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## Book Reviews

*Works intended for notice in this column should be sent direct to the Book-Review Editor (J. H. Robertson, School of Chemistry, University of Leeds, Leeds LS2 9JT, England). As far as practicable books will be reviewed in a country different from that of publication.*

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**Crystal optics with spatial dispersion and excitons.** By V. M. AGRANOVICH and V. L. GINSBURG. Pp. xi + 441. Berlin: Springer-Verlag, 1984. Price US \$49.00.

This is a densely packed monograph, written for specialists. It is a detailed, sophisticated presentation of the mathematical physics of optical phenomena in crystalline materials, treated with considerable rigour in terms of the electromagnetic-field equations and the complex dielectric-constant tensor. It concentrates on the phenomenon of dispersion (the effect of the change of wavelength) and on the application of the concepts of the exciton (quantized, local, but mobile electronic or magnetic excitation) and the polariton (effectively the photon, considered in the context of the crystalline medium in which it travels). It should be added that this volume is the English translation of the Russian-language publication of 1979, itself an updated expanded version of an original Russian text.

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**Properties of crystalline silicon carbide. Diodes; molecular species in the gas phase; amorphous silicon-carbon alloys.** (*The silicon supplement*, Vol. B2 of the *Gmelin handbook of inorganic chemistry*, 8th ed.) By J. SCHLICHTING, G. CZACK, E. KOCHBIENEMANN, P. KUHN and F. SCHRÖDER. Pp. xvi + 314. Berlin: Springer Verlag, 1984. Price DM 1080.

Silicon carbide has been investigated extensively by physicists, chemists, ceramic engineers, electronic engineers, crystallographers, materials scientists and others, on account of its very special structural characteristics and multifarious applications. The scientific literature on this

material is therefore spread over a very diverse range of journals covering different disciplines of science. This handbook is an excellent attempt to compile all the data available up to the middle of 1983 on different aspects of the material and its uses.

The first chapter, which comprises 80% of the book (245 pages), deals with the properties of crystalline SiC. It gives an account of the various polytype structures in which the material crystallizes, the notations used to describe them, the theories of their formation, polytype transformations, structural defects, radiation damage, electronic band structure, lattice dynamics, bonding, mechanical, thermal, electrical, magnetic, optical and surface properties of the material.

The second chapter (23 pages) deals with the diodes prepared from  $\alpha$ - and  $\beta$ -SiC, their electrical characteristics, luminescence behaviour, stability and breakdown. The third chapter (3 pages) describes the occurrence and detection of the different molecular species in the silicon-carbon system in the gaseous phase. The fourth and last chapter (36 pages) gives an extensive review of the structure and properties of amorphous silicon-carbon alloys, which frequently contain hydrogen and sometimes fluorine or oxygen. The optical properties of these amorphous alloys are compared with those of hydrogenated amorphous silicon material.

A separate volume covering the phase diagram, formation, preparation, manufacture and chemical reactions of SiC is planned to appear in the near future. These aspects are therefore not covered in the present volume. The authors are to be congratulated on the very thorough review of the literature that they have performed. For anyone working on the silicon-carbon system this volume provides an invaluable storehouse of information and data. While strongly recommending this volume as a standard work of reference, I must warn prospective buyers of its fantastically high price.

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