

MRS BULLETIN

June 1995

A Publication of the Materials Research Society

Volume XX, Number 6 ISSN: 0883-7694 CODEN: MRSBEA

ORGANIC THIN FILMS

- 18 Organic Thin Films: An Overview**
D.G. Whitten, T. Kajiyama, and T. Kunitake, Guest Editors
- 22 Chemistry of Self-Assembling Bilayers and Related Molecular Layers**
T. Kunitake
- 26 Structural Evaluation and Molecular Control of Vacuum-Evaporated Organic Thin Films**
K. Matsushige
- 32 Novel Concepts of the Aggregation Structure of Organic Monolayers on the Surface of Water**
T. Kajiyama
- 39 Supramolecular Assemblies of Chromophores in LB Films and Related Media**
H. Chen, C.W. Farahat, M.S. Farahat, H.C. Geiger, U.W. Leinhos, K. Liang, X. Song, T.L. Penner, A. Ulman, J. Perlstein, K-Y. Law, and D.G. Whitten
- 46 Surface Absorption of Monolayers**
A. Ulman
- 52 The Quartz-Crystal-Microbalance Study of Protein Binding on Lipid Monolayers at the Air-Water Interface**
Y. Okahata, Y. Ebara, and T. Sato

MRS NEWS

- 60 Kuech, Renschler, and Tsai to Chair 1996 MRS Spring Meeting**

JMR ABSTRACTS

- 63 Abstracts for August 1995**
Journal of Materials Research

DEPARTMENTS

- 4 Research/Researchers**
- 14 Washington News**
- 15 Public Affairs Forum**
- 16 Editor's Choice**
- 16 Advertisers in This Issue**
- 17 Resources**
- 57 University Chapter News**
- 58 Conference Report**
- 61 Historical Note**
- 70 Library**
- 71 Classified**



ON THE COVER: Atomic force microscopy image of a lignoceric acid monolayer over a scan area of $13.5 \times 13.5 \text{ nm}^2$. The brighter portions in the picture, arranged in a hexagonal array, are individual methyl groups with (10) spacing of 0.43 nm. The inset (a $3 \times 3 \text{ nm}^2$ scan area) corresponds to the marked circle and apparently exhibits a discontinuous molecular array in the crystal lattice. A typical edge dislocation can be observed in the center portion of the image, in which an additional molecular array is inserted between two molecular arrays coming down. For more information, please see "Novel Concepts of the Aggregation Structure of Organic Monolayers on the Surface of Water" on page 32.

The Materials Research Society (MRS), a non-profit scientific association founded in 1973, promotes interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes nearly 11,600 scientists, engineers, and research managers from industrial, government, and university research laboratories in the United States and nearly 50 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 50 topical symposia, and also sponsors numerous single-topic scientific meetings. The Society recognizes professional and technical excellence, conducts short courses, 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, 9800 McKnight Road, Pittsburgh, PA 15237. Application to mail at second class rates has been approved at Pittsburgh, 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 (412) 367-3003; fax (412) 367-4373. Printed in the U.S.A.

Additional copies of articles in the *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 and retired members. Dues include an allocation of \$29 (\$17 for students and retirees) to a subscription to *MRS Bulletin*. Individual member subscriptions are for personal use only. Non-member subscription rates are \$120 for one calendar year (12 issues) within the U.S.A. and \$175 elsewhere. Single copies may be purchased for \$16 each. Send subscription orders to Subscription Department, Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237.

MRS Bulletin is included in *Current Contents/Engineering, Computing, and Technology*; *Current Contents/Physical, Chemical, and Earth Sciences*; the *SciSearch* online database, *Research Alert*, and the *Materials Science Citation Index*. Back volumes of *MRS Bulletin* are available in 16mm microfilm, 35mm microfilm, or 105mm microfiche through University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48106.

Materials Research Society

9800 McKnight Road

Pittsburgh, PA 15237-6006

Tel. (412) 367-3003; Fax (412) 367-4373

Editorial Office • 9800 McKnight Road • Pittsburgh, PA 15237-6006

Tel. (412) 367-3003; fax (412) 367-4373

Publisher

G.A. Oare

Editor

E.L. Fleischer

Managing Editor

J. Meiksin

Assistant Editor

L.R. Gallagher

Copy Editors

J. Guenther and L.A. Kryszinski

Art Director

C. Love

Design/Production

T. Aiello and S. Franklin

Editorial Assistants

M.M. Costello and J. Dininny

Advertising

M.E. Kaufold

Circulation

S.E. Krasa

Guest Editors

T. Kajiyama, T. Kunitake, and D.G. Whitten

Special Contributors

I. Amato, M. Current, M. Freedhoff, and E. Pennisi

Special Consultant

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. 71-387-7050 ext. 3956 or 7304

Book Review Editor

C.J. McHargue
University of Tennessee
Knoxville, Tennessee

MRS Office of Public Affairs

555 13th Street NW, Suite 900 East
Washington, DC 20004
Tel. (202) 383-8809, Fax (202) 383-8877

CHAIR—EDITORIAL BOARDS

E.N. Kaufmann • Argonne National Laboratory • Argonne, Illinois, USA

INTERNATIONAL ADVISORY BOARD

M. Balkanski
University of Pierre and Marie Curie
Paris, France

R.G. Elliman
Australian National University
Canberra, Australia

S. Hsu
Chung Shan Institute of Science
and Technology, Retired
Taiwan, China

L.C. Ianniello
U.S. Department of Energy, Retired
Washington, DC, USA

H-D. Li
National Science Foundation-China
Beijing, China

P. Rama Rao
Ministry of Science and
Technology
New Delhi, India

R. Roy
The Pennsylvania State University
University Park, Pennsylvania, USA

T. Sugano
Toyo University
Tokyo, Japan

D.L. Weaire
University of Dublin
Dublin, Ireland

TECHNICAL EDITORIAL BOARD

J.C. Bravman
Stanford University
Stanford, California, USA

C.W. Draper
AT&T Engineering Research Center
Princeton, New Jersey, USA

E. Fogarassy
Centre de Recherches Nucléaires
Strasbourg, France

F.Y. Fradin
Argonne National Laboratory
Argonne, Illinois, USA

B.M. León
Universidad de Vigo
Vigo, Spain

G.L. Liedl
Purdue University
West Lafayette, Indiana, USA

S. Namba
Osaka University
Osaka, Japan

A.D. Romig Jr.
Sandia National Laboratories
Albuquerque, New Mexico, USA

J. Soares
Universidade de Lisboa
Lisboa, Portugal

K.C. Taylor
General Motors R&D Center
Warren, Michigan, USA

MRS BULLETIN PUBLICATIONS SUBCOMMITTEE

M. Nastasi, Chair
Los Alamos National Laboratory
Los Alamos, New Mexico

R.C. Ewing
University of New Mexico
Albuquerque, New Mexico

A.J. Hurd
Sandia National Laboratories
Albuquerque, New Mexico

M. Libera
Stevens Institute of Technology
Hoboken, New Jersey

F. Shapiro
Drexel University
Philadelphia, Pennsylvania

C.W. White
Oak Ridge National Laboratory
Oak Ridge, Tennessee

1995 MRS EXECUTIVE COMMITTEE

President

J.M. Phillips
AT&T Bell Laboratories

First Vice President and President-Elect
C.V. Thompson
Massachusetts Institute of Technology

Second Vice President

R. Hull
University of Virginia

Secretary

C.C. Koch
North Carolina State University

Treasurer
A.K. Hays
Sandia National Laboratories

Immediate Past President

J.C. Bravman
Stanford University

Executive Director
Materials Research Society
John B. Ballance

INTERNATIONAL UNION OF MATERIALS RESEARCH SOCIETIES

President

M. Doyama
Nishi-Tokyo University
Tokyo, Japan

Vice President

R.C. Ewing
University of New Mexico
Albuquerque, New Mexico
USA

Secretary

G-C. Chi
National Central University
Chung-Li, Taiwan

Treasurer

L-C. Lee
ITRI
Taiwan

Immediate Past President

P. Siffert
Centre de Recherches Nucléaires
Strasbourg, France

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, National Science Foundation—China

European Materials Research Society (E-MRS)
P.A. Glasow, Siemens AG

Materials Research Society (MRS)
J.M. Phillips, AT&T Bell Laboratories

Materials Research Society of India (MRS-I)
P. Rama Rao, Technology Bhavan

Materials Research Society of Japan (MRS-J)
T. Takagi, Ion Engineering Research Institute Corp.

Materials Research Society of Korea (MRS-Korea)
M.C. Chon, Chon International Co. Inc.

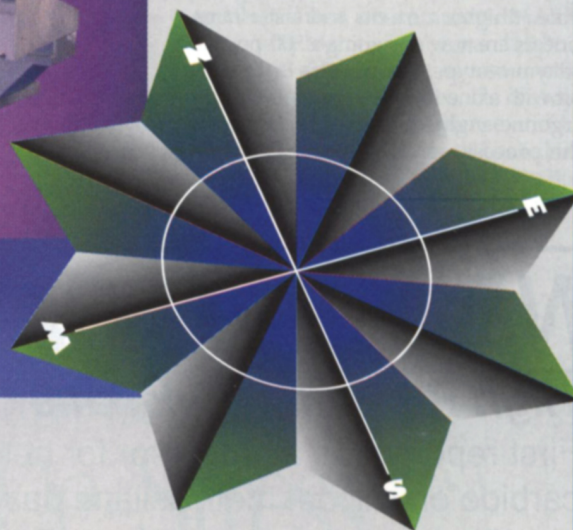
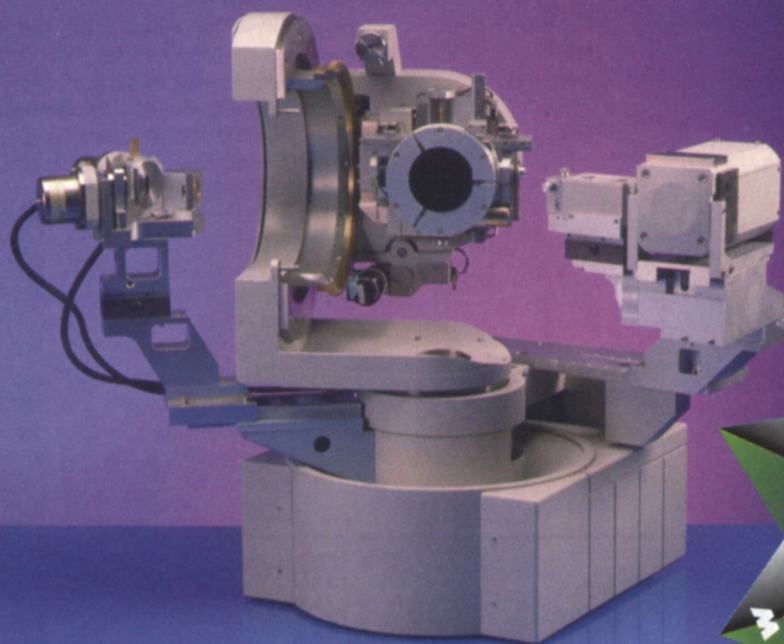
Materials Research Society of Russia (MRS-Russia)
I.V. Gorynin, Prometey Institute

Materials Research Society of Taiwan (MRS-T)
L-C. Lee, Industrial Technology Research Institute

Mexican Materials Research Society (Mexican-MRS)
M.J. Yacamán, Instituto de Física UNAM

New horizons in materials research

NEWS



The brand new X'Pert-Materials Research Diffractometers from Philips offer you the easiest access to direct solutions in materials research.

Optimum performance, versatility and immediate results in:

- High resolution
- Thin film
- Reflectometry
- Texture
- Stress
- Phase

Seeing is believing

Please ask for a free demonstration disk

Philips Analytical X-Ray BV
Lelyweg 1, 7602 EA Almelo,
The Netherlands.

Tel. +31 (546) 839430.

Fax +31 (546) 839598.

**Philips Electronic
Instruments Company**
85 McKee Drive, Mahwah,
NJ 07430, USA.

Tel. +1 (201) 5296246.

Fax +1 (201) 5295084.

Philips
Analytical
X-Ray



PHILIPS

Circle No. 16 on Reader Service Card.