

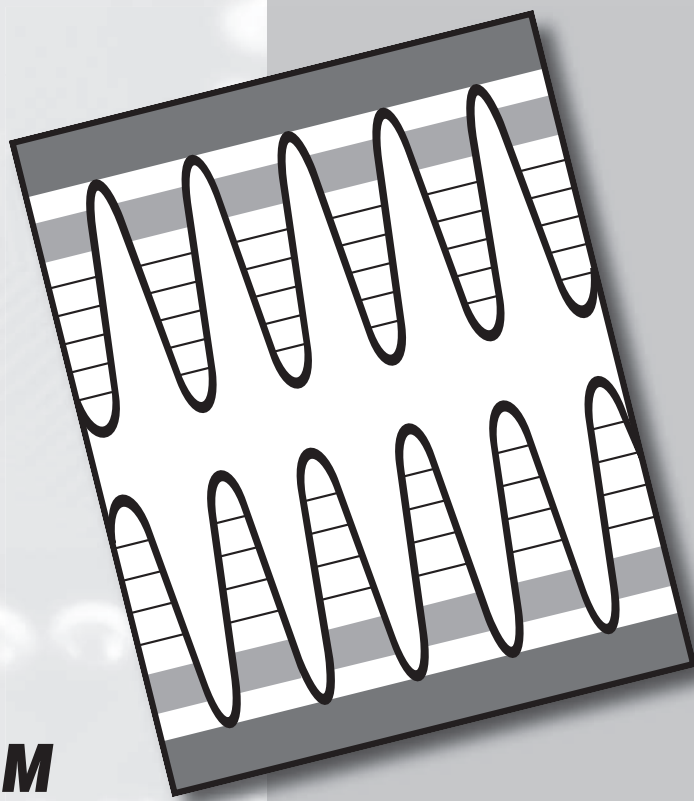
*The Premier Conference for
Advances in Electronic Materials*

**47th ANNUAL TMS
ELECTRONIC MATERIALS
CONFERENCE**

University of California, Santa Barbara
June 22-24, 2005

Featuring...

**THE EMC
EXHIBITION**



**TECHNICAL PROGRAM
with ABSTRACTS**

TMS

Sponsored by
Electronic, Magnetic, & Photonic Materials Division

www.tms.org/EMC.html

Welcome to the 47th Annual Electronic Materials Conference presented by the Electronic, Magnetic, & Photonic Materials Division of The Minerals, Metals and Materials Society (TMS).

TMS is a professional organization encompassing the entire range of materials and engineering, from minerals processing and primary metals production to basic research and the advanced applications of materials. Included among its professional and student members are metallurgical and materials engineers, scientists, researchers, educators, and administrators from more than 70 countries on six continents. TMS' mission is to promote the global science and engineering professions concerned with minerals, metals, and materials. To learn more, visit www.tms.org.

TABLE OF CONTENTS

Awards	6
Dining Hours	3
Exhibition	3
Manuscript Submission	4
Parking	3
Registration Hours	3
Social Events	3
Technical Program	9

Submit Your Manuscript for a Special Issue of *JEM*.

Journal of Electronic Materials: Group III Nitrides, SiC, and ZnO

A special issue of *JEM* will be published in 2006 highlighting work on group III nitrides, SiC, and ZnO.

Submit original manuscripts based on your work presented at EMC or other recent work on this topic.

Articles must be submitted online at <http://www.tms.org/pubs/journals/JEM/jem.html>.

Indicate category "Group III Nitrides, SiC, and ZnO" when submitting.

Deadline is August 1, 2005.

This year's editors are Suzanne Mohney, Penn State; Robert Stahlbush, Naval Research Laboratory, and Jamie Phillips, University of Michigan.



An Invitation for TMS Nonmembers

Join TMS today and pay only \$52.50 for the remainder of 2005!

Discover a wealth of information on electronic materials and resultant devices and enjoy all the benefits TMS membership offers:

- Print and electronic subscription to *JOM*, the magazine that explores the traditional, innovative, and revolutionary issues in the minerals, metals, and materials fields
- Members-only discount on *JEM*, a joint TMS and IEEE publication of critical new developments in the electronics field
- Electronic subscription to *TMS Letters*, a peer-reviewed journal consisting of two-page technical updates of research presented at TMS meetings but not published elsewhere
- Networking opportunities with a prestigious membership through international conferences
- Discount on TMS publications and conference fees
- Access to TMS' searchable online membership directory

Plus an array of other benefits and services!

To begin enjoying these benefits, complete the enclosed membership application and return it to TMS' registration desk during the conference with the \$52.50 membership fee. You may also join online at www.tms.org/Society/membership.html, or mail your application to TMS, 184 Thorn Hill Road, Warrendale, PA 15086, USA. For more information, visit www.tms.org, e-mail membership@tms.org, or call (724) 776-9000, ext 259.

**Your Professional Partner for
Career Advancement**

TMS

GENERAL INFORMATION

CONFERENCE REGISTRATION

On-site registration and advance registrant badge pick-up are located in the Multicultural Lounge during the following hours:

Tuesday, June 21	3 to 5 p.m.
Wednesday, June 22	7:30 a.m. to 5 p.m.
Thursday, June 23	7:30 a.m. to 4 p.m.
Friday, June 24	7:30 to 10 a.m.

Registration fee includes welcoming reception, coffee breaks, Thursday banquet, technical sessions and exhibition. One-day fee does not include the Thursday banquet.

REFUND POLICY

The deadline for all refunds was June 2, 2005. No refunds are issued at this meeting. All fees and tickets are nonrefundable.

TECHNICAL SESSIONS

The electronic materials technical program commences at 8:20 a.m. on Wednesday, June 22. All sessions are held on grounds at the University of California. University Center/Corwin Pavilion is the location of the conference plenary session.

COMPUTER/NETWORK FACILITIES

Registrants have Internet access through UCSB's ResNet Ethernet network in the residence halls only. A temporary username and password is provided to on-campus registrants upon check-in.

MESSAGES

A message board is located near the registration desk in the Multicultural Lounge. Messages are posted in this area throughout the conference.

CAMPUS SMOKING POLICY

The university prohibits smoking in buildings, including residence halls. Smoking is allowed in designated areas outside.

AMERICANS WITH DISABILITIES ACT



TMS strongly supports the federal Americans with Disabilities Act (ADA) which prohibits discrimination against, and promotes public accessibility for, those with disabilities. In support of, and in compliance with, ADA, we ask those requiring specific equipment or services to indicate their needs to TMS Meeting Services.

POLICY ON AUDIO AND VISUAL RECORDING OF TECHNICAL PAPER PRESENTATIONS/SESSIONS

TMS reserves the right to all audio and video reproductions of presentations at TMS sponsored meetings. Recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of TMS and the individual authors is strictly prohibited.

EXHIBITION

In addition to a strong technical program, EMC features an exhibition of electronic materials technology and related services. Attendees are encouraged to take advantage of this opportunity to meet exhibitors and learn about their capabilities and products.

Exhibit Location University Center/Lagoon Plaza

Exhibit Dates and Hours:

Wednesday, June 22	9:15 a.m. to noon
(Welcoming reception begins at 5 p.m.)	3 to 6 p.m.
Thursday, June 23	9 a.m. to 3:30 p.m.

ON-CAMPUS DINING HOURS

Meals are served in the De La Guerra Dining Hall:

Breakfast	7 to 8 a.m.
Lunch	11:45 a.m. to 1:15 p.m.
Dinner	5:30 to 7 p.m.

Food facilities on campus close at 7 p.m.

No refunds are made for late arrivals, early departures, or missed meals.

SOCIAL EVENTS

WELCOMING RECEPTION

Attendees are invited to a welcoming reception on Wednesday, June 22, from 5 to 6 p.m. at the University of California in the University Center/Lagoon Plaza.

EVENING AT THE NATURAL HISTORY MUSEUM

Conference attendees and their guests may enjoy a catered dinner at the Santa Barbara Natural History Museum on Thursday, June 23. The cost of this event is included in the full conference and student registration fees. It is not included in the one-day registration fee.

One-day registrants and guests may purchase tickets for the Natural History Museum dinner at a cost of \$60 for adults and \$25 for children 12 and under. Tickets are available for purchase at the EMC registration desk until 5 p.m. on Wednesday, June 22.

PARKING

Parking at the university is by permit only. On-campus residents receive a complimentary permit at check-in for the duration of their stay.

Off-campus residents may purchase permits at the gate:

EMC Only Parking Permit	\$28
DRC/EMC Parking Permit	\$37

Parking citations are issued for cars incorrectly parked or lacking permits. UCSB is a walking campus, and parking is limited. Parking assignments may not necessarily be close to assigned residence halls or session locations.

PUBLICATION INFORMATION

MANUSCRIPT SUBMISSION FOR PUBLICATION

TMS offers two convenient options for publication of manuscripts.

The Journal of Electronic Materials (JEM), a monthly archival publication of TMS and the Institute of Electrical and Electronics Engineers (IEEE), publishes selected papers presented at EMC and welcomes the submission of related electronic materials articles. *JEM* articles are reviewed, selected, and edited by peers in the field, most of whom are members of TMS' Electronic Materials Committee or IEEE. To be considered for publication, authors must submit manuscripts electronically at <http://jem.electronicip.com>. Detailed manuscript submission guidelines are available at <http://www.tms.org/jem.html>.

TMS Letters is a unique online technical journal that presents cutting-edge research in succinct, informative updates. The journal is peer-reviewed and presents information, in two-page technical updates, that is not published in any other book or journal. Presentations to be considered for publication must be submitted electronically at <http://cms.tms.org> in portable document format. Complete author instructions are available at <http://www.tms.org/TMSLetters.html>.

ABOUT JEM

JEM facilitates the rapid circulation of results of original research, detailing critical new developments in the electronics field. The journal contains technical papers focusing on electronic memory and logic structures, magnetic-optical recording media, superlattices, packaging, detectors, emitters, metallization technology, superconductors, and low thermal-budget processing, and includes general papers on electronic materials for device application, structure making, reliability, and yield. Articles on methods for preparing and evaluating the chemical, physical, and electronic properties of electronic materials are also included.

JEM SUBSCRIPTION

Manuscripts of papers presented at the 2005 EMC will be printed in the 2006 issues of *JEM*. Conference registrants have the option of subscribing to *JEM* with their registration.

Subscriptions are available in both print and electronic formats. Electronic subscribers also have unlimited access to past journal issues.

Individual issues may be purchased for \$25 a copy for TMS members or \$40 a copy for nonmembers, plus shipping. Order through the TMS Document Center at <http://doc.tms.org> or by contacting TMS Subscriptions at telephone (800) 759-4867 (U.S. only) or (724) 776-9000, ext. 251; fax (724) 776-3770; or e-mail subscriptions@tms.org.

JEM STAFF

Editor

Theodore C. Harman
Massachusetts Institute of Technology

Editorial Board

L.J. Guido
Virginia Tech

J.L. Merz
University of Notre Dame

L.S. Rea

US Air Force
Wright-Patterson AFB, OH

T.D. Sands

Purdue University

A.J. Steckl

University of Cincinnati

J.M. Woodall

Yale University

ELECTRONIC MATERIALS COMMITTEE

OFFICERS

April Brown

GENERAL CHAIR
Duke University

Ilesanmi Adesida
PAST CHAIRMAN
University of Illinois

Edward Yu
PROGRAM CHAIRMAN
University of California

Theresa Mayer
TREASURER
Pennsylvania State University

Robert Biefeld

SECRETARY
Sandia National Labs

Theodore C. Harman
EDITOR, *JEM*
Massachusetts Institute of Technology

Patrice Turchi
DIRECTOR/CHAIR
TMS ELECTRONIC, MAGNETIC, &
PHOTONIC MATERIALS DIVISION
Lawrence Livermore National Lab

MEMBERS

Andrew A. Allerman
Sandia National Labs

Leonard J. Brillson
Ohio State University

Michael A. Capano
Purdue University

Paul Daniel Dapkus
University of Southern California

L. Ralph Dawson
University of New Mexico

Eugene A. Fitzgerald
Massachusetts Institute of Technology

Rachel S. Goldman
University of Michigan

Mark S. Goorsky
University of California

Karl Hobart
Naval Research Lab

Julia W.P. Hsu
Sandia National Laboratories

David B. Janes
Purdue University

Thomas F. Kuech
University of Wisconsin

Kei May Lau
Hong Kong University of Science & Tech

James L. Merz
University of Notre Dame

Mark S. Miller
University of Utah

Suzanne E. Mohney
Pennsylvania State University

Thomas H. Myers
West Virginia University

Chris J. Palmstrom
University of Minnesota

Lisa M. Porter
Carnegie Mellon University

Laura S. Rea
US Air Force

Joan M. Redwing
Pennsylvania State University

Steven A. Ringel
Ohio State University

Timothy D. Sands
Purdue University

Akio Sasaki
Osaka Electro-Communication University

Ben V. Shanabrook
Naval Research Lab

Glenn Solomon
Stanford University

James S. Speck
University of California

Susanne Stemmer
University of California

Charles W. Tu
University of California

Christian M. Wetzel
Niroyal Optoelectronics

Jerry M. Woodall
Purdue University

INVITED ORGANIZERS FOR 2005 EMC

EMC wishes to thank the following invited organizers for their support and contribution to the technical program presented at this year's conference.

Charles Ahn
Yale University

Brian Bennett
Naval Research Lab

Shigefusa Chichibu
University of Tsukuba

Russell Dupuis
Georgia Institute of Technology

Kurt Eyink
Air Force Research Lab

Randy Feenstra
Carnegie Mellon University

David Gundlach
ETH-Zurich

Evgeni Gusev
IBM Corporation

Douglas Hall
University of Notre Dame

Jung Han
Yale University

Mark Hersam
Northwestern University

Andrew Hoff
University of South Florida

William Hoke
Raytheon Corporation

Archie Holmes
University of Texas

Diana Huffaker
University of New Mexico

Thomas Jackson
Pennsylvania State University

David Janes
Purdue University

Pat Lenahan
Pennsylvania State University

Lynn Loo
University of Texas

Gregory Lopinski
Steacie Institute for Molecular Sciences

Maria Losurdo
Institute of Inorganic
Methodologies and Plasmas

Yicheng Lu
Rutgers University

Charles Lutz
Kopin Corporation

Michael Manfra
Bell Labs, Lucent Technologies

Peter Moran
Michigan Technological University

Yasushi Nanishi
Ritsumeikan University

Hou T. Ng
NASA Ames Research Center

David Norton
University of Florida

Robert Okojie
NASA Glenn Research Center

Sarah Olsen
University of Newcastle-Upon-Tyne

Klaus Ploog
Paul Drude Institute for
Solid State Electronics

Alberto Salleo
Palo Alto Research Center

Nitin Samarth
Pennsylvania State University

William Schaff
Cornell University

Darrell Schlom
Pennsylvania State University

Tae-Yeon Seong
Kwangju Institute of Science & Tech

Anup Singh
Sandia National Laboratories

Robert Stahlbush
Naval Research Lab

Alec Talin
Sandia National Laboratories

Masaaki Tanaka
University of Tokyo

Michael Tischler
Ocis Technologies

Raymond Tsui
Motorola

Wladek Walukiewicz
Lawrence Berkeley Laboratory

Christine Wang
Massachusetts Institute of Technology
Lincoln Labs

Lloyd Whitman
Naval Research Laboratory

David Wilt
NASA Glenn Research Center

Shalom Wind
Columbia University

William Wong
Palo Alto Research Center

Ya-Hong Xie
University of California

Attention Students:

Join the Material Advantage program for just \$25 and receive membership benefits in three organizations!

- Access to member Web sites and membership directories of the American Ceramics Society, ASM International, and TMS
- Rotating print subscription plus online versions of *American Ceramics Society Bulletin*, *Advanced Materials & Processes*, *JOM*, and *TMS Letters*
- Discounted subscription fees to archival journals, such as *JEM*
- Discounted pricing on books, papers, CDs, software, videos, and more!
- Scholarship and award opportunities totaling more than \$400,000 through societies, chapters and foundations
- Opportunities to compete in society sponsored contests
- Discounted meeting registration fees

Apply today at www.materialadvantage.org.

MATERIALTM
ADVANTAGE
The ACerS-ASM-TMS Student Program

Everything Else Is Immaterial

AWARDS

STUDENT AWARDS

\$500 awards are made annually by the Electronic Materials Committee for the top 5 percent of student papers presented at the conference. Student papers are judged on both scientific content and presentation. Awards will be presented to the 2004 EMC student winners during the plenary session on Wednesday, June 22, in the Corwin Pavilion.

Student: Jeffrey Gleason

Paper: Nanometer-Scale Studies of Point Defect Distributions in GaMnAs Films

Student: Jessica L. Hilton

Paper: Reaction Kinetics, Thermodynamics, and Growth Characteristics of Ultra-Thin Mn Films on GaAs(001)

Student: Vincenzo Lordi

Paper: Electroabsorption and Band Edge Optical Properties of GaInNAsSb Quantum Wells Around 1550nm

Student: Tihomir Lubenov Gugov

Paper: Transmission Electron Microscopy (TEM) Structural Characterization of GaInNAs and GaInNAsSb Quantum Wells Grown by Molecular Beam Epitaxy (MBE)

2005 JOHN BARDEEN AWARD WINNER

The John Bardeen Award, established in 1994, recognizes an individual who has made outstanding contributions and is a leader in the field of electronic materials.

Recipient: Arthur C. Gossard

Citation: *For outstanding contributions and leadership to the materials science of epitaxial crystal growth and to the physics of electronic structure and devices.*

Arthur Gossard is a professor at the University of California, Santa Barbara. He graduated summa cum laude from Harvard University in 1956 with a bachelor of arts and earned a doctorate from the University of California, Berkeley, in 1960, both in physics. Prior to joining the University of California in 1987, Professor Gossard was a distinguished member of the technical staff at AT&T Bell Laboratories (1960–1987).

Among his many honors, he was elected to the National Academy of Sciences in 2001, named a Fellow of the Institute of Electrical and Electronic Engineers in 2001, and received the American Physical Society McGroddy Prize for New Materials in 2001.

"It is an honor to join the very distinguished ranks of the previous recipients of the John Bardeen Award. I am pleased by the recognition from TMS and my colleagues and by what this represents. It is very special to be associated with an award that recognizes the name of John Bardeen and his many contributions to both physics and electronic materials and devices."



Nominate a Deserving Colleague for the 2006 John Bardeen Award

TMS' John Bardeen Award recognizes an individual who has made an outstanding contribution and is a leader in the field of electronic materials.

The award is named in honor of John Bardeen who, through a career of theoretical and experimental research, set the foundation for the current state of understanding of electronic materials. Two areas in which Bardeen had great impact were the invention and development of the solid-state transistor and the theory that developed greater understanding of superconductivity.

To be considered for the John Bardeen Award, an individual must have an established record of research and publications in the field of electronic materials. The selection committee particularly recognizes the quality and relevance of work that has had, or is likely to have, significant and lasting impact in the field.

To nominate an individual for the John Bardeen Award:

1. Complete the nomination form on the next page.
2. Submit the nominee's current biography or curriculum vitae with a list of publications.
3. Submit a minimum of two, maximum of five, letters of endorsement. The principal nominator's cover letter of endorsement should include a supporting statement that outlines the qualifications of the nominee.
4. Mail nomination to Nellie Luther, TMS Honors & Professional Recognition Program, 184 Thorn Hill Road, Warrendale, PA 15086-7514 USA.

For more information, visit www.tms.org/society/honors.html or contact Nellie Luther at telephone (724) 776-9000, ext. 213, or e-mail luther@tms.org.



A nomination is valid for three years provided it meets the criteria for the award each year.

***Deadline:
October 31, 2005.***

TMS

Complete the following information. If you have any questions, please contact Nellie Luther, the professional affairs coordinator, at TMS: Telephone (724) 776-9000, ext. 213; Fax (724) 776-3770; E-mail luther@tms.org.

AWARD TITLE _____

DATE SUBMITTED _____

NOMINEE:

Name _____

Dr. Professor Mr. Ms.

Title/Position _____

Employer _____

Address _____

City _____ State _____

Zip/Postal Code _____ Country _____

Telephone _____

Facsimile _____

Is the nominee a member of TMS? Yes No

For Hardy Award Only: Birthdate _____

PRINCIPAL NOMINATOR:

Name _____

Dr. Professor Mr. Ms.

Title/Position _____

Employer _____

Address _____

City _____ State _____

Zip/Postal Code _____ Country _____

Telephone _____

Facsimile _____

TMS Member Yes/Member # _____ No

ENDORSEMENTS: (See procedure requirements on previous page.)

1) Name _____

Affiliation _____

2) Name _____

Affiliation _____

3) Name _____

Affiliation _____

4) Name _____

Affiliation _____

5) Name _____

Affiliation _____

CITATION: CITE IN 25 WORDS OR LESS the highlights of the nominee's contributions or qualifications for the specific honor/award.

Send Nomination Form and ALL Papers to:

Nellie Luther
Professional Affairs Coordinator
TMS
184 Thorn Hill Road
Warrendale, PA 15086-7514 USA

DEADLINE FOR COMPLETED NOMINATION MATERIALS IS OCTOBER 31 OF EACH YEAR.

FOR USE BY TMS STAFF AND HONORS & PROFESSIONAL RECOGNITION COMMITTEE

Date nomination received at TMS _____

Fellow nominee's membership number _____

Verified by _____

Date _____

Record of award subcommittee considering the nominee:

1st year chair _____

2nd year chair _____

3rd year chair _____

(A NOMINATION IS VALID FOR THREE YEARS PROVIDED IT MEETS CRITERIA FOR THE AWARD EACH YEAR.)

Publications TMS

Enhance your electronic materials library with these proceedings from related conferences.

CALPHAD AND ALLOY THERMODYNAMICS

Patrice E.A. Turchi, Antonios Gonis, and Robert D. Shull, editors

292 pp., illus., index, hardcover
Order No. 01-514X • Weight 2 lbs.
M \$72 ♦ S \$51 ♦ L \$102

SCIENCE & TECHNOLOGY OF INTERFACES

International Symposium Honoring the Contributions of Dr. Bhakta Rath

S. Ankem, C.S. Pande, I. Ovid'ko, and R. Ranganathan, editors

Softcover
Order No. 01-5204 • Weight 4 lbs.
M \$122 ♦ S \$87 ♦ L \$174

CD-ROM
Order No. 01-5204-CD • Weight 1 lb.
M \$122 ♦ S \$87 ♦ L \$174

Portable Document Format
Order No. 01-5204-E
M \$122 ♦ S \$87 ♦ L \$174

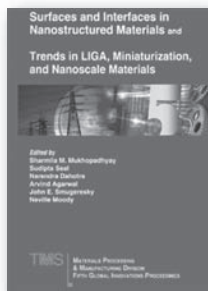
Individual Papers: Portable Document Format
M \$11 ♦ S \$11 ♦ L \$15

SURFACES AND INTERFACES IN NANOSTRUCTURED MATERIALS AND TRENDS IN LIGA, MINIATURIZATION, AND NANOSCALE MATERIALS

5th MPMD Global Innovations Symposium

Sharmila M. Mukhopadhyay, John Smugeresky, Sudipta Seal, Narendra B. Dahotre, and Arvind Agarwal, editors

Approx. 720 pp., illus., softcover
Order No. 04-5662 • Weight 4 lbs.
M \$118 ♦ S \$93 ♦ L \$168



THE SCIENCE OF COMPLEX ALLOY PHASES

P. Turchi and T. Massalski, editors

324 pp., illus., index, hardcover
Published in honor of 2005 Hume-Rothery Award recipient Uichiro Mizutani. This book emphasizes both theoretical and experimental aspects of electronic, structural, and thermodynamic properties of complex alloy phases. Leading experts provide an assessment of the current understanding of the structural properties of complex materials, including quasicrystalline and amorphous alloys. Special emphasis is placed on the understanding of why nature is able to stabilize complex atomic arrangements and on recent results related to structurally complex alloy phases.

Order No. 05-593X • Weight 2 lbs.
M \$125 ♦ S \$99 ♦ L \$179



THE SELECTED WORKS OF JOHN W. CAHN

W. Craig Carter and William C. Johnson, editors

559 pp., illus., softcover, CD-ROM or Portable Document Format

This book represents a collection of 30 selected papers from the work of John W. Cahn. Dr. Cahn is Senior Fellow at the Materials Science and Engineering Laboratory of the National Institute of Standards and Technology, and is widely recognized as a founder of modern theory and thought in materials science. The range of his research included kinetics and mechanisms of metallurgical phase changes, surfaces, interfaces, defects, quasicrystals, thermodynamics, and other areas impacting the fundamental understanding of materials science.

Each paper includes a 2-4 page review of the impact and historical perspective of the work. This is an important collection for scientists, instructors and students interested in materials science.

Softcover
Order No. 04-416X • Weight 4 lbs.
CD-ROM
Order No. 04-416X • Weight 1 lb.
Portable Document Format
Order No. 04-416X
M \$88 ♦ S \$65 ♦ L \$125

Individual Papers: Portable Document Format
M \$11 ♦ S \$11 ♦ L \$15



For more details on these titles, including online tables of contents, visit the TMS Document Center at <http://doc.tms.org>.

Pricing: M = Members ♦ S = Students ♦ L = List

3 Convenient Ways to Order:

Telephone (800) 759-4867 (U.S. only) or (724) 776-9000, ext. 256
E-mail publications@tms.org
Online <http://doc.tms.org>