

faces and the adsorption on and oxidation of silicon surfaces described in the later chapters.

Indeed, the latter part of the book beautifully summarizes the interactions of molecules with the silicon surfaces and thereby makes the important connection to the silicon oxidation and passivation that is so fundamental and critical to the microelectronics industry. It is particularly important and timely for technologists to appreciate the systematic steps taken to characterize and understand the reactions taking place during surface passivation, and to realize that wide gaps in understanding and lively controversies still exist.

In several areas, such as silicon oxide characterization, the authors skillfully provide a concise description of silicon processing technology, highlight the complementary aspects of existing characterization techniques, and incorporate the salient results of scientific investigations. Their discussion of the practical quality issues of the silicon/silicon oxide interface is of great benefit to surface scientists: it provides a concrete motivation for fundamental research. At the end of the book, Dąbrowski and Müssig provide a clear tutorial of materials issues associated with real-life devices, thus enabling and enticing surface scientists to explore these complex issues. The synergy between technology and surface science that is highlighted in this book is a clear reflection of the authors' expertise and the research focus of the Institute for Semiconductor Studies in Frankfurt, Germany, with which they are both associated.

Overall, this book constitutes a solid source of reference material, with over forty tables that conveniently summarize key references in each section. The references do not always reflect all the work done in the field, but they are exhaustive enough (over 1300) that the interested reader can eventually uncover some missing key contributions in the areas discussed.

Within a given chapter, the scope is sometimes uneven. In an attempt to provide in-depth information, the authors occasionally inject much of their own thinking and interpretation of existing work in some areas, while failing to give insight into others. This approach makes it difficult at times to separate educated speculation from established knowledge. Nonetheless, the discussions and opinions presented are welcome and stimulating, and always educational.

For a book of this length and depth, figures are noticeably scarce (only 82).

Yet, the existing figures are uniformly well done with thorough captions, and the authors cleverly illustrate in the text itself the surface structures and adsorption sites, greatly clarifying the presentation. Additionally, the authors raise philosophical questions in the opening and concluding chapters of the book that tend to detract from the real value of this otherwise tutorial volume.

Despite these minor pitfalls, this book is well written and highly educational. I strongly recommend it for materials scientists interested in the properties of silicon as a microelec-

tronic device material, and for micro-mechanical and photonics applications as well.

YVES J. CHABAL

Agere Systems

Murray Hill, New Jersey

NEW BOOKS

Optics and Photonics

The Fractional Fourier Transform with Applications in Optics and Signal Processing. H. M. Ozaktas, Z. Zalevsky, M. A. Kutay. *Wiley Series in Pure and Applied Optics*. Wiley, New York, 2001. \$65.00 (513

pp.). ISBN 0-471-96346-1

Mathematical Methods of Quantum Optics. R. R. Puri. *Springer Series in Optical Sciences* 79. Springer-Verlag, New York, 2001. \$59.95 (285 pp.). ISBN 3-540-67802-6

Nanoscale Linear and Nonlinear Optics. M. Bertolotti, C. M. Bowden, C. Sibia, eds. *AIP Conference Proceedings* 560. Proc. sch., Erice, Sicily, July 2000. AIP, Melville, N.Y., 2001. \$140.00 (450 pp.). ISBN 1-56396-993-9

Nonlinear Fiber Optics. 3rd edition. G. P. Agrawal. *Optics and Photonics*. Academic Press, San Diego, Calif., 2001 [1995]. \$74.95 (466 pp.). ISBN 0-12-045143-3

Optical Design Fundamentals for

Infrared Systems. 2nd edition. M. J. Riedl. *Tutorial Texts in Optical Engineering TT48*. SPIE, Bellingham, Wash., 2001 [1995]. \$50.00 *paper* (182 pp.). ISBN 0-8194-4051-5

Photonic Analog-to-Digital Conversion. B. L. Shoop. *Springer Series in Optical Sciences* 81. Springer-Verlag, New York, 2001. \$89.95 (330 pp.). ISBN 3-540-41344-8

Photonics: Linear and Nonlinear Interactions of Laser Light and Matter. R. Menzel. *Advanced Texts in Physics*. Springer-Verlag, New York, 2001. \$89.95 (873 pp.). ISBN 3-540-67074-2

The Quantum Theory of Light. 3rd edition. R. Loudon. Oxford U. Press, New York, 2000 [1983]. \$90.00, \$45.00 *paper*

(438 pp.). ISBN 0-19-850177-3, ISBN 0-19-850176-5 *paper*

Solid-State Lasers for Materials Processing: Fundamental Relations and Technical Realizations. R. Iffländer (translated from German by S. Weber). *Springer Series in Optical Sciences* 77. Springer-Verlag, New York, 2001. \$79.95 (350 pp.). ISBN 3-540-66980-9

Particle Physics

Introduction to Bose-Einstein Correlations and Subatomic Interferometry. R. M. Weiner. Wiley, New York, 2000. \$70.00 (244 pp.). ISBN 0-471-96922-2

The Supersymmetric World: The Beginnings of the Theory. G. Kane, M. Shifman, eds. World Scientific, River Edge, N.J., 2000. \$58.00, \$40.00 *paper* (271 pp.). ISBN 981-02-4522-X, ISBN 981-02-4539-4 *paper*

Plasmas and Fusion

Physics of Ionized Gases. B. M. Smirnov. Wiley, New York, 2001. \$89.95 (381 pp.). ISBN 0-471-17594-3

Spectral Line Shapes. J. Seidel, ed. *AIP Conference Proceedings* 559. Proc. conf., Berlin, Germany, July 2000. AIP, Melville, N.Y., 2001. \$155.00 (510 pp.). ISBN 1-56396-991-2

Popularizations

The Energy of Nature. E. C. Pielou. U. of Chicago Press, Chicago, 2001. \$25.00 (244 pp.). ISBN 0-226-66806-1

The Fermi Solution: Essays on Science. H. C. von Baeyer. Dover, Mineola, N.Y., 2001 [1993, reissued]. \$8.95 *paper* (172 pp.). ISBN 0-486-41707-7

Flatterland: Like Flatland, Only More So. I. Stewart. Perseus, Cambridge, Mass., 2001. \$25.00 (301 pp.). ISBN 0-7382-0442-0

Life Everywhere: The Maverick Science of Astrobiology. D. Darling. Basic Books, New York, 2001. \$26.00 (206 pp.). ISBN 0-465-01563-8

The Magic Furnace: The Search for the Origins of Atoms. M. Chown. Oxford U. Press, New York, 2001. \$25.00 (232 pp.). ISBN 0-19-514305-1

Mars: The Lure of the Red Planet. W. Sheehan, S. J. O'Meara. Prometheus Books, New York, 2001. \$27.00 (406 pp.). ISBN 1-57392-900-X

Our Cosmic Origins: From the Big Bang to the Emergence of Life and Intelligence. A. Delsemme. Cambridge U. Press, New York, 2000 [1998, reissued]. \$24.95, \$14.95 *paper* (322 pp.). ISBN 0-521-62038-4, ISBN 0-521-79480-3 *paper*

Parallax: The Race to Measure the Cosmos. A. W. Hirshfeld. Freeman, New York, 2001. \$23.95 (314 pp.). ISBN 0-7167-3711-6

Revealing the Universe: The Making of the Chandra X-ray Observatory. W. Tucker, K. Tucker. Harvard U. Press, Cambridge, Mass., 2001. \$27.95 (295 pp.). ISBN 0-674-00497-3

Space and Planetary Science

Nearest Star: The Surprising Science of Our Sun. L. Golub, J. M. Pasachoff. Harvard U. Press, Cambridge, Mass., 2001. \$29.95 (267 pp.). ISBN 0-674-00467-1

Space Physics: An Introduction to Plasmas and Particles in the Heliosphere and Magnetospheres. 2nd edition. M.-B. Kallenrode. *Advanced Texts in Physics*. Springer-Verlag, New York, 2001 [1998]. \$64.95 (365 pp.). ISBN 3-540-41249-2

Theory and Mathematical Methods

Acoustic and Electromagnetic Equations: Integral Representations for Harmonic Problems. J.-C. Nédélec. *Applied Mathematical Sciences 144*. Springer-Verlag, New York, 2001. \$64.95 (316 pp.). ISBN 0-387-95155-5

Anomalies in Quantum Field Theory. R. A. Bertlmann. *International Series of Monographs on Physics 91*. Oxford U. Press, New York, 2000 [1996, reissued]. \$50.00 *paper* (566 pp.). ISBN 0-19-850762-3

Best Approximation in Inner Product Spaces. F. Deutsch. *CMS Books in Mathematics 7*. Springer-Verlag, New York, 2001. \$69.95 (338 pp.). ISBN 0-387-95156-3

Continuous Advances in QCD 2000. M. B. Voloshin, ed. Proc. wksp., Minneapolis, Minn., May 2000. World Scientific, River Edge, N.J., 2000. \$99.00 (340 pp.). ISBN 981-02-4469-X

Dimensionality Reducing Expansion of Multivariate Integration. T.-X. He. Birkhäuser, Boston, 2001. \$59.95 (222 pp.). ISBN 0-8176-4170-X

A First Course in Wavelets with Fourier Analysis. A. Boggess, F. J. Narcowich. Prentice Hall, Upper Saddle River, N.J., 2001. \$66.67 *paper* (283 pp.). ISBN 0-13-022809-5

Geometrical Physics in Minkowski Spacetime. E. G. P. Rowe. *Springer Monographs in Mathematics*. Springer-Verlag, New York, 2001. \$59.95 (248 pp.). ISBN 1-85233-366-9

Lévy Processes: Theory and Applications. O. E. Barndorff-Nielsen, T. Mikosch, S. I. Resnick, eds. Birkhäuser, Boston, 2001. \$79.95 (415 pp.). ISBN 0-8176-4167-X

Mathematical Aspects of Numerical Solution of Hyperbolic Systems. A. G. Kulikovskii, N. V. Pogorelov, A. Y. Semenov. *Chapman and Hall/CRC Monographs and Surveys in Pure and Applied Mathematics 118*. Chapman and Hall/CRC, New York, 2001. \$94.95 (540 pp.). ISBN 0-8493-0608-6

Neutron Interferometry: Lessons in Experimental Quantum Mechanics. H. Rauch, S. A. Werner. *Oxford Series on Neutron Scattering in Condensed Matter 12*. Oxford U. Press, New York, 2000. \$120.00 (393 pp.). ISBN 0-19-850027-0

Nonlinear Multiobjective Optimization: A Generalized Homotopy Approach. C. Hillermeier (translated from German by R.

Knop). *International Series of Numerical Mathematics 135*. Birkhäuser, Boston, 2001. \$59.95 (135 pp.). ISBN 3-7643-6498-X

Numerical Methods of Statistics. J. F. Monahan. *Cambridge Series in Statistical and Probabilistic Mathematics*. Cambridge U. Press, New York, 2001. \$74.95 (428 pp.). ISBN 0-521-79168-5, *Diskette*

Orthogonal Polynomials of Several Variables. C. F. Dunkl, Y. Xu. *Encyclopedia of Mathematics and its Applications 81*. Cambridge U. Press, New York, 2001. \$80.00 (390 pp.). ISBN 0-521-80043-9

Quantum Computation and Quantum Information Theory. C. Macchiavello, G. M. Palma, A. Zeilinger, eds. Proc. sch.,

Villa Gualino, Torino, Italy, July 1999. World Scientific, River Edge, N.J., 2000. \$97.00 (517 pp.). ISBN 981-02-4117-8

Quantum Gauge Theories: A True Ghost Story. G. Scharf. Wiley, New York, 2001. \$89.95 (245 pp.). ISBN 0-471-41480-8

Quantum Mechanics: Symbolism of Atomic Measurements. J. Schwinger; B.-G. Englert, ed. Springer-Verlag, New York, 2001. \$49.95 (484 pp.). ISBN 3-540-41408-8

Special Functions. G. E. Andrews, R. Askey, R. Roy. *Encyclopedia of Mathematics and Its Applications 71*. Cambridge U. Press, New York, 2000 [1999, reissued]. \$85.00, \$34.95 *paper* (664 pp.). ISBN 0-521-62321-9, ISBN 0-521-78988-5 *paper* ■