

## 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, Michigan 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.

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

### Art Director

E. Stiller

### Design/Production

S. Franklin

### Editorial Assistants

J. Guenther and K.D. Wilson

### Advertising

M.E. Kaufold and D.L. Watterson

### Circulation

S. Forrest

### Guest Editors

H. Coufal and L. Dhar

### Special Contributors

J.T. Abiade, S. Banerjee, D.J. Eaglesham, N. Lotan, T. Prasad, G. Rao, S. Trohalaki, D. Uskokovic, and T. Xu

### Special Consultants

M.-I. Baraton, M.-G. Chow, and G. Jabbour

### Associate Technical Editor

T. Palucka

### Book Review Board

J.H. Westbrook (Chair), C. Batich, G. Kellogg, D.C. Martin, R.J. Matyi, L. Olafsen, S. Sant, A. Sellinger, and J.-C. Zhao

### 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  
 Cambridge University  
 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, D.C.

J.H. Westbrook  
 Brookline Technologies  
 Ballston Spa, NY

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

## VOLUME ORGANIZERS

### 2004

P.S. Drzaic  
 Alien Technology Corp.

T.E. Haynes  
 Oak Ridge National  
 Laboratory

H. Van Swygenhoven  
 Paul Scherrer Institute

### 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

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

R.A. Register  
 Princeton University

## 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)  
 D. Chakravorty, IACS

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