*spectroscopy*; *Raman studies of surfaces*; *Time dependence of scattering processes*; *Biological applications; CARS and other high-order processes*. The total coverage is comprehensive with contributions from almost every important research worker who is active in these fields. If one wanted to assess the current state of the art this would be a good book to browse through, but should it have been published at all?

All contributions are printed directly from masters provided (in typescript) by the authors. Therefore, something between 10 and 30% of this book is blank paper. The papers are adequate as summaries of conference reports, but so lacking in detail as to be almost worthless for reference purposes. One imagines that all work of substantial value will be published soon elsewhere. This reviewer finds difficulty in envisaging the readership which the publishers presumably hope will recommend purchase of this book.

It would be invidious to single out from the 350 or so articles any particular ones for mention here. After skimming through the book one is left with an overall impression of a field of great vitality covering an incredible diversity of subjects. A technique-orientated subject such as this is truly multi-disciplinary. This is laudable, but one must acknowledge that most scientists today have such specialized interests that much will be incomprehensible to the individual.

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**Sputtering by particle bombardment. I. Physical sputtering of single element solids.** Edited by R. BEHRISCH. **Topics in Applied Physics. Vol. 47.** Pp. x + 281. Berlin, Heidelberg, New York: Springer, 1981. Price US $46.00, DM 85.00.

The most recent book discussing all the different aspects of ion bombardment of solids was published more than ten years ago. This book and two further volumes, which are in print, are intended to update and summarize the knowledge in the fast-growing field of sputtering phenomena. It will be useful not only for scientists actually involved in this field but also for those using any of the many applications of sputtering, like thin-film deposition, micromachining or sputter etching for depth profiling in combination with a surface analytical technique.

Besides an overview by the editor, the four reviews of this first volume concentrate on the physical principles governing the sputtering process of single-element solids. However, not all aspects are dealt with. Some of them, like energy and angular distributions of sputtered particles will be contained in the following volumes.

Sputtering theory is discussed in two contributions. The first one by P. Sigmund brings an introduction to the theory for amorphous (polycrystalline) materials. Ion penetration and collision cascade theory are summarized and also the limits of the linear cascade theory and spike phenomena are discussed. The second contribution by M. T. Robinson focuses on computer simulation techniques for ion bombardment of single crystalline materials. Channeling of ions and focused collision sequences in low-index crystal directions are discussed.

These two theoretical contributions are supplemented by two chapters on sputtering yield measurements of polycrystalline materials (H. H. Andersen & H. L. Bay) and on single-crystalline targets (H. E. Roosendaal).

The sputtering yield, which is defined as the number of ejected target atoms per impinging particle, is of central importance in sputtering and its applications. Different methods to measure the yield are discussed and an extremely large amount of experimentally determined yield data has been collected from the literature. This chapter alone has over 400 references. These measured sputtering-yield data for over 40 elements are presented graphically as a function of bombarding ion energy for different noble gas ions and compared with calculated values according to the linear cascade theory as discussed in the first contribution. These data and those concerning the dependence of the sputtering coefficient on the angle of ion incidence are most valuable for anybody interested in actual sputtering yield data for a given ion–target combination.

The topic of the last contribution is the variation in the sputtering yield with angle of incidence of the incoming ion beam relative to the crystallographic orientation of a single-crystal target. This is discussed in terms of the channeling model.

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**Photoelastic and electrooptic properties of crystals.** By T. S. NARASIMHAMURTY. Pp. xxix + 514. New York: Plenum, 1981. Price US $37.50.

This book starts with a short historical introduction and a reasonably concise review of mathematical tools that will be needed. This is followed by a discussion of symmetry requirements on the photoelastic constants. A section on elasticity including some discussion of experimental methods is then provided. Chapters on measurements of the photoelastic constants and a discussion of classical theories of photoelasticity then conclude this section of the book. The portion dealing with linear and quadratic electrooptic effects occupies the concluding chapter. This, together with a short chapter on piezoelectricity, is about 20% of the book. A bibliography with titles of over 1600 items ranges from Brewster's 1815 paper through 1979. The notation used appears consistent and is summarized in a convenient table. Some descriptions of and references to technical applications appear in various parts of the book. The principal emphasis throughout is on understanding the effects of crystal symmetry and this is, after all, the first thing one must do in studying the effects.

In order to get some idea of the flavor of this book, let us look in more detail at Chapter 3 which is entitled *Pockels'*