

Book Reviews

PHYSICS OF THIN FILMS, Vol. 8, edited by G. Hass, M. H. Francombe and R. W. Hoffman.
Academic Press Ltd., London & New York. (£17.30)

Volume 8 constitutes the 1975 volume continuing the series on Physics of Thin Films (advances in research and development) commenced in 1963. The trend established in the more recent volumes towards reviewing the physics of thin films in relationship to its expanding role in technology, has been continued. Reviews are given on five subjects namely;

Dielectric Film Materials for Optical Applications,
Inhomogeneous and Co-evaporative Homogeneous
Films for Optical Applications,
Discontinuous and Cermet Films,
Electrical Conduction in Disordered Non-metallic
Films and
Topologically Structured Thin Films in
Semiconductor Device Operation.

The first article, by Elmar Ritter of Balzers, Leichtenstein, deals with the preparation, physics and application of dielectric film materials, with particular reference to materials that are used for optical interference applications. The second article, by R. Jacobsson of the A G A Innovation Centre, Täby, Sweden, reviews recent novel developments in the area of inhomogeneous optical films and discusses the method of preparation, optical properties and use of films of mixed dielectrics and semiconductor-dielectric combinations in which the refractive index is varied in a controlled fashion, with thickness. The interesting practical consequences of optical inhomogeneity in films used as anti-reflective coatings, matching layers for multilayer filters and absorbing layers, are discussed.

The third article by Z H Meiksin from the University of Pittsburgh, U.S.A., discusses mainly the electrical transport properties of discontinuous and cermet films. Such films are becoming increasingly important in high value resistors and strain gauges, and the present review examines not only the background physics but also the practical potential of metal-dielectric systems. The fourth review is complementary to Meiksin's article and is by A K

Jonscher and R M Hill of Chelsea College, University of London, U.K. This also discusses electrical conduction, but in non-metallic, amorphous films. Ideas in this area are continually being up-dated and the editors have noted the difficulty of covering the most recent developments. However, it is felt that the present text still meets the intention of providing a useful and important general review of the field, with published data referenced up to 1973.

The last article, by H C Nathanson and J Guldberg from Westinghouse R & D Centre in Pittsburgh, and Philips Research Laboratories, Hamburg, Germany, reviews amongst other things, the novel ways of using thin films in specially shaped configurations suitable for imaging and microwave devices. Also examined are the deposition, photolithographic and etching techniques employed in developing devices, the application of films in plated-beam technology and the use of partially supported thin film membranes as mechanically moving elements in special types of devices (accelerometers and vibrational sensors, tuning devices in integrated circuits and foil light valves).

Reviews, of their very nature, summarise material that has already been published and is therefore slightly out of date. However, this particular volume contains a great deal of material that is of considerable importance to all those who are interested in the practical application of thin films in device technology.

D. S. CAMPBELL

HANDBOOK OF THICK FILM HYBRID
MICROELECTRONICS, edited by Charles A. Harper.
McGraw-Hill, New York. (£19.20)

McGraw Hill have published, over the years, many handbooks of interest to circuit component designers. This latest handbook is intended to be a practical source book for designers, fabricators and users of hybrid microelectronics. As such, the book is heavily orientated towards the electronic design engineer but contains a wealth of data and guidelines for

fabricators and users as well. There are nine chapters contributed by experts in the fields, the first one covering the area of circuit design, component selection and layout generation. The second chapter deals with photofabrication operations, together with screens and masks and chapter 3 covers facilities, equipment and manufacturing operations for circuit deposition and testing. Chapter 4 is a shorter one concerning the important subject of substrates for thick film circuits. Chapter 5 examines conductor materials, processing and controls. Resistor materials, processing and controls are reviewed in Chapter 7. All hybrid circuits involve the attachment of components for completion, and Chapter 8 deals with this

important area of component attachment, techniques and equipment. The last chapter examines packaging and interconnection of assembled circuits.

The book is essentially a practical handbook and as such is full of useful figures, tables and references. A theoretical understanding of the devices discussed is not reviewed in this book in any detail; perhaps this is understandable as published material analysing, for example, conduction processes in thick film resistors, is only just becoming available. However, the book must be very strongly recommended to all those who are working in the manufacture or use of thick film hybrid circuits.

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