

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter

[More information](#)

**Advances in Material Design
for Regenerative Medicine,
Drug Delivery and
Targeting/Imaging**

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter

[More information](#)

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter

[More information](#)

**MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 1140**

**Advances in Material Design
for Regenerative Medicine,
Drug Delivery and
Targeting/Imaging**

Symposium held December 1–3, 2008, Boston, Massachusetts, U.S.A.

EDITORS:

V. Prasad Shastri

Albert-Ludwigs University of Freiburg
Freiburg, Germany

Andreas Lendlein

GKSS Research Centre Geesthacht GmbH
Teltow, Germany

LinShu Liu

U.S. Department of Agriculture
Wyndmoor, Pennsylvania, U.S.A.

Antonios Mikos

Rice University
Houston, Texas, U.S.A.

Samir Mitragotri

University of California - Santa Barbara
Santa Barbara, California, U.S.A.



Materials Research Society
Warrendale, Pennsylvania

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
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/9781107408388

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 978-1-107-40838-8 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.

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri

Frontmatter

[More information](#)

Prefacexi

Materials Research Society Symposium Proceedings..... xiii

***MATERIALS IN
REGENERATIVE MEDICINE***

**Dual and Triple Shape Capability of AB Polymer
Networks Based on Poly(ϵ -caprolactone)dimethacrylates3**
Marc Behl, Ingo Bellin, Steffen Kelch,
Wolfgang Wagermaier, and Andreas Lendlein

*** Bioreactor Systems in Regenerative Medicine: From
Basic Science to Biomanufacturing9**
Elia Piccinini, David Wendt, and Ivan Martin

**Shape-Memory Properties of Multiblock Copolymers
Consisting of Poly(ω -pentadecalactone) Hard Segments
and Crystallizable Poly(ϵ -caprolactone) Switching
Segments17**
Karl Kratz, Ulrike Voigt, Wolfgang Wagermaier,
and Andreas Lendlein

**Different Macrophage Responses on Hydrophilic and
Hydrophobic Carbon Nanotubes.....23**
Young Wook Chun, Dongwoo Khang, and
Thomas Webster

***MACROMOLECULAR DRUG/LIPID
INTERACTION***

**Triterpene Saponin Glycosides: A New Class of Chemical
Penetration Enhancers29**
Christopher Pino and V. Prasad Shastri

**Computational Modeling of Anionic and Zwitterionic
Lipid Bilayers for Investigating Surface Activities of
Bioactive Molecules37**
Jutarat Pimthon, Regine Willumeit,
Andreas Lendlein, and Dieter Hofmann

*Invited Paper

Cambridge University Press
978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140
Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter
[More information](#)

**Triterpene Saponin Glycosides Impact the Percutaneous
Delivery of Water Soluble Drugs.....43**
Christopher J. Pino, Michael A. Scherer,
Chenxia M. Guan, and V. Prasad Shastri

(NANO)MATERIALS IN DRUG DELIVERY

Nanostructured Ceramic Coatings for Drug Delivery51
Karin Dittmar, Arnaud Tourvieille de Labrouhe,
Laurent-Dominique Piveteau, and Heinrich Hofmann

**Encapsulation of Biomolecular Therapeutics Into Degradable
Polymer Capsules.....59**
Siow-Feng Chong, Alisa Becker, Alexander N. Zelikin,
and Frank Caruso

**Surface Engineering for *in vivo* Targeting Delivery of siRNA
for Efficient Cancer Therapy.....65**
Oleh Taratula, Paul Kirkpatrick, Ronak Savla,
Ipsit Pandya, Tamara Minko, and Huixin He

**Antisense Oligonucleotides Delivery to Antigen Presenting
Cells by Using Schizophyllan73**
Shinichi Mochizuki, Jusaku Minari, and Kazuo Sakurai

**Cytotoxicity and Biological Effects of Functional
Nanomaterials Delivered to Various Cell Lines79**
Meena W. Mahmood, Enkeleda Dervishi, Yang Xu,
Zhongrui Li, Mustafa Z. Abd Al-Muhsen, Nawab Ali,
Morgan Whitlow, and Alexandru S. Biris

**Nanoparticle-Tagged Perfluorocarbon Droplets for
Medical Imaging87**
Naomi Matsuura, Ivan Gorelikov, Ross Williams,
Kelvin Wan, Siqi Zhu, James Booth, Peter Burns,
Kullervo Hynynen, and John A. Rowlands

**Novel Superparamagnetic Iron Oxide Nanoparticles
for a Multifunctional Nanomedicine Platform.....93**
Oleh Taratula, Ronak Savla, Ipsit Pandya,
Andrew Wang, Tamara Minko, and Huixin He

Functionalized Magnetic Nanoparticles for Selective Targeting of Cells.....99
Wolfgang Tremel, Mohammed I. Shukoor,
Filipe Natalio, Muhammad N. Tahir, Matthias Wiens,
Thomas Schladt, Matthias Barz, Patrick Theato,
Heinz C. Schröder, and Werner Müller

Delivery of Doxorubicin to Solid Tumors Using Thermosensitive Liposomes 105
Elizaveta V. Tazina, Alevtina P. Polozkova,
Elena V. Ignatieva, Olga L. Orlova,
Valeria V. Mescherikova, Adolf A. Wainson,
Natalia A. Oborotova, and Anatoliy Y. Baryshnikov

Iron Oxide Magnetic Nanoparticles for Treating Bone Diseases 111
Nhiem Tran, Rajesh Pareta, and
Thomas J. Webster

Raman Spectroscopy of Defected Griseofulvin in Powders and Films 117
Anna Zarow, William Wagner, Eunah Lee, Fran Adar,
Bo B. Zhou, Rodolfo Pinal, and Zafar Iqbal

***HYDROGELS AND
MATERIAL-TISSUE INTERACTIONS***

*** Control of Adult Stem Cell Function in Bioengineered in vitro Niches 125**
Matthias P. Lutolf and Helen M. Blau

Hyaluronic Acid-Gelatin Fibrous Scaffold Produced by Electrospinning of Their Aqueous Solution for Tissue Engineering Applications 131
Ying Liu, Richard A. Clark, Lei Huang, and
Miriam H. Rafailovich

Modified Alginate for Biomedical Applications 137
Soumitra Choudhary, Jason Reck, and
Surita R. Bhatia

*Invited Paper

Cambridge University Press
978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140
Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter
[More information](#)

Tissue Integration of Two Different Shape-Memory Polymers with Poly(ϵ -Caprolactone) Switching Segment in Rats 143
Bernhard Hiebl, Dorothee Rickert, Rosemarie Fuhrmann, Friedrich Jung, Andreas Lendlein, and Ralf-Peter Franke

Development and Characterization of a Novel Elastin Hydrogel 151
Nasim Annabi, Suzanne M. Mithieux, Anthony S. Weiss, and Fariba Dehghani

Skin-External Device Integration Using Porous Cationic poly(DMAA-co-AMTAC) Hydrogels 157
Antonio Peramo, Joong Hwan Bahng, Cynthia Marcelo, Nick Kotov, and David Martin

Designing Enzyme-Triggered Hydrogels for Biomedical Applications Using Self-Assembling Octapeptides 163
Elisabeth Vey, Alberto Saiani, and Aline F. Miller

Platelet Response on poly(D,L -lactide-co-glycolide) (PLGA) Film with Nano-Structured Fillers 169
Li Buay Koh, Isabel Rodriguez, and Subbu S. Venkatraman

Electro-Wetting and ArF Excimer Laser Induced Photochemical Surface Modification of Hydrophilic and Hydrophobic Micro-Domain Structure on IOL Surface for Blocking After Cataract 177
Yuji Sato, Kenji Kawai, Mikio Sasoh, Hiroaki Ozaki, Takeo Ohki, Hiroshi Shiota, and Masataka Murahara

***SYNTHESIS AND CHARACTERIZATION
OF NANOMATERIALS FOR
BIOMEDICAL APPLICATIONS***

Controlled Actuation of Shape-Memory Nanocomposites by Application of an Alternating Magnetic Field 185
Muhammad Y. Razzaq, Marc Behl, Karl Kratz, and Andreas Lendlein

Cambridge University Press
978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140
Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter
[More information](#)

**Magnetron-Sputtered Zinc-Doped Hydroxyapatite Thin Films
for Orthopedic Applications191**
Patrick Marti, Zoe Barber, Roger Brooks, Neil Rushton,
and Serena Best

Active Cooperative Assemblies Towards Nanocomposites197
Muhammet S. Toprak, Carmen Vogt, and
Abhilash Sugunan

**Poly(vinylidene fluoride) Electrospun Fibers for
Electroactive Scaffold Applications: Influence of the
Applied Voltage on Morphology and Polymorphism203**
Vitor Sencadas, José Carlos Rodríguez Hernández,
Clarisse Ribeiro, José Luis Gómez Ribelles, and
Senentxu Lanceros-Mendez

**Optimized Synthetic Route for Tuneable Shell
SiO₂@Fe₃O₄ Core-Shell Nanoparticles209**
Carmen Vogt, Muhammet S. Toprak,
Jingwen Shi, Neus F. Torres, Bengt Fadeel,
Sophie Laurent, Jean-Luc Bridot,
Robert N. Müller, and Mamoun Muhammed

**Improved Mechanical Properties of Nanocrystalline
Hydroxyapatite Coating for Dental and Orthopedic
Implants.....215**
Wenping Jiang, Jiping Cheng, Dinesh K. Agrawal,
Ajay Malshe, and Huinan Liu

Author Index221

Subject Index.....223

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter

[More information](#)

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri

Frontmatter

[More information](#)

PREFACE

Many of the major breakthroughs and paradigm shifts in medicine to date have occurred due to innovations and materials and/or application/implementation of materials in clinical medicine. Artificial heart valves, implantable cardiac devices, limb prosthesis, cardiovascular stents, orthopaedic implants, and artificial skin are just a few examples of the numerous applications of materials science in modern-day medicine. The past two decades have seen the emergence of some of the most exciting avenues for innovation in clinical medicine, with materials as its core and include: sustained drug delivery systems, gene therapy, regenerative therapies, and targeting technologies primarily for imaging and tumor targeting.

Symposium HH, “Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging,” held December 1–3 at the 2008 MRS Fall Meeting in Boston, Massachusetts, covered a wide range of topics related to these various aspects of Regenerative Medicine. Session topics of this symposium included smart and active materials, controlling stem cell function, harnessing the potential of cell-based therapies in Regenerative Medicine, translation research, novel biomaterials and nano-scale systems for imaging and controlling cell function, biomaterials for drug delivery with an emphasis on intra cellular delivery and transdermal delivery, and engineered materials for gene delivery. This proceedings contains 33 peer-reviewed papers presented at the Fall Meeting, giving a representative cross-section of this great symposium.

The highlight of the symposium were the two sessions in honor of Prof. Robert Langer, Institute Professor at MIT, on the occasion of his 60th birthday, to recognize his contributions to the areas of biomaterials, drug delivery and tissue engineering. These sessions featured leaders in various highly interdisciplinary topics including two Nobel laureates and several members of national academies. Prof. Langer presented recent advances in novel biomaterials that can effectively deliver si-RNA and scaffolds that can promote spinal cord repair in primates. He also shared recent findings on the development of biomaterial niches for stem cell differentiation, a topic that was also discussed at length by Prof. Helen Blau. The role of material properties in controlling the fate of stem cells in various lineages including neurons was presented by Prof. Discher. Nobel Laureate Prof. Giaever discussed the challenges in commercializing laboratory science, and Nobel Laureate Prof. Grubbs discussed the development of new polymers for drug delivery based on ring-opening metathesis polymerization. Profs. Martin and Mooney detailed materials-based strategies to implement cell-based therapies into the clinic. The engineering of novel materials from non-natural amino acids with unique degradation behavior, with utility in corneal epithelial regeneration, was discussed by Prof. Tirrell. At the conclusion of the two special sessions and directly before his talk, Prof. Langer was awarded the inaugural Acta Biomaterialia Gold Medal to a rousing applause from the audience, for his contributions to the development of biomaterials. Other notable presentations

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri
Frontmatter

[More information](#)

included the development of novel polymers for imaging inflammation by Prof. Murthy, biomaterial-stem cell interactions by Prof. Hermanson, and the utility of CNT's in gene delivery by Paul Cherukuri.

We kindly acknowledge financial support for this symposium from Abbott Vascular, US Department of Agriculture, and GKSS Research Centre Geesthacht GmbH.

V. Prasad Shastri
Andreas Lendlein
LinShu Liu
Antonios Mikos
Samir Mitragotri

June 2009

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri

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. Trolor-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 — Biomimetic Interfaces—From Experiment to Theory, J.H. Harding, J.A. Elliott, J.S. Evans, 2009, ISBN 978-1-60511-103-2

Cambridge University Press

978-1-107-40838-8 - Advances in Material Design for Regenerative Medicine, Drug Delivery and Targeting/Imaging: Materials Research Society Symposium Proceedings: Volume 1140

Editors: V. Prasad Shastri, Andreas Lendlein, LinShu Liu, Antonios Mikos and Samir Mitragotri

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. Caturia, 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. Sparing, 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. Lauhon, 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