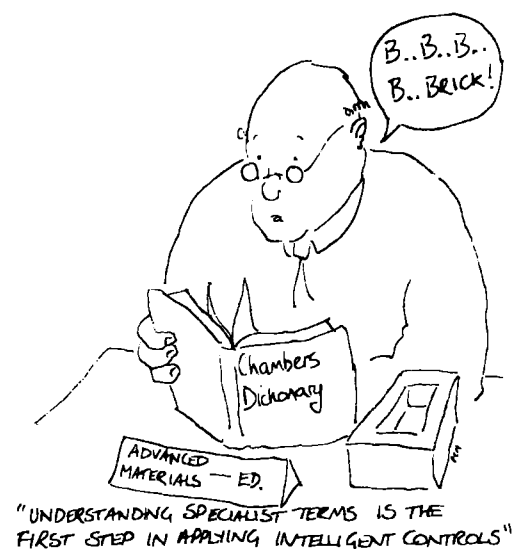


This book, to quote from the Preface, "will help a physician to understand a term in molecular biology, the layman to comprehend a medical term and both to talk to their builder in an informed manner."

Extending this philosophy to physicists, chemists, metallurgists, ceramists and engineers, which the dictionary does, is certainly a worthwhile task and one that is supported wholeheartedly in the Editorial Office of ADVANCED MATERIALS.

Chambers' technical dictionaries have a history of almost 50 years. The Technical Dictionary (1940), was supplemented substantially in 1958 and further revisions were made in 1971 and 1974. It seems a particular truism that changes in science and technology in the intervening years appear to have been as great as in the whole of earlier history.

The book, it is claimed, is not intended to replace the expert's own specialist dictionaries but should supplement them, giving the user a source of information which is multi-disciplinary in character. To quote from the Preface once again "understanding specialist terms is the first step in applying intelligent controls" and the quality and composition of this work will take the reader a long way towards that goal.



The main body of the dictionary, some 983 pages, starts with *a* and ends with *zymo-*, and the words in between are, unsurprisingly, arranged in alphabetical order. Joking apart, the coverage of the dictionary is satisfactory, the descriptions concise but clear, in many cases making interesting reading.

The book also contains a Greek alphabet (always useful) and appendices which contain information ranging from ISO paper sizes, through chemical formulae and nomenclature, information on the chemical elements and the classification of the animal and plant kingdoms, to a table mapping geological time and another describing and listing SI units and conversion factors.

All in all, the dictionary is well thought out, produced in high quality and is a valuable reference work which can be recommended without reservation to laymen and specialists alike.

Students of all ages, in all fields of materials technology will find it a valuable companion.

Knowledge is of two kinds. We know a subject ourselves or we know where we can find information upon it
—Samuel Johnson

Chambers are to be congratulated.

Peter Gregory

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Electronics Reliability and Measurement Technology—Non-Destructive Evaluation. Edited by *Joseph S. Heyman*, Noyes Publications, 1988, xii, 188 pp., bound, \$ 39.— ISBN 0-8155-1171-X

The title of the book is misleading. The reader expecting to find a description of the main nondestructive methods for reliability evaluations of electronics will be disappointed. The book consists of a collection of papers presented at a workshop held in June 1986 at NASA Langley Research Center and sponsored by NASA, the U.S. Air Force, the National Security Industrial Association, and the Aerospace Industry Association.

The first paper "Measurement Science and Manufacturing Science Research" gives an overview of the activities at some U.S. universities, sponsored by the Semiconductor Research Corporation.

The paper "Nondestructive SEM for Surface and Subsurface Wafer Imaging" describes the use of a scanning electron microscope as a tool for both failure analysis as well as device characterization. The main emphasis is on capacitive coupling voltage contrast and on nondestructive subsurface imaging of semiconductors.

The paper "Surface Inspection—Research and Development" gives a brief overview of the industrial approach to semiconductor and magnetic disc surface inspection methods and the paper "Sensors Developed for In-Process Thermal Sensing and Imaging" describes a silicon thermophile array for fabrication process control.

The paper "Wafer Level Reliability for High-Performance VLSI Design" deals with the problem that the lifetimes of devices using new technologies are far shorter than older ones and are coming close to system lifetime. In order to monitor reliability on the wafer level, the paper proposes to introduce test structures on the wafer which allow the evaluation of certain failure modes, such as electromigration of mobile ions within a short time.

Some further papers deal with
— microfocus X-ray imaging for solder quality and structure inspection

- measurement of opaque-film thickness by thermal waves
- intelligent laser soldering inspection and process control
- rupture testing of electrodeposited copper interconnections (is this a non-destructive evaluation?)
- heterodyne holographic interferometry and
- "whole wafer" scanning electron microscopy.

The last four papers apparently only consist of copies of view graphs used for presentation at the workshop. The main part of the book describes activities at some companies and universities in 1986 in the area of measurement technology and process control in semiconductor manufacturing. This may be of some interest to a few specialists in the field, but of more interest is a summary of findings and recommendations in the first part of the book. On six pages, the deficiencies of the U.S. semiconductor industry with regard to quality and reliability are listed. These few pages should be read thoroughly by all executives in the U.S. semiconductor industry, but they are of equal interest to quality managers in companies using microelectronics, and for semiconductor competitors in Japan and Europe.

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Analysis of Polymers. An Introduction By *T. R. Crompton*, Pergamon Press, Oxford 1989, viii, 362 pp., bound, DM 165.- ISBN 0-08-033942-5.

The number of commercially available polymers has been increasing over the last decade and is still increasing rapidly, due not only to the synthesis of new polymers, including new statistical copolymers or block copolymers, but also to the increasing use of polymer blends or of polymers containing various kinds of additives. Scientists in industry and in universities as well as potential users of such polymers frequently have the need to know what kind of polymers they are confronted with and which kind of additives they may contain. This is a formidable task. Fortunately the number of possible analytical techniques has also increased and some of

them are highly sophisticated. It is therefore often not easy to decide which of the techniques is the most promising and what kind of information they are able to provide.

This is where the book "Analysis of Polymers" comes in very handy. It has been designed both as an introduction and as a practical guide for students and analytical chemists in universities or industrial laboratories. To serve this purpose it contains detailed descriptions on the various approaches which can be pursued in order to analyze the chemical structure of homo- and copolymers and also the composition of multicomponent systems.

The organization of the book is primarily not so much technique-oriented but rather problem-oriented, as illustrated by the following titles of selected chapters: determination of elements, determination of functional groups, fingerprinting of polymers, polymer microstructure, fractionation and molecular weight, additives in polymers and adventitious volatiles in polymers.

Experimental techniques in turn are introduced within these chapters and their applications are demonstrated for a variety of examples in each of the chapters. Among the many techniques for which the basic theory is treated and applications demonstrated are gas chromatography, IR- and UV-spectroscopy, NMR- and ESR-spectroscopy, polarography, X-ray fluorescence spectroscopy, Neutron activation analysis, electron probe microanalysis, thermogravimetric and differential scanning calorimetry, titration methods, to mention just some.

The book is very well written and the examples have been selected well. It contains, in addition to the features mentioned so far, a large number of illustrations, extensive tables concerned with the properties of selected polymers as well as more than 1000 references. The book gives an impressive up-to-date exposition of the state of the art of polymer analysis and it seems certain that it will serve as a highly useful reference work.

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Books received:

An Introduction to Rheology. By H. A. Barnes et al. Elsevier, Amsterdam 1989. X, 200 pp., soft cover, US \$ 60.50. - ISBN 0-444-87469-0. **The Materials Revolution.** Edited by T. Forester. Basil Blackwell, Oxford 1988. XIII, 397 pp., paperback, £ 14.95. - ISBN 0-631-16701-3. **Practical Raman Spectroscopy.** Edited by D. J. Gardiner and P. R. Graves. Springer-Verlag, Heidelberg 1989. VIII, 157 pp., soft cover, DM 86. - ISBN 3-540-50254-8. **Chemistry and Physics of Carbon**, Vol. 22. Edited by P. A. Thrower. Marcel Dekker, New York 1989. XII, 264 pp., bound, US \$ 162. - ISBN 0-8247-8113-9. **The MOCVD Challenge**, Vol. 1. By M. Razeghi. Adam Hilger, Bristol 1989. XII, 328 pp., bound, £ 55. - ISBN 0-85274-161-8. **The New Physics.** Edited by P. Davies. Cambridge University Press, Cambridge 1989. IX, 516 pp., bound, £ 30. - ISBN 0-521-30420-2. **Life of a Scientist.** By R. S. Mulliken. Springer-Verlag, Heidelberg 1989. XV, 256 pp., bound, DM 98. - ISBN 3-540-50375-7. **Polymer Processing.** By D. H. Morton-Jones. Chapman and Hall, London 1989. XI, 260 pp., soft cover, £ 16. - ISBN 0-412-26700-4. **Polymer Characterization.** By D. Campbell and J. R. White. Chapman and Hall, London 1989. VIII, 362 pp., soft cover, £ 19.95. - ISBN 0-412-27170-2. **NMR-Basic Principles and Progress**, Vol. 21. Edited by P. Diehl et al., Springer-Verlag, Heidelberg 1989. XII, 176 pp., bound, DM 128. - ISBN 3-540-50151-7.