

## Book review

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*Thermal Analysis*, A Rensselaer Audio Course by Bernhard Wunderlich Professor of Chemistry. Published by: ATHAS (Advanced Thermal Analysis. A Laboratory for Research and Instruction). Available from Rensselaer Polytechnic Institute, Troy, NY 12181. 300-page textbook and 20 half-hour audio lectures: \$ 600-extra books, \$ 35 each). (A discount of \$ 250 is available for individual users).

A well-organized audio course is a unique educational tool. The user listens to the cassette and follows the lecture with the textbook in his hand. The latter provides the "black-board materials": curves, graphs, drawings, equations, and so on. This format allows in-depth understanding as well as a chance to return to portions which the listener needs to hear again. The combination of the tapes and the book may better be called an "audio-video" course, as it offers simultaneously an oral presentation and the corresponding visual aids.

The author is Prof. Bernhard Wunderlich, one of the most prominent scientists and educators in the field of thermal analysis. This material is not a short "how to do" manual, but a complete graduate course condensing the principles, theory and application of thermal analysis. It will be very useful to persons of different educational backgrounds. The "beginner", not familiar at all with thermal analysis, may learn the basic description of his commercial instrument, and detailed instructions for using it. For the researcher with basic knowledge of thermal analysis, the course offers a concise overview. By selecting the tape of his interest, one may get more familiar with the theoretical background, interpretation and practical application of

thermal analysis as it relates to his particular interest. The author uses a comprehensive set of examples from a wide list of materials (from PET to alloys to phenobarbital to cocoa butter). The user will find more than 100 problems with helpful suggestions and, on the final tape, he can assess his skill by finding the correct and/or most elegant solution.

The logical format of the course, the clarity of the explanations and the complete up-to-date coverage of the science and technology of thermal analysis make this a "must" for technical libraries, or individuals who want to gain or increase their knowledge of thermal analysis.

The appearance now of this quality audio course is another sign of the steadily emerging importance of the field. It is fortunate for all of us that this eminent scholar, Professor Wunderlich has provided such an outstanding teaching and review tool.

Edith A. TURI

J. Paulik and F. Paulik: *Simultaneous Thermoanalytical Examination by Means of the Derivatograph*. Wilson and Wilson's Comprehensive Analytical Chemistry (edited by G. Svehla), Vol. XII, Thermal Analysis (Advisory editor W. W. Wendlandt). Elsevier Scientific Publishing Company, Amsterdam—Oxford—New York, 1981.

Principles of the techniques and apparatuses of thermal analysis are known since the turn of the century. None the less, these techniques became widespread in the 'fifties only, one of the reasons being that results separately obtained with the two major thermoanalytical techniques, with thermogravimetry and differential thermal analysis

could not unreservedly be compared. This difficulty was overcome by simultaneous thermoanalytical methods. The first and most current commercial apparatus for simultaneous TG and DTA, the derivatograph was developed by the authors in the 'fifties.

This book is the first comprehensive collection of the results obtained by simultaneous methods.

It consists of three parts: Theory and Techniques, Applications and List of Publications.

In Part I, the theoretical foundations and the development of simultaneous techniques are presented. The introducing chapter demonstrates how information obtained is multiplied by using simultaneous methods. Derivative thermogravimetry and its simultaneous application with TG and DTG facilitates the evaluation of thermoanalytical curves and further increases the amount of information, in particular in the case of overlapping processes.

A chapter deals with derivative dilatometry, a technique also first applied by the authors combined with TG, DTG and DTA.

Another chapter discusses the potentials of increased selectivity. One of its paths is provided by the multi-plate sample holder also developed by the authors.

Evolved-gas titrimetry and the derivative of the curve obtained by this method are also suitable simultaneous techniques to complement TG and DTA. The adapter developed for this purpose and the results are summarized in the following chapter.

The chapter of highest interest in Part I deals with the isothermal-isobaric technique developed by the brothers Paulik, opening a novel, special method of thermal analysis. The technique, experimental conditions, the special labyrinth crucible and the completion of the method with evolved-gas titrimetry and quasi-isothermal thermodilatometry are described in this chapter.

The nine chapters of Part I give a clear picture of the results attained by the authors in the field of thermal analysis during the past 25 years, although the concisely written and well-chosen examples were not meant to present the steadfast and assiduous work performed in particular by the authors themselves. The reviewer had opportunity to work with practically all of their apparatuses,

from the first manually operated discontinuous simultaneous apparatus to the commercial, automated apparatus of the present, and can therefore appreciate the results achieved by the Paulik brothers in the field of thermal analysis from his own experience.

Part II demonstrates the applications and potentials of application of simultaneous thermoanalytical techniques by means of various examples. These are discussed in nine chapters, dealing with inorganic compounds, complexes, catalysts, minerals, silicates, organic compounds, plastics, biological applications and miscellaneous, resp. Part of the examples are results of the authors' own research work, others were obtained with the Hungarian-made derivatograph. The wide range of information provided by the simultaneous techniques impressively demonstrate their value. I wish to note here that the figures in the book are very expressive and speak for themselves, facilitating their discussion.

Part III is the List of Publications containing references of 1296 papers. These include a list (though, according to the authors, incomplete) of the major thermoanalytical results attained with the derivatograph. In my opinion it is regrettable that the references are marked in Parts I and II by five-digit numbers instead of the name of the first author. This anonymity is rather inconvenient. Most readers identify results, methods, techniques and frequently also the apparatus with a name. In its absence, the discussed results are sensed as impersonal. The name of a researcher or of the leader of a research group will mean more to the reader than a five-digit number which provides the only information that the first two digits are the year of publication of the paper.

The get-up of the book (277 pages, 187 figures, 5 tables, Subject Index) is very good, it might have been worth to use a line-equalizing typesetting machine.

The Paulik brothers' book, excellently demonstrating the principles, apparatuses, advantages and wide application range of simultaneous thermoanalytical techniques will be enjoyable reading for practicing thermoanalysts and very useful for researchers and chemists working in industry who apply thermal analysis occasionally only.

G. LIPTAY