

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

Frontmatter

[More information](#)

**Multiscale Phenomena in
Materials—Experiments and
Modeling Related to
Mechanical Behavior**

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

Frontmatter

[More information](#)

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22–24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

Frontmatter

[More information](#)

**MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 779**

Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior

Symposium held April 22–24, 2003, San Francisco, California, U.S.A.

EDITORS:

Hussein M. Zbib

Washington State University
Pullman, Washington, U.S.A.

David H. Lassila

Lawrence Livermore National Laboratory
Livermore, California, U.S.A.

Lyle E. Levine

National Institute of Standards and Technology
Gaithersburg, Maryland, U.S.A.

Kevin J. Hemker

Johns Hopkins University
Baltimore, Maryland, U.S.A.



Materials Research Society
Warrendale, Pennsylvania

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

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/9781558997165

Materials Research Society

506 Keystone Drive, Warrendale, PA 15086

<http://www.mrs.org>

© Materials Research Society 2003

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 2003

First paperback edition 2013

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

CODEN: MRSPDH

ISBN 978-1-558-99716-5 Hardback

ISBN 978-1-107-40937-8 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
978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.
Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker
Frontmatter
[More information](#)

CONTENTS

Preface.....xi
Materials Research Society Symposium Proceedings.....xii

*MULTISCALE MODELING OF
PLASTIC DEFORMATION*

*** Dislocation Patterning and Recovery Under Single Slip:
Modeling Micromechanisms From Observations3**
Patrick Veyssière, Yu-Lung Chiu, and Fabienne Grégori
*** Dislocation Behavior During Deformation—Combining
Experiments, Simulation and Modeling 15**
I.M. Robertson, J. Robach, B. Wirth, and A. Arsenlis
*** Dislocation Intersections and Reactions in FCC and BCC
Crystals 25**
Ladislav P. Kubin, Ronan Madec, and Benoit Devincere
**Single Crystal Deformation Experiments for Validation of
Dislocation Dynamics Simulations 37**
David H. Lassila, Mary M. LeBlanc, and Moono Rhee

*DISLOCATION PHENOMENA AT
THE ATOMISTIC LENGTH SCALE*

*** Structure of Dislocation Core in GaAs..... 51**
S.P. Beckman and D.C. Chrzan

*MULTISCALE MODELING OF
THIN FILMS AND NANO-INDENTATION*

*** Plasticity-Related Phenomena in Metallic Films on Substrates..... 63**
M. Legros, G. Dehm, T.J. Balk, E. Arzt, O. Bostrom, P. Gergaud,
O. Thomas, and B. Kaouache
*** 3D Simulation of the Dislocation Dynamics in Polycrystalline
Metal Thin Films..... 75**
B. von Blanckenhagen, E. Arzt, and P. Gumbsch

*Invited Paper

Cambridge University Press
978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.
Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker
Frontmatter
[More information](#)

* Parallel Glide: A Fundamentally Different Type of Dislocation Motion in Ultrathin Metal Films	87
T. John Balk, Gerhard Dehm, and Eduard Arzt	
Metallic Island Coalescence: Molecular Dynamics Simulations of Boundary Formation and Tensile Strain in Polycrystalline Thin Films.....	97
Andrew R. Takahashi, Carl V. Thompson, and W. Craig Carter	
Atomistic and Continuum Studies of Diffusional Creep and Associated Dislocation Mechanisms in Thin Films on Substrates.....	103
Markus J. Buehler, Alexander Hartmaier, and Huajian Gao	
 <i>MULTISCALE MODELING OF DISLOCATION PHENOMENA AND PLASTIC DEFORMATION</i>	
On the Interaction Between Mg Solute Atoms and Dislocations in Al-Mg Binary Alloys	111
D. Zhang and R.C. Picu	
Dislocation Core Structure Evolution During Dislocation Glide in FCC Lattices	117
M.A. Soare and R.C. Picu	
Some Theoretical Aspects of the Grüneisen Coefficient for the Equation of State of Solids.....	123
Francis Chaisé and Olivier Heuzé	
A Combined Ab Initio and Bond-Order Potentials Study of Cohesion in Iridium.....	129
Marc J. Cawkwell, Duc Nguyen-Manh, Vaclav Vitek, and David G. Pettifor	
Statistical Dislocation Dynamics—Multiplication and Long Range Interactions.....	135
Michael Zaiser and Anter El-Azab	
In Situ TEM Studies of Sessile Dislocation Arrangements and N Vacancy Ordering in ZrN.....	141
P. Li and J.M. Howe	

*Invited Paper

Cambridge University Press
978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.
Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker
Frontmatter
[More information](#)

Anisotropy of Nanoindentation—A Tool for the Determination of Nanocrystal Orientation?	147
David Christopher, Steven Kenny, Roger Smith, Asta Richter, Bodo Wolf, and Bruce King	
Features of Semiconductors During Nanoindentation	153
Asta Richter, Bodo Wolf, Roger Smith, and Margita Günther	
Plasticity in Polycrystalline Thin Films: A 2D Dislocation Dynamics Approach	159
Lucia Nicola, Erik Van der Giessen, and Alan Needleman	
Mechanisms of Misfit Strain Relaxation in Epitaxially Grown BLT (Bi_{4-x}La_xTi₃O₁₂, x = 0.75) Thin Films	165
Hyung Seok Kim, Sang Ho Oh, Ju Hyung Suh, and Chan Gyung Park	
Strain Relaxation by Dislocation Arrays in Thin Films	171
Prita Pant and Shefford P. Baker	
Inhomogeneous Distribution of Dislocation Density as Manifestation of Multiscale Structure in Tubes from Zr-Based Alloys	177
Yuriy Perlovich and Margarita Isaenkova	
Dislocation and Grain Derived Theory for Kinematic Metrics of Finite Deformation to Replace Existing Elastic-Plastic Phenomenological Metrics.....	183
Ray B. Stout	
Shape Change in Compressively Loaded Single Crystals	189
C.W. Bull, C.L. Briant, and D.H. Lassila	
A Continuum Model for Single Crystal Cyclic Plasticity.....	195
Biqiang Xu and Yanyao Jiang	
Dislocation Patterning in Fatigued Silicon Single Crystals.....	201
M. Legros, O. Ferry, J.-P. Feiereisen, A. Jacques, and A. George	
X-ray Microbeam Investigation of Deformation Microstructure in Microindented Cu	207
Wenge Yang, B.C. Larson, G.M. Pharr, G.E. Ice, J.Z. Tischler, J.D. Budai, and Wenjun Liu	

Cambridge University Press
978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.
Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker
Frontmatter
[More information](#)

**Application of the 3D X-ray Crystal Microscope to Study
Mesoscale Structure of Materials213**
Gene E. Ice, Wenjun Liu, Bennett C. Larson, and
Fredrick J. Walker

*MULTISCALE MODELING OF
MICROSTRUCTURES AND EXPERIMENTS*

*** Grain Rotations During Tensile Deformation of Columnar Tantalum221**
B.S. El-Dasher, B.L. Adams, and A.D. Rollett

**Effects of Grain Boundary Constraint on the Constitutive
Response of Tantalum Bicrystals.....231**
A. Ziegler, G.H. Campbell, M. Kumar, and J.S. Stölken

**Microdiffraction Experiments and Modeling for Analyzing
Multiscale Dislocation Ensembles in Materials237**
G.E. Ice, R.I. Barabash, and J. Pang

**Mesostructure of Textured Metal Materials: Experimental
Study and Newly-Discovered Regularities245**
Yuriy Perlovich, Margarita Isaenkova, and Vladimir Fesenko

*MODELS AND EXPERIMENTS IN
NANOSTRUCTURED MATERIALS*

Using Fluctuations to Locate the Surface Roughening Transition253
Daniel N. Bentz and Kenneth A. Jackson

*** Application of a Modified Jogged-Screw Model for Creep of
Titanium Aluminides: Evaluation of the Key Substructural
Parameters.....259**
Subramanian Karthikeyan, Junho Moon, Gopal B. Viswanathan,
and Michael J. Mills

Non-Stick and Scratch Resistant Sol-Gel Coating for Aluminum269
Linda Y.L. Wu and Sandor Nemeth

**Structural Evolution and Acoustic Phonon Behavior in
Crystalline PTFE Latex Films275**
M. Pierno, C.S. Casari, A. Li Bassi, M.G. Beghi, R. Piazza,
and C.E. Bottani

*Invited Paper

Cambridge University Press
978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.
Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker
Frontmatter
[More information](#)

**Generalized Quasicontinuum Approach to Atomistic-Continuum
Modeling of Complex Oxides281**
Anter El-Azab and Harold Trease

**Aerosol Deposition Method (ADM) for Nano-Crystal Ceramics
Coating Without Firing.....287**
Jun Akedo, Maxim Lebedev, Atsushi Iwata, Hisato Ogiso,
and Shizuka Nakano

Author Index293

Subject Index.....295

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

Frontmatter

[More information](#)

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22–24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

Frontmatter

[More information](#)

PREFACE

In recent years there has been increasing interest in using what are termed "multi-scale modeling" approaches to understand the effects of composition and microstructure on mechanical behavior of materials. It is of utmost importance that these modeling efforts and simulations at the various length scales be coupled with experimental work. Symposium W, "Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior," held April 22–24 at the 2003 MRS Spring Meeting in San Francisco, California, focused on experimentally validated multi-scale modeling of ductile metals and alloys. The following subject areas, at three principal length scales, were of primary interest:

1. Atomistic: modeling of dislocation core structure and dislocation-dislocation interaction phenomena using molecular statics and dynamics; high resolution electron microscopy of dislocation core structures; positron annihilation experiments of deformation-induced atomistic defects.
2. Mesoscopic: dislocation dynamics modeling of the collective behavior of 3D dislocation structures; accurate TEM validation of the latter; modeling of local plasticity at grain boundaries; in situ TEM studies of dislocation motion, dislocation-dislocation interaction and dislocation reactions at grain boundaries.
3. Continuum: experimentally observed 3D anisotropic yield behavior and texture evolution; computer code prediction of the latter using crystal plasticity and strain gradient theories.

We would like to thank all of the participants for making this a very successful symposium. Our hope is that this symposium and the resulting proceedings will encourage researchers in the field of multiscale modeling to seek out collaborations that work towards experimentally validated models.

The support of the Lawrence Livermore National Laboratory is gratefully acknowledged

Hussein M. Zbib
David H. Lassila
Lyle E. Levine
Kevin J. Hemker

July 2003

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

Frontmatter

[More information](#)

MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS

- Volume 734— Polymer/Metal Interfaces and Defect Mediated Phenomena in Ordered Polymers, E.D. Manias, G.G. Malliaras, 2003, ISBN: 1-55899-671-0
- Volume 735— Bioinspired Nanoscale Hybrid Systems, G. Schmid, U. Simon, S.J. Stranick, S.M. Arrivo, S. Hong, 2003, ISBN: 1-55899-672-9
- Volume 736— Electronics on Unconventional Substrates—Electrotextiles and Giant-Area Flexible Circuits, M.S. Shur, P. Wilson, D. Urban, 2003, ISBN: 1-55899-673-7
- Volume 737— Quantum Confined Semiconductor Nanostructures, J.M. Buriak, D.D.M. Wayner, F. Priolo, B. White, V. Klimov, L. Tsybeskov, 2003, ISBN: 1-55899-674-5
- Volume 738— Spatially Resolved Characterization of Local Phenomena in Materials and Nanostructures, D.A. Bonnell, J. Piqueras, A.P. Shreve, F. Zypman, 2003, ISBN: 1-55899-675-3
- Volume 739— Three-Dimensional Nanoengineered Assemblies, T.M. Orlando, L. Merhari, K. Ikuta, D.P. Taylor, 2003, ISBN: 1-55899-676-1
- Volume 740— Nanomaterials for Structural Applications, C. Berndt, T.E. Fischer, I. Ovid'ko, G. Skandan, T. Tsakalakos, 2003, ISBN: 1-55899-677-X
- Volume 741— Nano- and Microelectromechanical Systems (NEMS and MEMS) and Molecular Machines, A.A. Ayon, T. Buchheit, D.A. LaVan, M. Madou, 2003, ISBN: 1-55899-678-8
- Volume 742— Silicon Carbide 2002—Materials, Processing and Devices, S.E. Saddow, D.J. Larkin, N.S. Saks, A. Schoener, 2003, ISBN: 1-55899-679-6
- Volume 743— GaN and Related Alloys—2002, E.T. Yu, C.M. Wetzal, J.S. Speck, A. Rizzi, Y. Arakawa, 2003, ISBN: 1-55899-680-X
- Volume 744— Progress in Semiconductors II—Electronic and Optoelectronic Applications, B.D. Weaver, M.O. Manasreh, C.C. Jagadish, S. Zollner, 2003, ISBN: 1-55899-681-8
- Volume 745— Novel Materials and Processes for Advanced CMOS, M.I. Gardner, J-P. Maria, S. Stemmer, S. De Gendt, 2003, ISBN: 1-55899-682-6
- Volume 746— Magnetoelctronics and Magnetic Materials—Novel Phenomena and Advanced Characterization, S. Zhang, W. Kuch, G. Guentherodt, C. Broholm, A. Kent, M.R. Fitzsimmons, I. Schuller, J.B. Kortright, T. Shinjo, Y. Zhu, 2003, ISBN: 1-55899-683-4
- Volume 747— Crystalline Oxide-Silicon Heterostructures and Oxide Optoelectronics, D.S. Ginley, S. Guha, S. Carter, S.A. Chambers, R. Droopad, H. Hosono, D.C. Paine, D.G. Schlom, J. Tate, 2003, ISBN: 1-55899-684-2
- Volume 748— Ferroelectric Thin Films XI, D. Kaufman, S. Hoffmann-Eifert, S.R. Gilbert, S. Aggarwal, M. Shimizu, 2003, ISBN: 1-55899-685-0
- Volume 749— Morphological and Compositional Evolution of Thin Films, N. Bartelt, M.J. Aziz, I. Berbezier, J.B. Hannon, S. Hearne, 2003, ISBN: 1-55899-686-9
- Volume 750— Surface Engineering 2002—Synthesis, Characterization and Applications, A. Kumar, W.J. Meng, Y-T. Cheng, J. Zabinski, G.L. Doll, S. Veprek, 2003, ISBN: 1-55899-687-7
- Volume 751— Structure-Property Relationships of Oxide Surfaces and Interfaces II, X. Pan, K.B. Alexander, C.B. Carter, R.W. Grimes, T. Wood, 2003, ISBN: 1-55899-688-5
- Volume 752— Membranes—Preparation, Properties and Applications, V.N. Burganos, R.D. Noble, M. Asaeda, A. Ayral, J.D. LeRoux, 2003, ISBN: 1-55899-689-3
- Volume 753— Defect Properties and Related Phenomena in Intermetallic Alloys, E.P. George, H. Inui, M.J. Mills, G. Eggeler, 2003, ISBN: 1-55899-690-7
- Volume 754— Supercooled Liquids, Glass Transition and Bulk Metallic Glasses, A.L. Greer, T. Egami, A. Inoue, S. Ranganathan, 2003, ISBN: 1-55899-691-5
- Volume 755— Solid-State Chemistry of Inorganic Materials IV, M. Greenblatt, M.A. Alario-Franco, M.S. Whittingham, G. Rohrer, 2003, ISBN: 1-55899-692-3
- Volume 756— Solid-State Ionics—2002, P. Knauth, J-M. Tarascon, E. Traversa, H.L. Tuller, 2003, ISBN: 1-55899-693-1
- Volume 757— Scientific Basis for Nuclear Waste Management XXVI, R.J. Finch, D.B. Bullen, 2003, ISBN: 1-55899-694-X

Cambridge University Press

978-1-558-99716-5 - Materials Research Society Symposium Proceedings Volume 779: Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior: Symposium held April 22-24, 2003, San Francisco, California, U.S.A.

Editors: Hussein M. Zbib, David H. Lassila, Lyle E. Levine and Kevin J. Hemker

Frontmatter

[More information](#)

MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS

- Volume 758— Rapid Prototyping Technologies, A.S. Holmes, A. Piqué, D.B. Dimos, 2003, ISBN: 1-55899-695-8
- Volume 759— Granular Material-Based Technologies, S. Sen, M.L. Hunt, A.J. Hurd, 2003, ISBN: 1-55899-696-6
- Volume 760E—The Undergraduate Curriculum in Materials Science and Engineering, E.P. Douglas, O.D. Dubón Jr., J.A. Isaacs, W.B. Knowlton, M. Stanley Whittingham, 2003, ISBN: 1-55899-697-4
- Volume 761E—Molecular Electronics, M-I. Baraton, E.L. Garfunkel, D.C. Martin, S.S.P. Parkin, 2003, ISBN: 1-55899-698-2
- Volume 762— Amorphous and Nanocrystalline Silicon-Based Films—2003, J.R. Abelson, G. Ganguly, H. Matsumura, J. Robertson, E. Schiff, 2003, ISBN: 1-55899-699-0
- Volume 763— Compound Semiconductor Photovoltaics, R. Noufi, D. Cahen, W. Shafarman, L. Stolt, 2003, ISBN: 1-55899-700-8
- Volume 764— New Applications for Wide-Bandgap Semiconductors, S.J. Pearton, J. Han, A.G. Baca, J-I. Chyi, W.H. Chang, 2003, ISBN: 1-55899-701-6
- Volume 765— CMOS Front-End Materials and Process Technology, T-J. King, B. Yu, R.J.P. Lander, S. Saito, 2003, ISBN: 1-55899-702-4
- Volume 766— Materials, Technology and Reliability for Advanced Interconnects and Low-k Dielectrics—2003, A. McKerrow, J. Leu, O. Kraft, T. Kikkawa, 2003, ISBN: 1-55899-703-2
- Volume 767— Chemical-Mechanical Planarization, M. Oliver, D. Boning, D. Stein, K. Devriendt, 2003, ISBN: 1-55899-704-0
- Volume 768— Integration of Heterogeneous Thin-Film Materials and Devices, H.A. Atwater, M. Levy, M.I. Current, T. Sands, 2003, ISBN: 1-55899-705-9
- Volume 769— Flexible Electronics—Materials and Device Technology, B.R. Chalamala, B.E. Gnade, N. Fruehauf, J. Jang, 2003, ISBN: 1-55899-706-7
- Volume 770— Optoelectronics of Group-IV-Based Materials, T. Gregorkiewicz, R.G. Elliman, P.M. Fauchet, J.A. Hutchby, 2003, ISBN: 1-55899-707-5
- Volume 771— Organic and Polymeric Materials and Devices, P.W.M. Blom, N.C. Greenham, C.D. Dimitrakopoulos, C.D. Frisbie, 2003, ISBN: 1-55899-708-3
- Volume 772— Nanotube-Based Devices, P. Bernier, S. Roth, D. Carroll, G-T. Kim, 2003, ISBN: 1-55899-709-1
- Volume 773— Biomicroelectromechanical Systems (BioMEMS), C. Ozkan, J. Santini, H. Gao, G. Bao, 2003, ISBN: 1-55899-710-5
- Volume 774— Materials Inspired by Biology, J.L. Thomas, L. Gower, K.L. Kiick, 2003, ISBN: 1-55899-711-3
- Volume 775— Self-Assembled Nanostructured Materials, C.J. Brinker, Y. Lu, M. Antonietti, C. Bai, 2003, ISBN: 1-55899-712-1
- Volume 776— Unconventional Approaches to Nanostructures with Applications in Electronics, Photonics, Information Storage and Sensing, O.D. Velev, T.J. Bunning, Y. Xia, P. Yang, 2003, ISBN: 1-55899-713-X
- Volume 777— Nanostructuring Materials with Energetic Beams, S. Roorda, H. Bernas, A. Meldrum, 2003, ISBN: 1-55899-714-8
- Volume 778— Mechanical Properties Derived from Nanostructuring Materials, H. Kung, D.F. Bahr, N.R. Moody, K.J. Wahl, 2003, ISBN: 1-55899-715-6
- Volume 779— Multiscale Phenomena in Materials—Experiments and Modeling Related to Mechanical Behavior, K.J. Hemker, D.H. Lassila, L.E. Levine, H.M. Zbib, 2003, ISBN: 1-55899-716-4
- Volume 780— Advanced Optical Processing of Materials, I.W. Boyd, M. Dinescu, A.V. Rode, D.B. Chrisey, 2003, ISBN: 1-55899-717-2
- Volume 781E—Mechanisms in Electrochemical Deposition and Corrosion, J.C. Barbour, R.M. Penner, P.C. Searson, 2003, ISBN: 1-55899-718-0

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