

Finally, G. Petite (CEA, France) gave a very instructive presentation on electron emission associated with laser solid interactions both in metals and dielectrics.

### Diagnostics

The physical mechanisms of ablation remain controversial but are expected to largely depend both on the physico-chemical properties of the target and laser irradiation conditions. This is why it appears of paramount importance to analyze the plasma formation and species emission from laser treated targets using *in-situ* time- and space-resolved techniques.

Laser ablation of high  $T_c$  superconductor and semiconductor targets under vacuum and gaseous conditions was investigated by P.E. Dyer (University of Hull, U.K.), K. Murakami (University of Tsukuba, Japan), and A. Catherinot (University of Limoges, France) using optical spectroscopy and/or fast imaging techniques.

D.B. Geohegan (Oak Ridge National Laboratory, U.S.A.) extensively studied

laser-produced plasma from YBaCuO targets by a combined set of *in-situ* diagnostics such as ion probes, optical emission and absorption spectroscopy and ICCD photography.

### Applications

As clearly depicted by H.U. Habermeier (Max-Planck-Institut, Germany) and J. Perriere (University of Paris 6-7, France) for YBaCuO and BiSrCaCuO, respectively, laser ablation is able to produce high quality films of the new superconductor compounds, meeting industrial requirements.

These successful results explain the recent growing interest in depositing and synthesizing thin films of new materials with this novel technique. J.T. Cheung (Rockwell I.S.C., U.S.A.) also emphasized the technique for growing epitaxial layers of CdTe, HgCdTe, and their superlattices as did D.H. Lowndes (Oak Ridge National Laboratory, U.S.A.) for fabricating epitaxial copper oxide semiconductor/superconductor heterostructures.

Another important area is laser surface patterning of electronic materials. Laser surface modification and ablation of polymers, important in microelectronics, was reviewed by A. Yabe (NCLI, Tsukuba, Japan).

An interesting comparison between laser ablation and laser etching of silicon in a chlorine atmosphere was presented by J. Boulmer (IEF Orsay, France). Finally, in instrumentation, J.F. Muller (University of Metz, France) demonstrated that laser ablation coupled with a mass spectrometer could be an alternative tool for surface characterization and material analysis.

A proceedings including invited and contributed papers is under preparation and will be published by Elsevier/North Holland.

For information, please contact: E. Fogarassy, CRN-PHASE, BP 20, 67037 Strasbourg Cedex, France; phone (33) 88-28-62-57; fax (33) 88-28-09-90.

## UPCOMING CONFERENCES

### 1992 P/M Congress to Feature Powder Metallurgy, Particulate Materials

The 1992 Powder Metallurgy World Congress, June 21-26, San Francisco, California, will air its largest technical program yet on powder metallurgy and particulate ma-

terials. Sponsored by the Metal Powder Industries Federation and the American Powder Metallurgy Institute, the congress will feature more than 400 presentations in technical sessions, seminars, specialty symposiums on emerging technologies, and poster sessions. More than 2,500 delegates are expected from 40 countries. The

Congress is held once every four years in North America.

Program topics cover metal powder production techniques and properties, powder consolidation and production techniques, specialty materials, and new applications of the technology.

Some specific subjects to be covered include high-temperature and liquid-phase sintering, powder injection molding, thermal spraying, wear-resistant materials, nanoscale materials, hybrid packaging and other electronic materials, intermetallics, metal matrix composites, rapid solidification technology, superconductors and lightweight alloys.

Special programs will review powder injection molding, the automotive and P/M industries, emerging P/M composites, mechanical alloying, and super plastic forming of P/M parts.

In addition to the technical program, the conference will include a trade exhibition featuring materials, equipment, and products from international suppliers.

The metal powder field is growing in Western and Eastern Europe and in the Pacific Rim nations. Annual worldwide metal powder shipments exceed 800,000 tons.

For further information and a copy of the technical program, contact: Metal Powder Industries Federation, 105 College Road East, Princeton, New Jersey 08512; phone (609) 452-7700; fax (609) 987-8523. □

#### Announcement

### Second Conference on Computational Research on Materials

April 12, 13, and 14, 1992  
Lakeview Resort and Conference Center  
Morgantown, West Virginia

Join leading material researchers from universities, industry, and national laboratories in assessing the aims and latest developments in the computational materials research agenda:

- the national materials research agenda and materials modeling
- industrial applications of computational materials modeling
- atomistic and continuum modeling for the design of both structural and functional materials systems
- the role of highly parallel computing for specific problems
- linking experimental verification to atomistic and continuum modeling

#### For more information, contact:

**Prof. Bernard R. Cooper**, Department of Physics, West Virginia University, Morgantown, WV 26506. Telephone (304) 293-3423, FAX (304) 293-3120.

Circle No. 14 on Reader Service Card.

# NEW TITLES IN MATERIALS SCIENCE

## Fatigue of Composite Materials

edited by **K.L. Reifsnider**

(Composite Materials Series Volume 4)

This book provides the first comprehensive review of its kind on the long-term behaviour of composite materials and structures subjected to time variable mechanical, thermal, and chemical influences, a subject of critical importance to the design, development, and certification of high performance engineering structures. The volume provides an extensive presentation of data, discussions, and comparisons on the behaviour of the major types of material systems in current use, as well as extensive analysis and modeling (including the first presentation of work not found elsewhere). The scope of the work extends from entry level material to the frontiers of the subject.

1991 xii + 520 pages  
Price: US \$ 200.00 / Dfl. 350.00  
ISBN 0-444-70507-4

## Computer Aided Innovation of New Materials

Proceedings of the 1st International Conference and Exhibition on Computer Applications to Materials Science and Engineering - CAMSE '90, Sunshine City, Ikebukuro, Tokyo, Japan, 29-31 August 1990

edited by **M. Doyama, T. Suzuki, J. Kihara and R. Yamamoto**

This volume brings together the experience of specialists in the entire field of applications of Materials Science. The volume contains 196 of the excellent papers presented at the conference. This multidisciplinary meeting was held to bring together workers in a wide range of materials science and engineering activities who employ common analytical and experimental methods in their day to day work. The results of the meeting are of worldwide interest, and will help to stimulate future research and analysis in this area.

1991 xxiv + 984 pages  
Price: US \$ 283.00 / Dfl. 495.00  
ISBN 0-444-88864-0

Circle No. 15 on Reader Service Card.

## Microionics Solid-State Integrable Batteries

edited by **M. Balkanski**

The broad scope of the papers in this volume will facilitate the reader towards a deeper understanding of the basic processes in fast-ion conduction and intercalation, as well as paving the way for further research. The original results obtained within the framework of this project have already been published in a companion volume entitled Solid State Ionics edited by M. Balkanski and C. Julien. Together these two publications constitute a firm basis for the future development of this very promising field of Solid State Ionics.

1991 xiv + 512 pages  
Price: US \$ 200.00 / Dfl. 350.00  
ISBN 0-444-88853-5

## Science of Ceramic Interfaces

edited by **J. Nowotny**

(Materials Science Monographs Volume 75)

The significance of surfaces and interfaces in the processing and properties of ceramics is reviewed in this volume in a concentrated and accessible form. Research in this field, involving specialized experimental techniques, sophisticated experimental approaches and theoretical methods of investigations, has resulted in the formation of an independent discipline of the science of ceramic interfaces. This discipline combines several other areas such as surface chemistry, high temperature chemistry and ceramics. The purpose of the present volume is to bridge these disciplines and to present an overview of the state of the art in several aspects of the science of ceramic interfaces.

1991 xx + 612 pages  
Price: US \$ 197.00 / Dfl. 345.00  
ISBN 0-444-88181-6

For a listing of the complete contents, please contact the publisher.

ELSEVIER SCIENCE PUBLISHERS  
P.O. Box 103, 1000 AC Amsterdam,  
The Netherlands

Customers in the U.S.A. and Canada please contact:

ELSEVIER SCIENCE PUBLISHING Co. Inc.  
P.O. Box 882, Madison Square Station,  
New York, NY 10159, U.S.A.



*The* **ELSEVIER**  
*Materials Science*  
*Publisher*

AMSTERDAM • LAUSANNE • LONDON • NEW YORK • OXFORD • TOKYO

## ◆ New Materials Development



## ◆ New Characterization Methods

## ◆ New Process Technology

April 27-May 1

Spring  
'92

San Francisco Marriott  
San Francisco, CA

### ◆ Technical Program

- A: Amorphous Silicon Technology - 1992
- B: Chemical Surface Preparation, Passivation and Cleaning for Semiconductor Growth and Processing
- C: Advanced Metallization and Processing for Semiconductor Devices and Circuits - II
- D: Photo-Induced Space Charge Effects in Semiconductors: Photoconductivity, Spectroscopy and Electro-Optics
- E: Defect Engineering in Semiconductor Growth, Processing and Device Technology
- F: Mechanisms of Heteroepitaxial Growth
- G: Electronic Packaging Materials Science VI
- H: Materials Reliability
- Ia: Materials Interactions Relevant to Recycling of Wood-Based Materials
- Ib: Materials for Energy Technologies
- Ic: Materials for Separation Technology
- J: Materials Issues in Art & Archaeology III
- K: Materials Modification by Energetic Atoms and Ions
- L: Microwave Processing of Materials
- M: Novel Forms of Carbon
- N: Better Ceramics through Chemistry V
- O: Chemical Processes in Inorganic Materials: Metal and Semiconductor Clusters and Colloids
- P: Aerosol Precursors to Materials
- Q: Intermetallic Matrix Composites II
- R: Submicron Multiphase Materials
- S: Layered Superconductors: Fabrication, Properties, and Applications
- T: Defect Structures in Crystalline Electronic Oxides
- U: "Smart" Materials Fabrication
- V: Macromolecular Host-Guest Complexes: Optical and Optoelectronic Properties and Applications
- W: Computational Methods in Materials Science
- X: Frontiers of Materials Research
- Y: Materials for Micro-Electro-Mechanical Systems

### ◆ Job Placement Bulletin Board

A Job Placement Bulletin Board for MRS Spring Meeting and Short Course attendees will be open Tuesday through Thursday during the Meeting. Contact Jane Stokes at MRS Headquarters to request application forms and/or information: (412) 367-3003; FAX (412) 367-4373.

### ◆ Symposium Aide Opportunities

Graduate students who plan to attend the Spring Meeting and who are willing to assist in the symposium presentations to earn a waiver of entry fees are encouraged to apply for Symposium Aide positions.

### ◆ Equipment Exhibit

A major exhibit of the latest analytical and processing equipment which closely parallels the nature of the technical symposia will be located in the Yerba Buena Ballroom, San Francisco Marriott Hotel, convenient to the technical session rooms. For show booth information, contact: Bob Finnegan, MRS Show Manager, American Institute of Physics, 335 East 45th Street, New York, NY 10017; Telephone (212) 661-9404; FAX (212) 661-2036.

### ◆ Short Course Program

Courses on advanced materials characterization, preparation, and processing/diagnostic techniques have been designed for scientists, engineers, managers, and technical staff who wish to update their knowledge and skills in the research, development and processing of materials. These up-to-date courses are at the forefront of science and technology and complement Spring Meeting symposia. Class sizes are limited. Early preregistration is encouraged.

### ◆ Proceedings

Many of the MRS symposia will be publishing proceedings. For a complete list of MRS publications and prices, contact Materials Research Society, Publications Department, 9800 McKnight Road, Pittsburgh, PA 15237; Telephone (412) 367-3012; FAX (412) 367-4373.

### ◆ Preregistration

Preregister by telephone, (412) 367-3003, or FAX (412) 367-4373, with your VISA, MasterCard or Diners Club card. Ask for Meeting Registration and your preregistration will be completed for you. Telephone preregistrations are accepted between 8:00 a.m. and 5:00 p.m. EST, Monday through Friday. Confirmations will be mailed within 10 working days.

To request detailed 1992 Spring program, short course, or symposium aide information, contact:



### Materials Research Society

9800 McKnight Road, Pittsburgh, PA 15237  
Telephone (412) 367-3003, FAX (412) 367-4373

The 1992 MRS Spring Meeting will serve as a key forum for discussion of interdisciplinary leading-edge materials research from around the world. Various meeting formats - oral, poster, roundtable, forum and workshop sessions - are offered to maximize participation.

910207

**Plenary Speaker**  
**Bassam Z. Shakhshiri**  
**Monday, April 27, 1992**  
**San Francisco Marriott**

An outspoken advocate of science and technology education and literacy, Bassam Z. Shakhshiri is a professor of chemistry at the University of Wisconsin-Madison and holds AB, MS, and PhD degrees in chemistry as well as several honorary doctorates. He founded the University of Wisconsin's Institute for Chemical Education in 1983 and is co-author of several texts and videotapes on chemistry. He was the National Science Foundation's assistant director for science and engineering education from 1984 to 1990 and claims credit for having set the NSF education budget on a \$600 million trajectory for fiscal year 1993.

Shakhshiri is well-known for his development and use of demonstrations in teaching to prove that "science is fun." He has had an interactive chemistry exhibit on display since 1983 at the Chicago Museum of Science and Industry and annually puts on a Christmas science show that has been presented at various places, including the National Academy of Sciences and the Smithsonian's National Air and Space Museum.

**Travel and Lodging**

Meeting Hotel:  
 San Francisco Marriott Hotel  
 55 Fourth Street  
 San Francisco, CA 94103  
 (800) 228-9290 Nationwide  
 (415) 896-1600 Direct  
 FAX (415) 442-0141

A block of rooms has been reserved for MRS meeting attendees at the San Francisco Marriott Hotel. When reserving your room, mention the Materials Research Society to receive the special rates: \$140 single; \$165 double.

**DEADLINE FOR HOTEL RESERVATIONS: March 30, 1992**

**Air Travel:**

American Airlines is offering special rates for traveling to and from the San Francisco meeting from Friday, April 24, through Monday, May 4, 1992:

- 45% off full-day coach fare (U.S. only),
- 5% off all other fares with all tariff rules in effect.

To take advantage of these discounts — available only through American Airlines' toll-free number:

1. Call American Airlines today, or have your travel agent call: (800) 433-1790
2. Refer to Star Number: S02Z2VO

**Preregistration Fees**

Preregistration fees for the MRS meeting are \$225 for MRS members; \$260 for nonmembers; \$60 for student members; \$70 for student nonmembers; and \$95 for MRS short course attendees registered for two or more short course days.

Preregister by **April 17, 1992**, to take advantage of pre-meeting fees. Registrations received after April 17, 1992, will be charged at-meeting rates. At-meeting registration fees will be \$50 higher (\$10 higher for students) than preregistration fees.

Preregistrations are accepted by mail, phone, or fax. If you need a form for mail or fax preregistration, call (412) 367-3003.

**Telephone Preregistrations** require credit card payment (VISA, MasterCard, or Diners Club only). Call (412) 367-3003 and ask for *Meeting Registration, Monday* through Friday between 8:00 a.m. and 5:00 p.m. EST.

**Telephone preregistrations will close at 5:00 p.m., Friday, April 17, 1992.**



**MRS Short Course Program**

**Five New Course Topics and Tutorial**

Selected short courses and a tutorial covering the latest developments in materials science and technology will be offered in conjunction with the 1992 Spring Meeting of the Materials Research Society. These up-to-date presentations are at the forefront of science and technology and complement Spring Meeting symposium topics. **SPECIALITY, REVIEW, AND SURVEY COURSES** and the **TUTORIAL** are designed to meet the needs of professional scientists, engineers, professional staff, and managers who want to know the latest techniques relating to materials science and technology.

For information regarding registration, student scholarships, and special meeting registration discounts, contact MRS Headquarters: **Telephone (412) 367-3003; Fax (412) 367-4373.**

	<b>Preregistration Tuition</b>
<b>Advanced Materials</b>	
<b>Optoelectronic Materials, Processes, and Devices</b>	
Instructor: Mool C. Gupta	
Friday-Saturday, May 1-2 .....	\$595
<b>Polymers for Electronic and Photonic Applications</b>	
Instructors: C.P. Wong, C. Grant Willson and Robert J. Twieg	
Saturday-Monday morning, April 25-27 .....	\$645
<b>Characterization of Materials</b>	
<b>Amorphous Silicon Technology</b>	
Instructors: Robert A. Street and Michael G. Hack	
Monday, April 27 .....	\$395
<b>IC Failure Mechanisms and Analytical Techniques</b>	
Instructor: Giorgio Riga	
Thursday-Friday, April 30-May 1 .....	\$595
<b>Scanning Electron Microscopy: Applications to Electronic Materials and Devices</b>	
Instructor: Alton D. Romig, Jr.	
Tuesday-Wednesday, April 28-29 .....	\$595
<b>TEM Specimen Preparation in the Physical Sciences</b>	
Instructor: Ronald M. Anderson	
Monday afternoon-Tuesday, April 27-28 .....	\$450

<b>Characterization of Diamond Films</b>	
Instructors: Jeffrey T. Glass and Robert J. Nemanich	
Sunday, April 26 .....	\$395
<b>Materials Research and Analysis Using In Situ and Ex Situ Spectroscopic Ellipsometry</b>	
<b>New!</b> Instructor: John A. Woolam	
Tuesday, April 28 .....	\$395
<b>Preparation and Fabrication of Materials Film and Coating Deposition Techniques</b>	
Instructor: Donald M. Mattox	
Tuesday-Wednesday, April 28-29 .....	\$595
<b>Plasma Etching for Microelectronic Fabrication</b>	
Instructor: G. Kenneth Herb	
Monday, April 27 .....	\$395
<b>Materials and Processing Aspects of Advanced VLSI Assembly and Packaging</b>	
<b>New!</b> Instructor: Shankara K. Prasad	
Thursday-Saturday, April 30-May 2 .....	\$825
<b>Microwave Interactions with Dielectric Materials</b>	
Instructors: Hal D. Kimrey and Magdy F. Iskander	
Saturday-Sunday, April 25-26 .....	\$595
<b>Materials and Processes at the Leading Edge of Microlithography</b>	
<b>New!</b> Instructor: Gary N. Taylor	
Friday, May 1 .....	\$395
<b>Film Formation, Adhesion, Surface Preparation, and Characterization of Thin Film Structures</b>	
Instructor: Donald M. Mattox	
Saturday-Sunday, April 25-26 .....	\$595
<b>Vapor Phase Synthesis of Powders and Films</b>	
<b>New!</b> Instructors: Toivo Kodas and Sotiris E. Pratsinis	
Monday, April 27 .....	\$395
<b>Fundamentals of Epitaxial Growth Techniques for Compound Semiconductors</b>	
Instructor: L. Ralph Dawson	
Saturday-Sunday, April 25-26 .....	\$595
♦ ♦ ♦ ♦ ♦	
<b>Tutorial Program</b>	
<b>Introduction to Parallel Supercomputing in Material Science</b>	
<b>New!</b> Instructors: Jeffrey S. Nelson, Mark P. Sears and Steve J. Plimpton	
Monday morning, April 27 .....	\$145
<b>Special Fee Discounts:</b>	
• P-14 and F-01 - \$975 Total Fee; C-16 and C-12 - \$975 Total Fee	
• Facilities registering three or more persons at the same time in one MRS short course receive a 20% discount for the third and all additional persons.	