

*Book Review**

For Better Thermal Analysis and Calorimetry. Edition III (1991)

John O. Hill (editor)

International Confederation for Thermal Analysis (ICTA – Secretary: Prof. S. Yariv, Department of Inorganic and Analytical Chemistry, The Hebrew University, Jerusalem 91904, Israel), 1991, viii + 93 pp.

'For Better Thermal Analysis', which aimed at promoting good practice in thermoanalytical studies, as well as publicizing ICTA and its activities, was first produced in 1977 by Prof. G. Lombardi, Rome, as a joint publication of ICTA and the University of Rome. Both it and a second revised edition (1980) were found so generally useful by thermal analysts that, despite large printings, they have been out of print for many years. Council of ICTA, therefore, commissioned Dr. J. O. Hill (then of Australia, now of Singapore) to compile a new updated edition that would also include calorimetry. The present brochure, in compiling which Dr. Hill was supported by Dr. J. P. Redfern (UK) as Associate Editor and Prof. M. E. Brown (South Africa), Prof. E. L. Charsley (UK), Prof. G. Lombardi (Italy) and Prof. S. St. J. Warne (Australia) as Advisory Committee, is the result.

At the time of writing, copies have been distributed to ICTA members only – and this is fortunate, as some gremlins seem to have caused the centre section to be so wrongly paginated and arranged that it is unintelligible. A correctly paginated section will be distributed to ICTA members in due course and it is believed that some remedial action will be taken before copies become available to the public: consequently, this review is written on the basis of correct pagination. For those unfortunate enough to have only the version issued to ICTA members, the correct pagination of pp. 37–50 is 49, 48, 47, –, 45, 42, 43, 44, 41, 40, 39, 38, 37, –, the correct pages 40 and 50 being completely omitted. As it stands, this brochure might well qualify for inclusion in the Guinness Book of Records!

The subject-matter is presented under two main headings – namely, 'Thermal Analysis and Calorimetry Data Handbook' (53 pp.) and 'What is ICTA?' (39 pp.). The second details essentially how ICTA attempts to assist the practising thermal analyst and calorimetrist by describing the origin, structure, activities, committees, awards and publications of ICTA with appendices listing

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the membership of some component bodies, the societies affiliated to ICTA, the Statutes of ICTA, etc. This succeeds in giving the reader an excellent overview of what ICTA does and of the work performed by the various committees, the terms of reference of which are specified for the first time. There seems to be some doubt, however, whether or not the Chairman of the Organizing Committee is a member of Council (cf. p. 37, lines 2–1 from foot, and p. 78, last line, with the diagram on p. 59). It is also very difficult, because all headings are given the same weight, to distinguish paragraphs from sub-paragraphs in the section on the Scientific Commission (pp. 60–67): indeed, one might ask why awards given by Affiliated Societies should appear here?

The 'Data Handbook', which comprises five sections along with appendices listing instrument suppliers and correlating energy units, will undoubtedly be the most generally useful. The history section (3 pp.), which lists references to books and articles where relevant information can be found, seems fairly complete, at least so far as thermal analysis and the English language is concerned. The nomenclature section (9 pp.) gives reference to all ICTA and IUPAC recommendations for thermal analysis nomenclature in the English language and reproduces these recommendations on symbols. However, the major part is occupied by a provisional document that has as yet no ICTA or IUPAC backing and merely indicates how technique names and definitions might possibly develop in the future. This reviewer cannot understand why this document should appear in, of all things, a 'Data Handbook' – especially when definitive recommendations on apparatus and curve nomenclature are nowhere mentioned. References to thermal analysis nomenclature in some languages other than English are given and a sub-section on calorimetry nomenclature is included – oddly, under the heading 'Conference Proceedings'! The remaining sections are excellent and extremely informative. That on standardization (6 pp.) describes all standard reference materials available for temperature and enthalpy calibration of thermoanalytical and calorimetric instruments and that on data presentation (4 pp.) reproduces ICTA recommendations for thermal analysis and quotes references for calorimetry. The section on literature (26 pp.) deserves special mention for its comprehensive nature, although it covers essentially only 1980–1990 (pre-1980 literature was listed in the second edition). The books and articles referred to span an enormous range of applications and disciplines and the editor has put all who use the brochure greatly in his debt by compiling such an exhaustive list of reviews.

In conclusion, the editor is to be congratulated for amassing so much material and for condensing it into such a compact publication: the only laxity seemed to be pp. 26–30, where inordinate space seemed to be given to 'Thermal Analysis Reviews and Abstracts' – presumably because it is ICTA's own publication. Perhaps one might suggest, however, that the next edition incorporate more material from languages other than English through the offices of several assistant editors in different countries. As to the publication itself, it leaves much to be desired. The cover, for example, is, to this reviewer, unattractive and uninviting when compared with Editions I and II and might have been designed with more sensitivity. Moreover, in addition to the transposition of pages and matters relating to headings noted above, there are minor errors of grammar and punctuation that suggest hasty publication and inadequate proof-reading. Production-wise, therefore, it is not a publication of which ICTA can be proud.

R. C. Mackenzie

Bernhard Wunderlich: Thermal Analysis. Academic Press, San Diego etc. ix + 450 pp., 320 refs, 152 figs, 6 summarizing tables, 115 problems.

The scientific and practical contents of the book reviewed and enthusiastically recommended here are based on the ample knowledge and experience of a leading authority in thermal analysis (especially in its application for research and characterization of polymers). On the other hand, the arrangement of the chapters and the way of presentation reflects a 23 year development from a lecture course, via a graduate course on thermal analysis of macromolecules later expanded to the present scope. The result is a book discussing the physical and chemical background of thermal analysis and a detailed treatment of the most common techniques.

In the Introduction (Chapter 1) the fundamental concepts of heat, temperature and thermal analysis as well as a short description of matter (classification of molecules and phases, including mesophases) is presented briefly. Chapter 2 is devoted to the theoretical basis of thermal analysis: equilibrium and irreversible thermodynamics, kinetics and the functions of state related to the method treated in the next chapters.

In chapters 3 to 7 thermometry, differential thermal analysis, calorimetry, thermomechanical analysis and dilatometry, and thermogravimetry are discussed. (The other techniques are just listed in the book.) Each of these chapters begin with the principles and the history of the method, contains up-to-date information on instrumentation, standardization, evaluation of the experimental results and the most important qualitative and quantitative applications. The latter is generally dominated by examples from the field of macromolecules but other uses are discussed as well. Problems are set up for each chapter helping the reader to summarize and understand the contents and to find the relationship between general principles and particular phenomena. Besides bibliographical data, the references belonging to the chapters contain additional information, too.

At the end of the book a table of quantitative thermal properties of linear macromolecules is included as an appendix, then the solutions to the problems and an index are presented.

The style of the text is clear and logical. Selection and arrangement of the material is done to make reading and understanding as easy as possible. University students at undergraduate or graduate levels, starting users of thermoanalytical equipment and R&D experts can simply find what they need and skip things known or unnecessary. The reader is also helped by the figures,

most of which contain several graphs, equations with explanation and/or short tables in order to summarize a unit of the material. In fact, these figures, as stated in the Preface, are "blackboard material" for courses on thermal analysis and intended to be used as the visual material of a planned audio course.

Anyone having the necessary background of chemistry and basic physical chemistry and wanting to get acquainted with thermal analysis or expand his/her knowledge in this field will find the book most useful and interesting. Of course, several good books, journal articles etc. are available on different aspects of thermal analysis, so one can most likely get the general overview and detailed information needed without reading Wunderlich's book as well. But it is not worthwhile.

György Pokol