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A review of: “Thermal Analysis”

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BOOK REVIEW

"Thermal Analysis"

Thermal Analysis (263 pages), Volume 1 of the series *Techniques and Methods of Polymer Evaluation*, edited by Philip E. Slade and Lloyd T. Jenkins, and published by Marcel Dekker, Inc., New York, 1966, is a very readable book and is written in a style that the reviewer enjoys reading. It is not so elementary as to be trite, but it is not so complex as to take hours to understand. The book serves as a good introduction to differential thermal analysis (DTA) and thermogravimetric analysis (TGA) as applied to polymers. It should serve well the authors' intent of providing a book to stimulate the average polymer chemist as to the potentials of thermal analysis as applied to his problems. For a person already engaged in thermal analysis of polymers, the book will be less useful, in that none of the work is discussed in detail. Nevertheless, the book should serve to broaden the horizons of persons now engaged in thermal analysis.

The principle criticism of this book would appear to be inherent in a book of this type. In any book where the individual chapters are written by different authors, there is always a great tendency for subjects to be repeated. This book is no exception. For example, both Chapter 3 on page 94 and Chapter 4 on page 116 discuss condensation of volatiles on the cooler parts of the TGA apparatus as being a serious problem. Sometimes there appear to be minor disagreements from chapter to chapter. For example, Chapter 1 on page 31 indicates benzoic acid is a poor calibration standard for DTA instruments, whereas Chapter 2 on pages 58-59 would tend to show that it is a perfectly adequate calibration standard. The repetition, however, does not deter one from reading the book and even may serve to emphasize the importance of some of these variables.

Chapters 1 and 3 are primarily concerned with the instrumentation of DTA and TGA, respectively. Included in the chapters are

discussions of commercially available instruments. These lists are useful, but caution should be exercised since they by no means cover all commercially available apparatus. One change in the commercial instruments listed in these chapters is that the Stone equipment is now manufactured by the Tractor Equipment Company, 6500 Tractor Lane, Austin, Texas. It seems unfortunate that in the discussion of the commercial equipment, the differences between the various instruments would not be emphasized. A discussion of this type would be a great aid to a person contemplating entering the thermal analysis field.

Chapters 2 and 4 are concerned with the applications of DTA and TGA to polymer systems. Both chapters indicate the potentials of thermal analysis in polymer characterization without implying that all the important research in this field has already been carried out. Chapter 4 at first glance appears to be quite complex and to involve deep mathematical derivations. In fact, it is a beautiful illustration of elementary chemical kinetics as applied to TGA curves.

Chapter 5 deals with effluent gas analysis as used to study polymer degradations. It points out how gas chromatographs and mass spectrometers can be very useful adjuncts to DTA and TGA instruments.

There are several sections of this book that the reviewer found to be especially interesting. One of these is the discussion on page 6 of the reason why thermistors have not found wide use in instruments. Another good discussion is found on page 93 concerning TGA curves obtained on thick and thin film samples.

This book is no classic in the realm of polymer chemistry; nevertheless, it is a very useful book. It will not find wide application in the general academic field, but should have wide circulation in industrial and research laboratories engaged in polymer research.

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