nescence technique has been augmented by a variety of thermally stimulated conductivity experiments and by the whole range of capacitance measurements known under the collective heading of "deep-level transient spectroscopy."

The first half of this book is devoted to a detailed summary of the various models and methods of analysis that have been applied. Examples of the investigation of defects in materials are provided for alkali halides, quartz and silica. The remainder of the book is concerned with uses of the technique (including a discussion of the major materials used) in dosimetry in general and medicine in particular, in dating, in geological problems involving meteorites and lunar materials and in terrestrial applications such as shock detection, geo- and paleothermometry and prospecting.

The book concludes with a discussion of the instrumentation needed for carrying out research in thermally stimulated luminescence, appendices on minerals and available systems, a list of over 1000 references and an index.

McKeever has performed a genuine service in collecting in this book the major theoretical and practical information concerning thermally stimulated luminescence. It will be particularly useful to those who desire to use the technique in one of the fields described.

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Supercomputers in Theoretical and Experimental Science

Jozef T. Devreese and Piet Van Camp
225 pp. Plenum, New York, 1985. $59.50

The use of supercomputers in all disciplines of science has increased tremendously in the last few years. Academic scientists in the United States have access to supercomputers in large part because of the initiatives of the US Department of Energy and the National Science Foundation. These agencies have directly funded first-rate supercomputer centers in universities and have provided reasonably adequate access to the centers for nearly all scientists who need supercomputer power in their research. This new and exciting method of research is often dignified with the title "computational science" and frequently is even promoted as a third way of doing science, alongside the more traditional theoretical and experimental methods.

Whether or not one subscribes to the view that computational science is providing a revolutionary new method of doing basic research, literally thou-

sands of scientists and students are eagerly learning to use supercomputers in their research, and there is a growing need for good resource books. By experience, one has learned not to look to the supercomputer manufacturers for such material. Indeed, in such fledgling fields published conference proceedings often are the most helpful references. The present book is exactly of this sort: The International Workshop on the Use of Supercomputers in Theoretical Science took place near Antwerp, Belgium, in the summer of 1984 (how "and Experimental" came into the title of the book is an unexplained mystery).

The book consists of nine contributions, of which seven could be of some interest to scientists who want to learn about techniques for using supercomputers. It appears to me, however, that this book would not be a good choice for today's scientist for several reasons. First, much of the material is out of date. Both the hardware and the software technology available today on supercomputers have been greatly improved in the last three years. As a simple example, the availability of hardware scatter and gather instructions on today's Cray XMP significantly changes one's approach to programming that machine. Similarly, the memories available on the European machines that served this book's authors were quite small by today's standards and forced compromises that are largely irrelevant now.

Second, the articles are decidedly too formal and too oriented toward computer science to be of interest to most practicing physical scientists. This is not meant in any way as a claim that scientists do not need to learn some computer science; in fact, nearly all supercomputer users would profit greatly from fundamental courses in that area. It is my impression, however, that the articles in the present book would be of little help in establishing good programming practices, the area most often neglected by scientists using computers.

Finally, the book makes reference to true parallel processing in only one article, where the discussion centers around a rather obscure French machine (the Marianne supercomputer project) that, as far as I know, has had little if any impact to date on scientific computing.

There are a number of other books that I would recommend for those who want to learn about techniques of using supercomputers. First, *Vectorization of Computer Programs with Applications to Computational Fluid Dynamics* by Wolfgang Gentzsch (Vieweg, Braunschweig, 1984) is a very good introduction to using vector supercomputers in general (and only the last chapter is specific to computational fluid dynamics). Second, *High Speed Computation*, edited by Janusz S. Kowalik (Springer-Verlag, New York, 1984), and *Parallel Computing '85*, edited by M. Feilmeier, G. Joubert and U. Schendel (Elsevier, New York, 1986), both provide a great wealth of information not only on using vector supercomputers but also on the emerging potentials of other highly parallel architectures.

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Adsorption Processes on Semiconductor and Dielectric Surfaces I

V. F. Kiselev and O. V. Krylov
(Translated from the Russian by A. S. Dobroslavski)
287 pp. Springer-Verlag, New York, 1985. $49.50

This book is a compact review of the area of surface chemistry that is concerned with the study of adsorption and heterogeneous catalysis on semiconductor and oxide surfaces. It is a revision of an earlier monograph published in 1978; originally written in Russian, it has been skillfully translated into English.

The book is strongly focused toward the classical approach to the properties of rather complex surfaces. Thus, it emphasizes techniques such as ir spectroscopy, nmr, esr and isotherm measurements on large-area surfaces, although it also discusses many studies on single crystal surfaces. In a sense, V. F. Kiselev and O. V. Krylov have supplied the reader with everything one might wish to know about the deep historical roots of the field—they provide about 1000 references—but they report very little truly modern surface science.

The book emphasizes substrate surfaces such as Si, Ge, SiO_2, Al_2O_3, graphite and zeolites. It also discusses phenomena such as surface reconstruction, vibrational relaxation of surface species, and the properties of the surface hydroxyl group. Another central theme is the nature of the active adsorption site on these surfaces.

The authors have combined the approaches of surface chemistry and solid-state physics, and the book will therefore appeal to readers from a wide range of backgrounds. I would recommend the book to anyone working in surface chemistry or physics who desires to learn more of the traditional approach to the study of the complex