

that one might consider using it as an introductory text in a regular one-semester physics course for majors.

The complaint of many physics students is that we spend too much time teaching the physics of the 19th century; Glashow's book is firmly rooted in the 20th. It should be on every physicist's bookshelf, especially teachers of core college curricula. Acceptance as a text will very much depend on the level of student preparation and the culture on the individual campus.

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Introduction to Surface Chemistry and Catalysis

Gabor A. Somorjai
Wiley, New York, 1994.
667 pp. \$59.95 hc
ISBN 0-471-03192-5

With the explosive development of techniques for atomic-level scrutiny of surfaces and interfaces over the past quarter-century, modern surface science has come of age. Yet it is only recently that the full power of the field has been brought to bear on the definition and development of surface chemistry. Until now, a text that provides the necessary technological, conceptual and fundamental introduction to surface chemistry and its importance in fields such as heterogeneous catalysis has been sorely needed. But with the publication of *Introduction to Surface Chemistry and Catalysis*, much of this void is filled.

In this text, Gabor Somorjai, a pioneer in surface chemistry, provides an authoritative account of the discipline. Somorjai presents, in a lucid and readable style, the underlying principles of surface chemistry together with an overview of our current understanding of the structure, thermodynamics, dynamics, electrical properties and bonding of clean surfaces and adsorbed monolayers. The text also includes important case histories (many from the author's laboratory) of the contributions of surface science to heterogeneous catalysis and tribology.

Introduction to Surface Chemistry and Catalysis achieves the difficult objective of combining perspective on the state of the art with pedagogy on the fundamentals of the discipline. The text updates and combines many of the features of Somorjai's two earlier books on the subject: *Principles*

of *Surface Chemistry* (Prentice-Hall, 1972) and *Chemistry in Two-Dimensions: Surfaces* (Cornell, 1981). While it does not supplant topical monographs, such as those in the Springer Series in Surface Science, or more specialized books, such as those focusing on surface analysis techniques, it is the definitive, comprehensive text on modern surface chemistry. It is an ideal book for advanced undergraduate and introductory graduate courses and will be an important reference for specialists in the field. Parts of the text are even suitable for general chemistry.

The book achieves these diverse objectives by combining a textbook format with clear writing, intuitive insights and summary statements supported by well-tabulated data from the literature. For the beginning student, each chapter begins with a conceptual overview and concludes with a list of key concepts. Problems given within each chapter range from illustrative examples of theoretical concepts to extensions of the textual material via references to work in the literature. Detailed, informative solutions for all but the most open-ended assignments are given at the back of the book.

More advanced students and active researchers will appreciate the extensive references (article titles are included) and the numerous literature results summarized in tables and figures. Particularly notable is a comprehensive (more-than-100-page) tabulation of the two-dimensional ordered structures reported in the literature for clean solid surfaces and adsorbed monolayers. The tabulation, which is subdivided according to substrate (metal, semiconductor, insulator), adsorbate (atomic, molecular), surface geometry and overlayer symmetry, includes more than 2400 references, is comprehensive through 1986 and contains selected citations through 1992. This tabulation is a remarkable resource not only for specific surface structures and general trends but also as a useful first source to determine which surface-adsorbate systems have been previously studied and by whom. A welcome addition for newcomers to the field is a well-referenced table that summarizes concisely the acronyms, names, principles and uses of over 50 of the most common techniques of surface analysis.

Introduction to Surface Chemistry and Catalysis will be a classic text and should see wide application both within and beyond surface chemistry.

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G. I. Budker: Reflections and Remembrances

Edited by Boris N. Breizman and James W. van Dam
AIP, New York, 1994. 364 pp.
\$45.00 hc ISBN 1-56396-070-2

G. I. Budker: Reflections and Remembrances is a book about a man who was both a genius in physics and a fascinating personality. In it, prominent physicists such as Wolfgang K. H. Panofsky, Yakov B. Zel'dovich, Arkady B. Migdal, Lev B. Okun, Spartak T. Belyaev, Alexander N. Skrinsky, Boris V. Chirikov, Roald Z. Sagdeev, Norman Rostoker, Dmitri D. Rytov and others share with readers their reminiscences of Gersh Budker's work and life. Selected popular essays by Budker open the book, which originated as a 1988 memorial volume, edited by Skrinsky and published in Russian 11 years after Budker's death to mark the 70th anniversary of his birth. New material has been added to the English-language edition, which is nicely edited by Boris N. Breizman and James W. van Dam. The very satisfying translation from the Russian was done by Natasha Breizman.

The reminiscences in the book vividly portray Budker's originality as a physicist, organizer of scientific enterprises, teacher and person. In all these facets, his life was a nonstop process of generating radically new ideas. Budker took a childlike enjoyment from this process. When his colleagues would start to criticize his latest idea immediately upon hearing of it, he would say: "Wait! Let me get some fun out of it first. Then we will work it out further."

In physics, his genius showed up primarily in high-energy physics and the physics of controlled thermonuclear fusion. The contributions for which he is best known are the stabilized electron beam, the magnetic-mirror plasma trap, colliding beams of electrons and positrons, and electron cooling for proton beams.

A good illustration of Budker's originality as a teacher is the radical innovation in his general physics course at Novosibirsk University, which he opened with a presentation of special relativity. As a freshman, in 1959, I was exposed to this successful, revolutionary experiment in teaching.

Budker was proud of the nickname "engineer of relativity" given to him by Lev Landau. Indeed, he used his

BOOKS

deep understanding of relativistic physics to invent industrial, agricultural and medical applications of particle accelerators. Moreover, at the Institute of Nuclear Physics, which he founded in Novosibirsk in 1958 and which was named after him in 1992, Budker converted his inventiveness into a source of powerful support for basic research. The structure and functioning of the Budker institute exemplify Budker's deep understanding of the way scientific institutions should be organized. There he introduced a round table, some four meters in diameter, where brainstorming discussions of new ideas among researchers of all ranks took place. Today, 17 years after Budker's death, the institute is operating under the same principles and doing well. It is a great success, especially considering the circumstances of present day Russia.

The reader will find in the book's remembrances many lively episodes in which Budker's irreverent sense of humor as well as his deep wisdom are shown. Together with expressive photographs, they give a flavor of Budker's unorthodox personality. I will finish this review with a quotation from Panofsky's foreword to the book: "I hope that this book will serve to make knowledge of Budker's contributions available to a wider audience who can benefit from both the substance of his innovative ideas and the knowledge about a truly great man."

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