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Book review

''Thermische Analyse an Kunststoffen — Methoden und Anwendungen''; Contributions to the LabTalk-Seminar of Mettler Toledo in Wetzlar on 25 November 1997. Th. Nitzschke, J. Vogel (Eds.), Landsberg: ecomed Verlagsgesellschaft, 1998, ISBN 3-609-68340-6, paperback, 98 pp., 48,00 DM

This book is based on a seminar held in 1997, organised by Mettler Toledo. It claims to impart basic knowledge about the fundamental thermoanalytical measurement methods, the physico-chemical backgrounds for the application to polymers and the possibilities of error avoidance.

It addresses all those performing thermoanalytical measurements, including their evaluation and assessment, i.e. technical engineers, Ph.D. students, engineers etc.

Authors are:

- J. Vogel: DSC — Introduction into measuring technique, avoidance of errors
- R. Düren: Application of DSC to damage analysis of plastics
- B. Benzler: Temperature-modulated DSC — General approach
- J. M. Hutchinson: Alternating differential scanning calorimetry (ADSC). The technique and its application to the glass transition
- M. Stroh: Thermogravimetry in quality assurance of elastomers
- S. Gallas: Dynamic mechanical analysis (DMA) — measuring principle and applications
- H. H. Belz: TG/FTIR coupling — Principle and possibilities
- G. Matuschek: TA/MS tests on the decomposition of polymers

Each chapter generally comprises an introduction into the respective measurement procedure as well as a series of examples, by which application of this measurement procedure to special problems is described, thus giving the opportunity to explain the physico-chemical background, and to show that generally known thermodynamic or kinetic laws are helpful and necessary for the interpretation of the measurement results.

The reader should not be put off by the quality of the first chapter; the following chapters are entirely interesting compilations and provide a multitude of examples competently discussed.

These examples are taken from the practical work of the respective author and show the broad field of application of thermal analysis and the high value of thermoanalytical measurements — as long as the reader allows his physico-chemical knowledge to prevail and, if there is any doubt, performs additional measurements, for example, IR spectroscopic tests to obtain unequivocal results.

The level of part of the contributions is very high and may, therefore, exceed the expectations of the book's target group. This applies especially to the chapter on the technique and application of the alternating DSC on glass transition.

On account of the simple application, the high degree of automation, the obscure software and the generally unknown evaluation algorithms of modern measuring instruments, the temptation is great for the less experienced user to uncritically accept the automatically produced nice and colourful diagrams and lists. It is just this user who has too little experience to distinguish between sample effects and artifacts, which possibly occur in the unsuitable crucibles, too high or too low an ambient temperature, lack of equilibrium conditions, variations of the ambient temperature, and the gas flow, etc. The seminar's initiators wanted to show the possibilities of avoiding such errors.

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Only the first chapter of this publication (on DSC) takes this aspect into account, although these problems are just the same in TG, TMA, or DMA.

In summary it may be said that this book gives a nice survey of some classical and modern methods of thermal analysis as well as some good examples showing the efficiency of thermal analysis combined with an intelligent person in charge.

Together with theoretical and metrological basic publications and the pure collection of application examples, this book may, therefore, claim a place on the laboratory bench next to the thermal analysis instrument.

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