

About the Materials Research Society

The Materials Research Society (MRS), a not-for-profit scientific association founded in 1973, promotes interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes over 13,400 scientists, engineers, and research managers from industrial, government, and university research laboratories in the United States and close to 70 countries.

The Society's interdisciplinary approach differs from that of single-discipline professional societies because it promotes information exchange across the many technical fields touching materials development. MRS sponsors two major international annual meetings encompassing approximately 70 topical symposia, and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence and fosters technical interaction in local geographic regions through Sections and University Chapters.

MRS participates in the international arena of materials research through the International Union of Materials Research Societies (IUMRS). MRS is a member of ASTRA and is an affiliate of the American Institute of Physics.

MRS publishes symposium proceedings, *MRS Bulletin*, *Journal of Materials Research*, and other publications related to current research activities.

MRS Bulletin (ISSN: 0883-7694) is published 12 times a year by the Materials Research Society, 506 Keystone Drive, Warrendale, PA 15086-7573. Copyright ©2006, Materials Research Society. Permission required to reproduce content. Periodical postage paid at Warrendale, PA, and at additional mailing offices. POSTMASTER: Send address changes to *MRS Bulletin* in care of the Materials Research Society, at the address listed; tel. 724-779-3003; fax 724-779-8313. Printed in the U.S.A.

Membership in MRS is \$105 annually for regular members, \$30 for students. Dues include an allocation of \$29 (\$17 for students) to a subscription to *MRS Bulletin*. Individual member subscriptions are for personal use only. Non-member subscription rates are \$230 for one calendar year (12 issues) within the U.S.A. and \$285 elsewhere. Single copies may be purchased for \$35 each. Requests from subscribers for missing journal issues will be honored without charge only if received within six months of the issue's actual date of publication; otherwise, the issue may be purchased at the single-copy price.

MRS Bulletin is included in *Current Contents®/Engineering, Computing, and Technology*; *Current Contents®/Physical, Chemical, and Earth Sciences*, the *SciSearch®* online database, *Research Alert®*, *Science Citation Index®*, and the *Materials Science Citation Index™*. Back volumes of *MRS Bulletin* are available on microfiche through University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, MI 48106, USA.

Send Letters to the Editor to:

MRS Bulletin
Materials Research Society
506 Keystone Drive
Warrendale, PA 15086-7573 USA
Fax 724-779-8313
Bulletin@mrs.org

Letters must include your name, affiliation, and full contact information.

MRS BULLETIN

Editorial Office • 506 Keystone Drive • Warrendale, PA 15086-7573 USA
Tel. 724-779-3004 ext. 522; fax 724-779-8313; Bulletin@mrs.org; http://www.mrs.org/

Editor

E.L. Fleischer

Managing Editor

J. Meiksin

Technical Editor

A. Bertram Wilson

Editorial Assistants

T. Miller, B. Moriarty,
and K.D. Wilson

Art Director

E. Stiller

Design/Production

S. Franklin and D. Miller

Advertising

M.E. Kaufold and D.L. Watterson

Circulation

S. Forrest

Guest Editors

J. Elliott and B. Hancock

Special Contributors

M. Allendorf, H. Aourag, R.A. Ayers,
M. Buehler, J.J. Carvajal, T. Cullis,
J.F. Fernández, V. Li, R. Louie,
X. Mathew, B. Stadler, and S. Trohalaki

Special Consultants

M.I. Baraton, G.M. Chow, R.L. Fleischer,
R.G. Ford, and M. Goodway

Associate Technical Editor

T. Palucka

Book Review Board

J.H. Westbrook (Chair), C. Batich,
R.J. Matyi, L. Olafsen, S. Sant, and
J.-C. Zhao

Visiting Scientist

V.S. Arunachalam
Center for Study of Science,
Technology & Policy
Bangalore, India

MRS Office of Public Affairs

499 South Capitol Street SW, Suite 600
Washington, DC 20003

EDITORIAL BOARD

P.S. Drzaic, Chair
Alien Technology Corp.
Morgan Hill, CA

V.S. Arunachalam
Center for Study of Science,
Technology & Policy
Bangalore, India

I.W. Boyd
University College London
London, UK

R.C. Cammarata
Johns Hopkins University
Baltimore, MD

Laura Fornaro
University of Uruguay
Montevideo, Uruguay

A.L. Greer
University of Cambridge
Cambridge, UK

G.G. Long
Argonne National Laboratory
Argonne, IL

S.C. Moss
Aerospace Corporation
Los Angeles, CA

J.R. Weertman
Northwestern University
Evanston, IL

E. Werwa
Washington, DC

J.H. Westbrook
Brookline Technologies
Ballston Spa, NY

S.M. Yalisove
University of Michigan
Ann Arbor, MI

VOLUME ORGANIZERS

2005

S.A. Carter
University of California,
Santa Cruz

M.E. Davis
California Institute
of Technology

T.P. Russell
University of Massachusetts

2006

P.A. Midgley
University of Cambridge,
UK

C.A. Orme
Lawrence Livermore
National Laboratory

J.A. Rogers
University of Illinois at
Urbana-Champaign

J.-C. Zhao
GE Global
Research Center

2007

T.F. Kuech
University of
Wisconsin-Madison

T.E. Mallouk
Pennsylvania State
University

J.A. Nucci
Max Planck Institute for
Metals Research,
Germany

R.A. Register
Princeton University

2008

Y.-T. Cheng
General Motors R&D Center

R.S. Goldman
University of Michigan

R. Krishnamoorti
University of Houston

A. Sellinger
Institute of Materials
Research and Engineering,
Singapore

2006 MRS OFFICERS

President

P.F. Green
University of Michigan

Vice President and President-Elect

A.J. Hurd
Los Alamos National Laboratory

Secretary

C.A. Volkert
Forschungszentrum Karlsruhe

Immediate Past President

D.J. Eaglesham
Applied Materials

Executive Director

Materials Research Society
J.B. Ballance

INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES

President

L. Zhou
NIN
Xian, Shaanxi, China

First Vice President

G.M. Crean
Tyndall Natl. Inst.
Cork, Ireland

Second Vice President

B.V.R. Chowdari
National University of Singapore
Singapore

Secretary

G. Zhang
BIAM
Beijing, China

Treasurer

H. Yamamoto
Nihon Univ.
Chiba, Japan

Immediate Past President

R.J. Nemanich
North Carolina State Univ.
Raleigh, NC, USA

General Secretary

R.P.H. Chang
Northwestern University
Evanston, IL, USA

IUMRS ADHERING BODIES

Australian Materials Research Society (A-MRS)
J.S. Williams, Australian National University

Brazil Materials Research Society (B-MRS)
E. Longo, UFSCar

Chinese Materials Research Society (C-MRS)
L. Zhou, NW Institute for Nonferrous Metal Research

European Materials Research Society (E-MRS)
H. Grimmer, University of Lund

Materials Research Society (MRS)
P.F. Green, University of Michigan

Materials Research Society of Argentina (MRS-Argentina)
J. Ovejero García, CNEA

Materials Research Society of India (MRS-I)
R.A. Mashelkar, Council of Scientific & Industrial Research

Materials Research Society of Japan (MRS-J)
O. Takai, Nagoya University

Materials Research Society of Korea (MRS-K)
J.-W. Park, Hanyang University

Materials Research Society of Russia (MRS-Russia)
N.Z. Lyakhov, Russian Academy of Sciences

Materials Research Society of Singapore (MRS-S)
B.V.R. Chowdari, National University of Singapore

Materials Research Society of Taiwan (MRS-T)
J.-M. Liu, ITRI

Mexican Materials Research Society (Mexican-MRS)
P.H. Hernández Tejada, Benemérita Universidad
Autónoma de Puebla