

MRS BULLETIN

November 1998

A Publication of the Materials Research Society

Volume 23, Number 11 ISSN: 0883-7694 CODEN: MRSBEA

NEW FUNCTIONALITY IN GLASS

27 New Functionality in Glass

S. Houde-Walter and P. Green,
Guest Editors

31 Poled Glasses

W. Margulis, F.C. Garcia,
E.N. Hering, L.C. Guedes Valente,
B. Lesche, F. Laurell, and
I.C.S. Carvalho

36 Permanent Photoinduced Refractive-Index Changes for Bragg Gratings in Silicate Glass Waveguides and Fibers

J. Albert

43 Stimulation of Biological Function With Bioactive Glass

P. Ducheyne

51 The Dynamics of Mobile Ions in Ionically Conducting Glasses and Other Materials

K.L. Ngai and C.T. Moynihan

57 Transparent Oxyfluoride Glass Ceramics

M.J. Dejneka

63 Spectroscopic Studies on the Structures of Phosphate Sealing Glasses

R.K. Brow, T.M. Alam, D.R. Tallant,
and R.J. Kirkpatrick

INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES

68 IUMRS-ICEM-98 Convenes in Korea

69 MRS-Taiwan Initiates the Chinese Federation of Materials Societies and Other Activities During the Year of Its 30th Anniversary

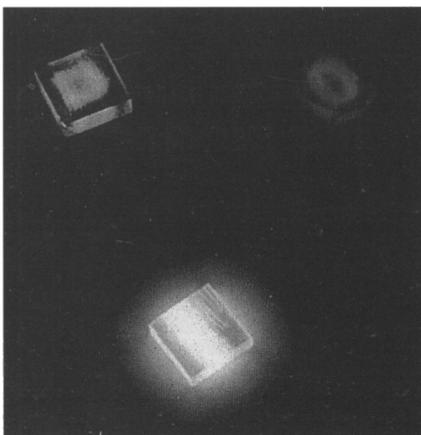
MRS NEWS

71 Graduate Student Award Finalists Compete at 1998 MRS Fall Meeting

ABSTRACTS

87 Abstracts for January 1999 *Journal of Materials Research*

98 Abstracts of *MRS Internet Journal of Nitride Semiconductor Research*, Volume 3, Articles 8-20



DEPARTMENTS

5 Letter from the President



6 Research/Researchers

19 Washington News

20 Public Affairs Forum

22 Resources

74 Upcoming Conference

75 Conference Report

77 Profiles & Perspectives

*Order in Disorder: Stanford
Ovshinsky Talks of His Materials,
Methods, and Machines*

85 Library

*Fundamentals of Ceramic Powder
Processing and Synthesis, T.A.
Ring, reviewed by J.D. Cawley;
Crystal Fire: The Birth of the
Information Age, M. Riordan and
L. Hoddeson, reviewed by R. Cahn.*

102 Calendar

104 Advertisers in This Issue

106 Classified

112 Postterminaries

ON THE COVER: Illustration of persistent phosphorescence in rare-earth-doped ZBLAN glasses that have been previously treated by exposure to femtosecond laser pulses. The choice of rare-earth dopant affects the colors achieved. Illustration courtesy of K. Hirao, Hirao Active Glass Project, ERATO, Japan.

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 12,000 scientists, engineers, and research managers from industrial, government, and university research laboratories in the United States and nearly 68 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 the Federation of Materials Societies 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. 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; phone 724-779-3003; fax 724-779-8313. Printed in the U.S.A.

Additional copies of articles in *MRS Bulletin* may be made at \$2.50 per article. This fee can be paid to the Materials Research Society through the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970.

Membership in MRS is \$75 annually for regular members, \$25 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 \$155 for one calendar year (12 issues) within the U.S.A. and \$215 elsewhere. Single copies may be purchased for \$16 each. Send subscription orders to Subscription Department, Materials Research Society, 506 Keystone Drive, Warrendale, PA 15086-7573. 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 in 16 mm microfilm, 35 mm microfilm, or 105 mm microfiche through University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48106.

Materials Research Society
506 Keystone Drive
Warrendale, PA 15086-7573 USA
Tel. 724-779-3003; Fax 724-779-8313
<http://www.mrs.org/>

MRS BULLETIN

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

Editor
E.L. Fleischer

Managing Editor
J. Meiksin

Assistant Editor
L.R. Gallagher

Art Director
E. Stiller

Design/Production
T. Aiello and S. Franklin

Editorial Assistants
J. Dininny, J.J. Stewart,
A. Williams, and M. Wilmoth

EDITORIAL BOARD

A.L. Greer, Chair
Cambridge University
Cambridge, UK

V.S. Arunachalam
Carnegie Mellon University
Pittsburgh, PA

E. Arzt
Max-Planck-Institute
Für Metallforschung und
University of Stuttgart
Stuttgart, Germany

R.W. Cahn
Cambridge University
Cambridge, UK

VOLUME ORGANIZERS

1998
O. Auciello
Argonne National Laboratory
Argonne, IL

1999
M.I. Baraton
University of Limoges
Limoges, France

VISITING SCIENTISTS

V.S. Arunachalam (1998)
Carnegie Mellon University
Pittsburgh, PA

R.L. Fleischer (1995)
Union College
Schenectady, NY

Advertising
M.E. Kaufold

Circulation
S. Forrest

Guest Editors
S. Houde-Walter and P. Green

Special Contributors
P. Berardelli, L.J. Chen, T. Cullis,
V.J. Ehlers, E.N. Kaufmann, H.J. Kim,
A. King, A. Polman, L. Snyder, and
J. Venables

Special Consultants
T.M. Besmann and M. Goodway

Associate Editor—Europe
I.W. Boyd, University College London
Dept. of Electronic and
Electrical Engineering
Torrington Place
London WC1E 7JE, U.K.
Tel. 44-171-380-7300 or 7302

Book Review Board
M.L. Green (Chair), R.W. Cahn, and
E.J. Kramer

MRS Office of Public Affairs
601 13th Street, NW, Suite 1000 South
Washington, DC 20005-3807
Tel. 202-661-2285, Fax 202-661-2299

D.J. Eaglesham
Bell Laboratories, Lucent Technologies
Murray Hill, NJ

E.J. Kramer
University of California—
Santa Barbara
Santa Barbara, CA

G.G. Long
National Institute of Standards
and Technology
Gaithersburg, MD

S.C. Moss
Aerospace Corporation
Los Angeles, CA

M.A. Nastasi
Los Alamos National Laboratory
Los Alamos, NM

S.T. Picraux
Sandia National Laboratories
Albuquerque, NM

Y. Shiohara
ISTEC
Tokyo, Japan

C.C. Tsai
Applied Komatsu Technology
Santa Clara, CA

J.H. Westbrook
Brookline Technologies
Ballston Spa, NY

R.J. Composto
University of Pennsylvania
Philadelphia, PA

R.C. Cammarata
Johns Hopkins University
Baltimore, MD

P.M. Fauchet
University of Rochester
Rochester, NY

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

R.W. Cahn (1997)
Cambridge University
Cambridge, UK

F.W. Clinard (1996)
Los Alamos National Laboratory
Los Alamos, NM

1998 MRS EXECUTIVE COMMITTEE

President
R.J. Nemanich
North Carolina State University

Vice President and President-Elect
R. Gibala
University of Michigan

Secretary
C.C. Tsai
Applied Komatsu Technology

Treasurer
A. Hurd
Sandia National Laboratories

Immediate Past President
R. Hull
University of Virginia

Councillors
H.A. Atwater
California Institute of Technology

M.L. Green
Bell Laboratories/Lucent
Technologies

Executive Director
Materials Research Society
John B. Ballance

INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES

President
R.C. Ewing
University of Michigan
Ann Arbor, MI, USA

First Vice President
H-D. Li
Tsinghua University
Beijing, China

Second Vice President
P.A. Glasow
Erlangen, Germany

Secretary
C-G. Li
Beijing, China

Treasurer
R-I. Yamamoto
University of Tokyo
Tokyo, Japan

Immediate Past President
M. Doiyama
Nishi-Tokyo University
Tokyo, Japan

General Secretary
R.P.H. Chang
Northwestern University
Evanston, Illinois, USA

IUMRS ADHERING BODIES

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

Chinese Materials Research Society (C-MRS)
H-D. Li, Tsinghua University

European Materials Research Society (E-MRS)
G.M. Crean, University College

Materials Research Society (MRS)
R.J. Nemanich, North Carolina State University

Materials Research Society of India (MRS-I)
R. Chidambaram, Atomic Energy Commission

Materials Research Society of Japan (MRS-J)
R-I. Yamamoto, University of Tokyo

Materials Research Society of Korea (MRS-Korea)
S-J. Park, Seoul National University

Materials Research Society of Russia (MRS-Russia)
I.V. Gorynin, Prometey Institute

Materials Research Society of Taiwan (MRS-T)
L.J. Chen, National Tsing Hua University

Mexican Materials Research Society (Mexican-MRS)
R. Perez, Laboratorio de Cuernavaca IFUNAM