Electronic Structure and Optical Properties of Semiconductors. By *M. L. Cohen* and *J. R. Chelikowsky*. Springer-Verlag, Berlin 1988, xii, 264 pp., hard cover, DM 98,— ISBN 3-540-18818-5

In the preface to this book the authors state that they tried to strike a compromise between a reference text and an textbook. The authors have achieved their goal. It contains much compiled information on the optical properties of semiconductors, and whether one is interested in the technologically important semiconductors, such as Si, Ge and GaAs, or the obscure such as $ZnGeP_2$, the desired information is there. In the back of the book there are over fifty pages of references, so the active researcher can quickly find detailed information in a subject of interest.

The book should also be of considerable use to the newcomer to the area as it provides a very nice introduction to the theory of band structure calculations. The authors begin with the nearly-free electron and tight binding models to demonstrate the basic properties of electrons in a periodic potential and point out that these two methods represent the two extreme views of electrons in solids and therefore, the augmented plane wave and the orthogonal plane wave methods have been developed to more realistically describe the electronic structure of solids.

Although the authors give a completely adequate introduction to the theoretical methods, they spend most of the time describing the pseudopotential method and its variations. This is not surprising, considering that the authors have made contributions in this area for more than twenty years. They begin the chapter on pseudopotentials with the mathematical formalism, and go on to explain the empirical, self consistent and the ab initio variations not only providing details of the mathematical formalism, but also describing in detail the computational philosophy used in each pseudopotential variation.

The three chapters that follow are those that make this book quite special. In these chapters the authors explain how, once you have completed a band structure calculation, the results can be compared to experiments. When one experimentally measures the optical properties of a semiconductor, one does not measure the band structure but some property related to it. In these chapters the authors go through in detail the process of calculating response functions.

They then compare how the pseudopotential calculations and experimental determined values agree. This is the section of the book that truly sets it apart from other theoretical books on solid state physics. Numerous experimental methods and how they can be used to further understand the band structure of solids are described. These include not only optical methods, such as electroreflectance, but also surface analysis techniques, such as X-ray photoemission and ultraviolet photoemission spectroscopy.

The last section in the book, which consists of almost one hundred pages, is devoted to describing the optical properties of numerous semiconductors. This is an excellent reference section for anyone working in the field of semiconductor physics or optoelectronics. It begins with the elemental semiconductors Si, Ge and Sn and then goes on to describe the III-V and II-VI semiconductors. Not only are the optical properties of the zinc blende and diamond structure semiconductors described, but detailed information on the wurtzite semiconductors is also included.

This is a very fine book on the optical and electronic properties of semiconductors and should find a place on the bookshelf of everybody who is involved in the areas of semiconductor physics or optoelectronics.

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Silicon-nitride in Electronics. By *V. J. Belyi* et al. Elsevier Science Publishers, Amsterdam 1988. viii, 340 pp., bound, US$ 100.– ISBN 0-444-42689-2

This book, originally written in Russian, describes the technology of silicon nitride film preparation on a silicon wafer. This subject is not new and therefore the authors intent is to present a collection of the properties and physical-chemical aspects, which govern the production.

In the first chapters, the reaction theories of all the gaseous production techniques are discussed. This is done in a style which is typical for a Russian theoretical book. However, one clearly recognizes that the formulas characterizing the process steps dramatically define the properties of the silicon nitride layer. In contrast to solid-state silicon nitride, which is widely resistant against chemical attack, a silicon nitride film, produced by vapor deposition techniques can be structurized by normal photolithographic techniques. The reader who is interested in a deep understanding of the fundamental parameters of the process would certainly read this chapter with interest. On the other side, the practical point of view is not forgotten. The process of the layer-deposition is described in detail.

In the following chapters, the basic principles of the deposition-process are emphasized more than the manufacturing techniques. Pictures of furnaces or other types of processing hardware, which are common to a book of this kind, are not given. However, a nearly complete literature list is provided.

The properties of the different types of films, produced using the different types of processes are discussed in detail. Curves and diagrams will help the reader, who is not so familiar with the formula-language. A more theoretically oriented user however, will be deeply impressed by the equations and the data, which can help him to calculate his process and compare the results to the electrical data given in this book. This collection of data explaining the influence of process parameters on the electrical properties is helpful to any producer of silicon nitride layers on silicon.

The data is presented in a format oriented for a semiconductor technologist. Band-diagrams and energy representations are given. These can be used by the circuit designer as input to his calculations on an integrated circuit. In the last chapter the applications for silicon nitride films are reviewed, including LOCOS process, EPROM devices, pH sensors, etc. This is done only briefly but a reader who needs more information can use the comprehensive literature list.

In summary, this book collects all the theoretical and practical aspects of the production of a silicon nitride film on a silicon-wafer. A user, who is working on this process and this material will certainly welcome this book as a process handbook or dictionary of the silicon nitride preparation process.

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Textile Structural Composites. Edited by *T.-W. Chou* and *F. Ko*. Elsevier Science Publishers, Amsterdam 1988. xiii, 480 pp., bound, US$ 155.25. – ISBN 0-444-42992-1

Textile composites can be defined as the combination of a resin system with a textile fiber, yarn or fabric system. The various textile composite systems are described with reference to chopped fiber and filament yarn constructions, the different fabric and non-woven fabric structures, behavior, and related composites.

Basic principles of the mechanics of tensile deformation and theories describing the non-linear stress-strain relations of fabrics are covered, concentrating on the two basic structures, plain woven and plain knitted fabrics.

The characteristics of the braiding process, the wide composite applications, and mechanical performance along with the structure, formation, properties and analysis of 3-D fabrics are reviewed.

Dr. *S. M. Bishop* discusses the properties of carbon fiber fabric laminates. Woven fabrics combined with unidirectional tape structures are investigated and their advantages in terms of tensile, compressive, impact and fatigue properties are described. Prof. *T.-W. Chou* presents analytical and calculational models for determining the thermal and mechanical properties of woven fabric laminates. The fabrics studied are either made of one material or are hybrid fabrics. The properties determined, such as stiffness, strength and thermal expansion, are partly compared with experimental data. The paper by Prof. *I. M. Yang* and Prof. *T.-W. Chou* deals with the thermo-elastic analysis of triaxial woven fabrics and the laminates made therefrom. This theoretical study also covers non-orthogonal fabrics, which are compared with triaxial fabrics.

Dr. *S. R. Moghe* describes the development of a mathematical model for designing woven fabric laminates taking into account the different material properties and process parameters. The calculated values are presented.

Additional materials covered are flexible composites and coated fabrics.

The book on the whole gives a good and up-to-date account of the theoretical and practical aspects of textile intermediates and their behavior in composites.

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PARAT. Index of Acronyms and Abbreviations in Electrical and Electronic Engineering. Compiled by *Büro Scientia*, Berlin. VCH Verlagsgesellschaft, Weinheim 1989. 538 pp., bound, DM 224. – ISBN 3-527-26842-1

The book lists about 45000 acronyms and abbreviations with their associated definitions. In an attempt to facilitate the use of the book the entries have been standardized by printing the acronyms and abbreviations in capital letters while the full texts of the comments appear in lower case. This is certainly helpful. Looking up terms is made easy by the large and clear print. The solid binding promises to stand well the heavy usage one expects for a reference book of this kind.

A German-speaking reader will look in vain for the explanation of BTX, DIN, EVU, or the like since only English terms are listed. This could be indicated in the title of the book by changing it to: "Index of English Acronyms...".

The book contains a wealth of valuable entries that are not restricted only to the area of electric and electronic engineering but that go far beyond. The terms reach from ACELSCO (associated civil engineers and land surveyors of santa clara county) on page 6 to YST (yukon standard time) on page 563. Of course, the reader will find most of the expressions he would look for in a book on electric and electronic terms e.g. CPU, TV, CRT, LCD, VHF, VLSI, WATS, ISDN, and many more. But one would also expect to see terms like MODEM or AI, and a materials scientist would be interested in MOS or HTSC (high-temperature superconductivity) all of which are not (yet) listed.

Many of the terms are related to computer technology or to military applications. Unavoidably many abbreviations have multiple meanings, for some of them, e.g. SP, MS, CC, or MC more than 50 different interpretations are listed. To show the broad scope of the book, here are some examples selected at random: referring to organizations/institutions/company names one finds entries like FCCN, CBO, ISO, IBM, PAA down to SAAD (san antonio air depot). Relating to projects/products there are ILLIAC, STAIRS or LLM (lunar landing mission or module). And among the more general concepts are listed DEPT, VAT, SQRT (square root), and PAYE (pay as you earn).

Keeping in mind that it is impossible to please everybody, the editors did a good job in selecting the material and in including many "exotic" terms that are rarely found elsewhere. Altogether this volume is a comprehensive and up-to-date reference tool for the individual scientist or engineer as