

a national laboratory operates.

In April 1998, I began a one-year assignment as a senior policy analyst at the White House Office of Science and Technology Policy (OSTP) Technology Division, on leave from Sandia National Laboratories. The Technology Division, under the direction of Duncan Moore, the Associate Director for Technology, helps to shape federal policies for harnessing technology to serve national goals and to foster a strong U.S. economy. In this position, I serve many functions which include providing advice in the analysis, development, and implementation of Presidential S&T policy; assisting in identifying policy issues and problems requiring the Technology Division's attention; suggesting the outline, scope, schedule, and appropriate staffing for studies; and assisting in coordinating the work of the Technology Division with that of OSTP's other divisions. I also represent OSTP on a wide range of government and private sector forums.

Some of the issues for which I am re-

sponsible include transportation research and a Partnership for a New Generation of Vehicles initiative; biotechnology; marine technology; environmental industrial initiatives; and eldercare technology to improve the lives of older Americans. I also serve as the OSTP point of contact for a few Technology Subcommittees of the National Science and Technology Council—an inter-agency arm of OSTP—including one that focuses on materials technologies.

Working in the Executive Office of the President environment is an intense and exhilarating experience. In this job, I work with creative thinkers within the White House Agencies and help identify critical technological initiatives of national interest that need to be considered by President Clinton and Vice President Gore.

As a chemistry major with a business option at the University of Richmond (UR), I never would have predicted that my career would follow such a path. Two of my undergraduate professors played an instrumental role in carving out my graduate career and introducing me to

materials science and engineering.

My experience at a liberal arts college and as a head resident (resident hall manager and counselor) at UR gave me the confidence to pursue a new path. Being a head resident helped me to hone my leadership skills, while the liberal arts environment provided me with ways to look at issues from a broad base and with the creativity to step out of the academic box. I saw that I could use my doctorate in materials science in one of two ways: technically as a research scientist, or as a process whereby I could use my problem-solving skills to dissect, understand, and solve a problem. I have chosen to follow the latter.

Choosing this career path has been very stimulating for me and will provide me with skills that do not constrain me to one type of work. Someday I may parlay my skills into private industry to forecast future technical market sectors for high-tech industry. After that, anything is possible. Who knows, maybe someday I will run for office. □

## LIBRARY

### **Precipitation Hardening, 2d ed.**

*J.W. Martin*  
(Butterworth-Heinemann,  
Oxford, 1998)  
xiv + 219 pages, \$74.95  
ISBN 0-7506-3885-0

The author, John Martin, is emeritus reader in physical metallurgy at Oxford University, and one of the leading physical metallurgists in Britain. Just 30 years ago, he published an iconoclastic small textbook with Pergamon Press—the first edition of the work under review here. The unusual feature about it was that two-thirds of the book was devoted to reprints of 15 classical papers on aspects of precipitation hardening—complete or in the form of excerpts. That first edition, commended in a foreword by no less a metallurgist than Hume-Rothery himself, was to be the first of a series of undergraduate texts using this format, but so far as I know it remained the only member of its series (Hume-Rothery died about the time the first edition appeared). At the time, I reviewed the book enthusiastically since I had made some experiments in using classical texts as a feature of education in materials science and this book (as indeed Hume-Rothery pointed out in his foreword) could be used to train the critical and historical skills of students.

The first edition has long since been out

of print, and therefore this new, scrupulously updated edition is to be welcomed. Although it has slightly fewer pages than its predecessor, it is actually slightly longer because the page size has been increased. The extracts from various classical papers now make up only 20% of the total length, and they now feature as appendices to the relevant chapters. One such extract (actually a full reprint) is a recent (1996) memoir by André Guinier (co-discoverer of GP zones) of how his 1937 breakthrough happened. (He never met the co-discoverer, the Scot G.D. Preston, whose own account is also reprinted here.) Classic extracts include a translation of Alfred Wilm's original paper of 1911, in which the mystified engineer reports on the spontaneous hardening of his aluminum alloy over a weekend, and a notable American paper by Z. Jeffries and R.S. Archer (1921) on the "slip interference theory of the hardening of metals." I was sorry to see that one of David Turnbull's deceptively simple papers on the effects of quenching on the resistivity of aluminum-copper alloys, included in the first edition, has been taken out; this is one of my favorite papers in all of physical metallurgy! However, instead we have a fine paper "on the yield stress of aged Ni-Al alloys" by R.G. Davies and N.S. Stoloff (1965). Both these authors are still happily active in research. A short

extract from Egon Orowan's original (1948) theory of dislocation bowing and the bypassing of dispersed particles is also included.

The book offers a marvelously clear and economical exposition of the microstructure and mechanics (including fracture) of age-hardened alloys, and while most of the references, as might be expected from a mature topic, are fairly old, some recent ones cover such topics as small-angle x-ray and neutron scattering and the properties of Al-Li alloys, both relatively new topics.

The book can be unreservedly recommended to those materials science professors who are not yet ashamed of including aspects of physical metallurgy in their teaching schedules. The only pity is that Hume-Rothery's principle of texts with selected extracts could not be extended to other topics in materials science.

*Reviewer: Robert W. Cahn is a physical metallurgist turned materials scientist, currently attached in nominal retirement to Cambridge University. He has researched on intermetallics and many other metallurgical themes, has edited a number of journals and book series devoted to materials science, and has striven over the years to popularize materials science in the pages of Nature. He is a member of the Editorial Board of MRS Bulletin and a member of the publication's Book Review Board.*



# Expand Your Materials Science Library with Springer Books

AIP  
PRESS

P.Y. YU, University of California, Berkeley, and M. CARDONA, Max-Planck-Institut für Festkörperforschung, Stuttgart, Germany

## FUNDAMENTALS OF SEMICONDUCTORS

Physics and Materials Properties

SECOND EDITION

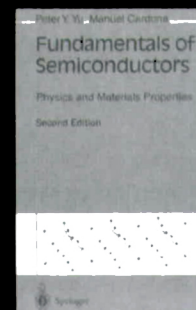
FROM REVIEWS OF THE FIRST EDITION—

"The most striking feature of the book is its modern outlook... provides a wonderful foundation... The most wonderful feature is its efficient style of exposition... an excellent book."  
—PHYSICS TODAY

"There is nothing quite like it in the genre of graduate texts. Those embarking on research into the optical properties of semiconductors will benefit from working through these chapters [on optical properties] and the problems set at the end... A student who masters this text will have a solid introduction to the optical properties of semiconductors from which to launch a subsequent career in semiconductors."  
—CONTEMPORARY PHYSICS

This second edition is updated and corrected throughout.

1999/APPROX. 630 PP., 246 ILLUS., 50 TABLES/HARDCOVER/\$59.95  
ISBN 3-540-65352-X



M. DAUD, CEA-CNRS, Gif-sur-Yvette, and  
C.E. WILLIAMS, Université de Paris Sud, Orsay,  
both, France (Eds.)

## SOFT MATTER PHYSICS

This book offers the first introduction to the physics of soft materials in a single volume. It covers a variety of experiments and concepts, including the phenomena of capillarity and wetting, fractals, small volumes and large surfaces, colloids, surfactants, giant micelles and fluid membranes, polymers, and liquid crystals. Each chapter is written by experts in the field. Nobel Prize winner P.-G. de Gennes has written the foreword.

1999/APPROX. 330 PP., 153 ILLUS. (9 IN COLOR),  
9 TABLES/HARDCOVER/\$79.95  
ISBN 3-540-64852-6

P. MILANI, University of Milano, and  
S. IANNOTTA, Povo di Trento, both, Italy

## CLUSTER BEAM SYNTHESIS OF NANOSTRUCTURED MATERIALS

Provides a systematic description of the preparation, characterization and manipulation of cluster beams for the synthesis of nanocrystalline materials. It also addresses all the issues relevant in the realization of nanophase structures (cluster-surface interaction, cluster coalescence), and provides a complete description of the method. Particular emphasis is given to the potential of this technique in connection with the synthesis of nanostructured materials and to the combination of cluster beams with other surface science experimental techniques.

1999/APPROX. 244 PP., 150 ILLUS./HARDCOVER  
\$89.95/ISBN 3-540-64370-2

D. DRAGOMAN, University of Bucharest, and  
M. DRAGOMAN, National Institute for Research and  
Development in Microtechnology, both, Romania

## ADVANCED OPTOELECTRONIC DEVICES

This book gives the first unified presentation of the physics and applications of optoelectronic devices. The reader will benefit from a comprehensive mathematical treatment, and from a state-of-the-art presentation of the latest results in applied optoelectronics and semiconductor physics. The two different and complementary physical theories for describing optoelectronic devices, namely the electromagnetic field theory and quantum mechanics, are treated together, so that links and analogies are made apparent wherever possible.

1999/464 PP., 142 ILLUS./HARDCOVER/\$129.00  
ISBN 3-540-64846-1  
SPRINGER SERIES IN PHOTONICS, VOL. 1

R. E. HUMMEL, University of Florida, Gainesville

## UNDERSTANDING MATERIALS SCIENCE

History, Properties, Applications

"Has succeeded admirably in rendering such intrinsically complicated topics, such as polymerization, palatable and digestible. As a first-level introduction to materials science I recommend it unreservedly."  
—MRS BULLETIN

This introduction to materials science examines not only the physical and engineering properties of materials, but also their history, development, and uses. Hummel organizes the major classes of materials chronologically, progressing through materials in the order humanity learned to add them to its cultural and technological repertoire.

1998/426 PP., 351 ILLUS./HARDCOVER/\$59.95  
ISBN 0-387-98303-1

H. METCALF, SUNY Stony Brook, NY, and  
P. VAN DER STRATEN, University of Utrecht,  
The Netherlands

## LASER COOLING

This comprehensive monograph on laser cooling begins with a review of the relevant results of quantum mechanics, and then turns to the electromagnetic interactions involved in slowing and trapping atoms and ions, in both magnetic and optical traps. The concluding chapters discuss a broad range of applications, from atomic clocks and studies of collision processes to diffraction and interference of atomic beams at optical lattices and Bose-Einstein condensation.

1999/APPROX. 312 PP., 110 ILLUS./SOFTCOVER  
\$24.00 (TENT.)/ISBN 0-387-98728-2  
HARDCOVER/\$69.95 (TENT.)/ISBN 0-387-98747-9  
GRADUATE TEXTS IN CONTEMPORARY PHYSICS

R. KRAUSE-REHBERG and H.S. LEIPNER,  
both, University of Halle-Wittenberg, Germany

## POSITRON ANNIHILATION IN SEMICONDUCTORS

Defect Studies

Discusses the use of positron annihilation to investigate lattice imperfections in semiconductors. A comprehensive review is given of different positron techniques and their application to various kinds of defects, e.g. vacancies, impurity-vacancy complexes, and dislocations, is described. A special chapter of the book deals with positron annihilation as a promising tool for many technological purposes.

1999/APPROX. 416 PP., 211 ILLUS., 20 TABLES  
\$109.00/ISBN 3-540-64371-0  
SPRINGER SERIES IN SOLID-STATE SCIENCES,  
VOL. 127

K. K. CHAWLA, New Mexico Tech, Socorro

## COMPOSITE MATERIALS

Science and Engineering

SECOND EDITION

FROM A REVIEW OF THE FIRST EDITION—

"...well-organized, up-to-date, informative...."  
—AMERICAN SCIENTIST

This completely up-to-date second edition contains new chapters on fatigue and creep of composites, while others have been brought up to date.

1998/483 PP., 403 ILLUS./HARDCOVER/\$69.95  
ISBN 0-387-98409-7

Visit our website for more information on:

J. LAANE, Texas A&M University of Texas, et al. (Eds.)

## STRUCTURE AND DYNAMICS OF ELECTRONIC EXCITED STATES

1999/320 PP., 165 ILLUS., 36 TABS./HARDCOVER  
\$169.00/ISBN 3-540-63908-X

D. MUNZ, University of Karlsruhe, and  
T. FETT, Karlsruhe, both, Germany

## CERAMICS

Mechanical Properties, Failure Behavior,  
Materials Selection

1999/APPROX. 298 PP., 216 ILLUS., 38 TABLES  
HARDCOVER/\$89.95  
ISBN 3-540-65376-7

SPRINGER SERIES IN MATERIALS SCIENCE, VOL. 36

BE SURE TO VISIT THE SPRINGER BOOTH  
AT THE MRS EXHIBIT FOR SPECIAL  
CONFERENCE-ONLY DISCOUNTS

FOUR EASY WAYS TO ORDER:

- CALL: Toll Free: 800-SPRINGER 8:30 am-5:30 pm ET;
  - FAX: 201-348-4505;
  - E-MAIL: orders@springer-ny.com;  
Outside North America, orders@springer.de;
  - VISIT your local scientific bookstore or urge your librarian to order.
- 3/99 Promotion #5304

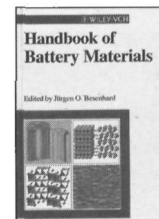
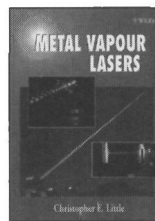
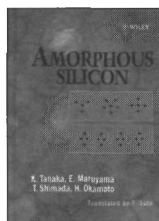
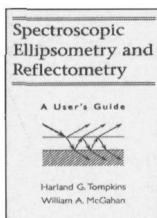
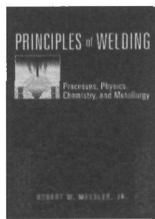
Springer

http://www.springer-ny.com

VISIT MRS BOOTH NO. 121



# Explore the Latest in Materials Science from JOHN WILEY & SONS, INC.



## **PRINCIPLES of WELDING:** Processes, Physics, Chemistry, and Metallurgy

*Robert W. Messler, Jr. and Warren F. Savage*

Presents a comprehensive, self-contained treatment of the welding process along with the underlying physics, chemistry and metallurgy of weld formation. Supplemented with hundreds of tables and illustrations and correlates the science to welding practices in the real world.

1-25376-6 • approx. 672pp • 3/99 • \$135.00

## **SPECTROSCOPIC ELLIPSPOMETRY and REFLECTOMETRY:** A User's Guide

*Harland G. Tompkins and William G. McGahan*

This guide provides a practical introduction to spectroscopic ellipsometry and the related technique of reflectometry. Including applications and case studies, this guide provides all the information you need to effectively use ellipsometry to measure thickness and optical properties of thin films.

1-18172-2 • approx. 248pp • 2/99 • \$79.95

## **AMORPHOUS SILICON**

*K. Tanaka, E. Maruyama, T. Shimada, and H. Okamoto - Translated by T. Sato*

Offering one of the first unified treatments of the field, this resource details the way in which amorphous silicon is prepared, and growth mechanism. Covers device applications from both a materials science and physics perspective.

1-98293-8 • 258pp • 1999 • \$175.00

## **COLLOID-POLYMER INTERACTIONS** From Fundamentals to Practice

*Paul Dubin and Raymond S. Farinato*

This book focuses on the basic principles, analytical techniques, and major applications. Each chapter combines a tutorial flavor with a selective survey or review of recent work.

1-24316-7 • approx. 482pp • 6/99 • \$115.00

## **MECHANICS and MATERIALS** Fundamentals and Linkages

*Marc A. Meyers and R.W. Armstrong*

This book illustrates the relationship and linkages between mechanics and materials. Presents the fundamentals and emphasizes the relationships between the areas of mechanics and materials science by clarifying and unifying the many shared and related concepts.

1-24317-5 • approx. 624pp • 6/99 • \$135.00

## **KIRK-OTHMER CONCISE ENCYCLOPEDIA of CHEMICAL TECHNOLOGY - 4th Edition**

This indispensable desk reference incorporates the authoritative data and all the subjects covered in the 27-volume encyclopedia into one extremely convenient resource.

1-29698-8 • approx. 2,322pp. • 2/99 • \$295.00

(valid until 4/15/99; \$325.00 thereafter)

Please send me a complete prospectus

## **METAL VAPOUR LASERS**

*Christopher Little*

This essential reference covers all of the most commercially important and scientifically interesting pulsed and continuous wave gas-discharge MVLs, and includes device histories, operating characteristics, engineering, kinetics, commercial exploitation, and applications.

1-97387-4 • 619pp. • 1999 • \$299.00

## **IMAGING of SURFACES and INTERFACES:** Frontiers of Electrochemistry - Volume 5

*Jacek Lipkowski and Philip Ross*

The new technology developed for imaging surfaces over the last 20 years now permits scientists to record real-time and real-space images with resolution at the level of atoms. This unified work covers the latest research including many techniques that have been introduced only during the last 10 years and features in-situ methods.

1-24672-7 • approx. 344pp • 5/99 • \$125.00

## **SURFACES, INTERFACES, and COLLOIDS:** Principles and Applications - Second Edition

*Drew Myers*

This new edition provides an easy-to-follow introduction to the concepts, theories and applications of surfaces, interfaces, and colloids. Includes over 200 illustrations.

1-33060-4 • approx. 528pp • 5/99 • \$94.95

## **HANDBOOK of BATTERY MATERIALS**

*Edited by Jürgen O. Besenhard*

This one-of-a-kind handbook provides a concise survey of the materials used on modern battery technology. The physico-chemical fundamentals are treated as are the environmental and recycling aspects.

3-527-29469-4 • 618pp • 1999 • \$398.00

## **LASER APPLICATIONS in SURFACE SCIENCE and TECHNOLOGY**

*H.-G. Rubahn*

Provides an overview of the different techniques, discusses the principles behind them and gives a concise description of laser-induced and laser-detected processes on surfaces.

1-98449-3 • approx. 350pp • 4/99 • \$140.00

1-98450-7 • approx. 350pp • 4/99 • \$59.95 (pb)

## **ORGANIC COATINGS:** Science and Technology - Second Edition

*Zeno W. Wicks, Frank N. Jones, and S. Peter Pappas*

Now in one convenient volume, this new edition of a bestselling 2-volume work provides comprehensive, practical coverage of coatings science from underlying principles to applications. Includes references to sources of detailed information.

1-24507-0 • approx. 616pp • 1999 • \$125.00

## **HANDBOOK of OLIGO- and POLYTHIOPENES**

*Edited by D. Fichou*

This concise handbook gives a broad survey over this emerging field of research. The physical background is covered as well as the synthesis, electronic and nonlinear optical properties, and applications of these advanced materials.

3-527-29445-7 • 560pp • 1999 • \$265.00



### 5 Easy Ways to Order or Examine FREE for 15 days:

#### 1. CONTACT CUSTOMER SERVICE:

Call: 1-800-225-5945 or E-mail: [custserv@wiley.com](mailto:custserv@wiley.com)

2. FAX TO: 212-850-8888, Attn: A. Yee

3. VISIT WILEY ONLINE: [www.wiley.com](http://www.wiley.com)

#### 4. Check off your selection, fill this form out and mail the

ENTIRE ad to: A. Yee, 9th Floor, John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158

5. For orders outside of North America, please call +44 (0) 1243 779777 or fax: +44 (0) 1243 843296.

Send for 15-day exam, with bill (Valid in the US only)

Payment enclosed (Please include local sales tax. You will be charged shipping and handling fees.)

Name \_\_\_\_\_

Affiliation \_\_\_\_\_

Address \_\_\_\_\_

Tel \_\_\_\_\_

Prices subject to change without notice and may be higher outside of the U.S. All orders are subject to credit approval.  
**MRS Bulletin 3/99**

### The Most Comprehensive Collection of Material Tensors on 1 CD!

## **ENCYCLOPEDIA of MATERIAL TENSORS on CD**

*S. Popov, Y. Svirko, and N. Zheludev*

A unique database of over 130,000 material tensors, this CD allows you to fully exploit the potential of tensor formalism to investigate, predict and calculate the properties of materials.

1-98506-6 • CD • 5/99 • \$500.00