

MRS BULLETIN

March 1999

A Publication of the Materials Research Society

Volume 24, Number 3 ISSN: 0883-7694 CODEN: MRSBEA

MEMBRANES AND MEMBRANE PROCESSES

- 19** Membranes and Membrane Processes
V.N. Burganos, Guest Editor
- 25** Microporous Inorganic Membranes for Gas Separation
S. Morooka and K. Kusakabe
- 30** Synthesis of Porous Inorganic Membranes
M. Tsapatsis and G.R. Gavalas
- 36** Characterization of the Pore Structure of Membranes
J.D.F. Ramsay
- 41** Transport of Gases in Porous Membranes
S.V. Sotirchos and V.N. Burganos
- 46** Dense Palladium and Perovskite Membranes and Membrane Reactors
Y.H. Ma
- 50** Separation of Volatile Organic Compounds from Water by Pervaporation
R.W. Baker

INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES

- 54** Argentine Association of Materials Joins IUMRS

MRS NEWS

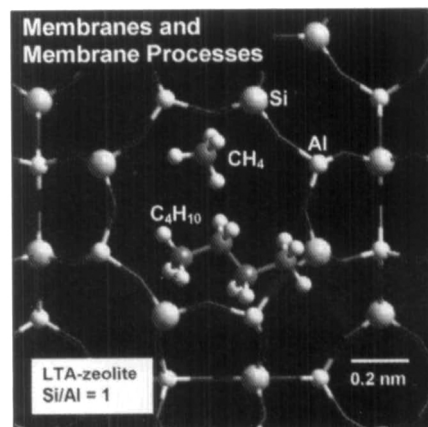
- 55** Frans Spaepen Receives 1998 Woody Award
- 56** 1998 MRS Fall Meeting Presents Broad Spectrum of Current Materials Research
- 80** Chad A. Mirkin Named Outstanding Young Investigator for Work on DNA/Nanoparticle Hybrid Materials
- 81** Plenary Speaker Gargini to Address Materials and the Semiconductor Industry
- 81** MRS Invites Nominations for the Von Hippel Award, Turnbull Lectureship, and MRS Medal

ABSTRACTS

- 87** Abstracts for May 1999
Journal of Materials Research
- 98** Abstracts for *MRS Internet Journal of Nitride Semiconductor Research*, Volume 3, Articles 24–31

DEPARTMENTS

- 5** Research/Researchers
- 14** Washington News
- 17** Resources
- 82** Career Clips
- 84** Library
Precipitation Hardening, 2nd ed., J.W. Martin, reviewed by R.W. Cahn
- 100** Advertisers in This Issue
- 102** Calendar
- 107** Classified



ON THE COVER: A computer-aided representation of LTA-zeolite shows molecules of methane and butane at the entrance of the main cage. Molecular sieving can lead to highly selective transport of even similar molecules. The indicated size of the atoms is four times smaller than the van der Waals size. For information on the preparation of zeolites and transport simulation, see the articles by M. Tsapatsis and G.R. Gavalas on p. 30 and S.V. Sotirchos and V.N. Burganos on p. 41.

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 \$80 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

Technical Editor
A. Bertram Wilson

Art Director
E. Stiller

Design/Production
T. Aiello and S. Franklin

Editorial Assistants
J. Dininny, L. Willson, 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

R.J. Composto
University of Pennsylvania
Philadelphia, PA

P.M. Fauchet
University of Rochester
Rochester, NY

VISITING SCIENTISTS

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

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

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

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

1999 MRS EXECUTIVE COMMITTEE

President
R. Gibala
University of Michigan

Vice President and President-Elect
H.A. Atwater
California Institute of Technology

Secretary
C.C. Tsai
Applied Komatsu Technology

Treasurer
M.J. Mayo
Pennsylvania State University

Treasurer (Interim)
A. Hurd
Sandia National Laboratories

Immediate Past President
R.J. Nemanich
North Carolina State University

Councillors
M.J. Aziz
Harvard University

A. King
State University of New York
at Stony Brook

Executive Director
Materials Research Society
John B. Ballance

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

Advertising
M.E. Kaufold and D.L. Watterson

Circulation
S. Forrest

Guest Editor
V.N. Burganos

Special Contributors
B. Harris, E.N. Kaufmann,
K. Kirkpatrick, G.R. Rao,
and L. Snyder

Special Consultants
T.M. Besmann, M. Freedhoff,
and M. Goodway

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

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

R.C. Cammarata
Johns Hopkins University
Baltimore, MD

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

2000
D.C. Martin
University of Michigan
Ann Arbor, MI

G.M. Pharr
University of Tennessee
Knoxville, TN

A. Polman
FOM Institute
Amsterdam, The Netherlands

INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES

President
L. Heng-De
Tsinghua University
Beijing, China

First Vice President
P.A. Glasow
Erlangen, Germany

Second Vice President
J.S. Williams
Australian National University
Canberra, Australia

Secretary
L-C Lee
Industrial Technology
Research Institute
Hsinchu, Taiwan

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

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

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)
L. Heng-De, Tsinghua University

European Materials Research Society (E-MRS)
I.W. Boyd, University College

Materials Research Society (MRS)
R. Gibala, University of Michigan

Materials Research Society of Argentina (MRS-Argentina)
J. Feugas, Universidad Nacional de Rosario

Materials Research Society of India (MRS-I)
S.K. Joshi, National Physics Laboratory

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)
L.M. Gomez, Instituto de Fisica UNAM