and to the MRS staff for their help in preparing this proceedings volume.

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)**MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS**

- Volume 1108 — Performance and Reliability of Semiconductor Devices, M. Mastro, J. LaRoche, F. Ren, J-I. Chyi, J. Kim, 2009, ISBN 978-1-60511-080-6
- Volume 1109E — Transparent Conductors and Semiconductors for Optoelectronics, J.D. Perkins, T.O. Mason, J.F. Wager, Y. Shigesato, 2009, ISBN 978-1-60511-081-3
- Volume 1110E — Theory and Applications of Ferroelectric and Multiferroic Materials, M. Dawber, 2009, ISBN 978-1-60511-082-0
- Volume 1111 — Rare-Earth Doping of Advanced Materials for Photonic Applications, V. Dierolf, Y. Fujiwara, U. Hommerich, P. Ruterana, J. Zavada, 2009, ISBN 978-1-60511-083-7
- Volume 1112 — Materials and Technologies for 3-D Integration, F. Roozeboom, C. Bower, P. Garrou, M. Koyanagi, P. Ramm, 2009, ISBN 978-1-60511-084-4
- Volume 1113E — Low-Cost Solution-Based Deposition of Inorganic Films for Electronic/Photonic Devices, D.B. Mitzi, D. Ginley, B. Smarsly, D.V. Talapin, 2009, ISBN 978-1-60511-085-1
- Volume 1114E — Organic and Hybrid Materials for Large-Area Functional Systems, A. Salleo, A.C. Arias, D.M. DeLongchamp, C.R. Kagan, 2009, ISBN 978-1-60511-086-8
- Volume 1115 — Physics and Technology of Organic Semiconductor Devices, M. Baldo, A. Kahn, P.W.M. Blom, P. Peumans, 2009, ISBN 978-1-60511-087-5
- Volume 1116E — Reliability and Properties of Electronic Devices on Flexible Substrates, J.R. Greer, J. Vlassak, J. Daniel, T. Tsui, 2009, ISBN 978-1-60511-088-2
- Volume 1117E — Materials Science for Quantum Information Processing Technologies, M. Fanciulli, J. Martinis, M. Eriksson, 2009, ISBN 978-1-60511-089-9
- Volume 1118E — Magnetic Nanostructures by Design, J. Shen, Z. Bandic, S. Sun, J. Shi, 2009, ISBN 978-1-60511-090-5
- Volume 1119E — New Materials with High Spin Polarization and Their Applications, C. Felser, A. Gupta, B. Hillebrands, S. Wurmehl, 2009, ISBN 978-1-60511-091-2
- Volume 1120E — Energy Harvesting—Molecules and Materials, D.L. Andrews, K.P. Ghiggino, T. Goodson III, A.J. Nozik, 2009, ISBN 978-1-60511-092-9
- Volume 1121E — Next-Generation and Nano-Architecture Photovoltaics, V.G. Stoleru, A.G. Norman, N.J. Ekins-Daukes, 2009, ISBN 978-1-60511-093-6
- Volume 1122E — Structure/Property Relationships in Fluorite-Derivative Compounds, K.E. Sickafus, A. Navrotsky S.R. Phillpot, 2009, ISBN 978-1-60511-094-3
- Volume 1123 — Photovoltaic Materials and Manufacturing Issues, B. Sopori, J. Yang, T. Surek, B. Dimmler, 2009, ISBN 978-1-60511-095-0
- Volume 1124 — Scientific Basis for Nuclear Waste Management XXXII, R.B. Rebak, N.C. Hyatt, D.A. Pickett, 2009, ISBN 978-1-60511-096-7
- Volume 1125 — Materials for Future Fusion and Fission Technologies, C.C. Fu, A. Kimura, M. Samaras, M. Serrano de Caro, R.E. Stoller, 2009, ISBN 978-1-60511-097-4
- Volume 1126 — Solid-State Ionics—2008, E. Traversa, T. Armstrong, K. Eguchi, M.R. Palacin, 2009, ISBN 978-1-60511-098-1
- Volume 1127E — Mobile Energy, M.C. Smart, M. Nookala, G. Amaratunga, A. Nathan, 2009, ISBN 978-1-60511-099-8
- Volume 1128 — Advanced Intermetallic-Based Alloys for Extreme Environment and Energy Applications, M. Palm, Y-H. He, B.P. Bewlay, M. Takeyama, J.M.K. Wiezorek, 2009, ISBN 978-1-60511-100-1
- Volume 1129 — Materials and Devices for Smart Systems III, J. Su, L-P. Wang, Y. Furuya, S. Trolier-McKinstry, J. Leng, 2009, ISBN 978-1-60511-101-8
- Volume 1130E — Computational Materials Design via Multiscale Modeling, H.E. Fang, Y. Qi, N. Reynolds, Z-K. Liu, 2009, ISBN 978-1-60511-102-5
- Volume 1131E — Biomineral Interfaces—From Experiment to Theory, J.H. Harding, J.A. Elliott, J.S. Evans, 2009, ISBN 978-1-60511-103-2

Cambridge University Press

978-1-107-40841-8 - Materials and Devices for Smart Systems III: Materials

Research Society Symposium Proceedings: Volume 1129

Editors: Ji Su, Li-Peng Wang, Yasubumi Furuya, Susan Trolier-McKinstry and Jinsong Leng

Frontmatter

[More information](#)**MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS**

- Volume 1132E —Mechanics of Biological and Biomedical Materials, R. Narayan, K. Katti, C. Hellmich, U.G.K. Wegst, 2009, ISBN 978-1-60511-104-9
- Volume 1133E —Materials for Optical Sensors in Biomedical Applications, D. Nolte, P. Kiesel, X. Fan, G. Hong, 2009, ISBN 978-1-60511-105-6
- Volume 1134 — Polymer-Based Smart Materials—Processes, Properties and Application, Z. Cheng, Q. Zhang, S. Bauer, D.A. Wroblewski, 2009, ISBN 978-1-60511-106-3
- Volume 1135E —Design, Fabrication, and Self Assembly of "Patchy" and Anisometric Particles, E. Luijten, S.C. Glotzer, F. Sciortino, 2009, ISBN 978-1-60511-107-0
- Volume 1136E —Materials in Tissue Engineering, T. Webster, 2009, ISBN 978-1-60511-108-7
- Volume 1137E —Nano- and Microscale Materials—Mechanical Properties and Behavior under Extreme Environments, A. Misra, T.J. Balk. H. Huang, M.J. Caturla, C. Eberl, 2009, ISBN 978-1-60511-109-4
- Volume 1138E —Nanofunctional Materials, Structures and Devices for Biomedical Applications, L. Nagahara, T. Thundat, S. Bhatia, A. Boisen, K. Kataoka, 2009, ISBN 978-1-60511-110-0
- Volume 1139 — Microelectromechanical Systems—Materials and Devices II, S.M. Spearing, S. Vengallatore, J. Bagdahn, N. Sheppard, 2009, ISBN 978-1-60511-111-7
- Volume 1140E —Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging, V.P. Shastri, A. Lendlein, L.S. Liu, S. Mitragotri, A. Mikos, 2009, ISBN 978-1-60511-112-4
- Volume 1141E —Bio-Inspired Transduction, Fundamentals and Applications, T. Vo-Dinh, C. Liu, A. Zribi, Y. Zhao, 2009, ISBN 978-1-60511-113-1
- Volume 1142 — Nanotubes, Nanowires, Nanobelts and Nanocoils—Promise, Expectations and Status, P. Bandaru, S. Grego, I. Kinloch, 2009, ISBN 978-1-60511-114-8
- Volume 1143E —Transport Properties in Polymer Nanocomposites, J. Grunlan, M. Ellsworth, S. Nazarenko, J.F. Feller, B. Pivovar, 2009, ISBN 978-1-60511-115-5
- Volume 1144 — Nanowires—Synthesis, Properties, Assembly and Applications, Y. Cui, E.P.A.M. Bakkers, L. Lahun, A. Talin, 2009, ISBN 978-1-60511-116-2
- Volume 1145E —Applications of Group IV Semiconductor Nanostructures, T. van Buuren, L. Tsybeskov, S. Fukatsu, L. Dal Negro, F. Gourbilleau, 2009, ISBN 978-1-60511-117-9
- Volume 1146E —*In Situ* Studies across Spatial and Temporal Scales for Nanoscience and Technology, S. Kodambaka, G. Rijnders, A. Petford-Long, A. Minor, S. Helveg, A. Ziegler, 2009, ISBN 978-1-60511-118-6
- Volume 1147E —Grazing-Incidence Small-Angle X-Ray Scattering, B. Ocko, J. Wang, K. Ludwig, T.P. Russell, 2009, ISBN 978-1-60511-119-3
- Volume 1148E —Solid-State Chemistry of Inorganic Materials VII, P.M. Woodward, J.F. Mitchell, S.L. Brock, J.S.O. Evans, 2009, ISBN 978-1-60511-120-9
- Volume 1149E —Synthesis and Processing of Organic and Polymeric Functional Materials for a Sustainable Energy Economy, J. Li, C-C. Wu, S.Y. Park, F.B. McCormick, 2009, ISBN 978-1-60511-121-6
- Volume 1150E —Artificially Induced Grain Alignment in Thin Films, V. Matias, R. Hammond, S-H. Moon, R. Hühne, 2009, ISBN 978-1-60511-122-3
- Volume 1151E —Selecting and Qualifying New Materials for Use in Regulated Industries, R. Rogge, J. Theaker, C. Hubbard, R. Schneider, 2009, ISBN 978-1-60511-123-0
- Volume 1152E —Local Structure and Dynamics in Amorphous Systems, Jeff Th.M. de Hosson, A.L. Greer, C.A. Volkert, K.F. Kelton, 2009, ISBN 978-1-60511-124-7

Prior Materials Research Society Symposium Proceedings available by contacting Materials Research Society