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Book Review

Michael E. Brown: Introduction to Thermal Analysis.
Techniques and Applications
Chapman and Hall, London-New York, 1988 ix + 211 pp, 111 Figs,
10 Tables, 303 Refs.

The volume is really a short introduction to the methods and applications of thermal analysis. Based on the material of thermal analysis courses given by the author, the book is intended for beginners in the field.

The majority of the chapters are devoted to different techniques of thermal analysis, including less common ones. The most frequently used methods: thermogravimetry, DTA and DSC, are discussed in a little more detail. These chapters are compiled in a uniform way. After the provision of the fundamentals of the technique in question, the parts and arrangement of measuring devices are presented, usually on the basis of the literature from leading manufactures. The effects of the experimental conditions and procedures of calibration are then described, followed by the most important fields of application.

After the introduction to the different techniques, separate chapters give an outline of the use of microcomputers, the evaluation of reaction kinetics, purity determination by DSC, the thermal analysis literature and the equipment. Appendices contain a list of basic introductory experiments in DSC and TG, and some program lists of data acquisition and processing written by the author (in Applesoft Basic).

Brown's work is a convenient and easy-to-read first book for those intending to use thermal analysis methods; it is a practical help in getting started. It must not be forgotten, however, that the first step must be followed by the second, etc., and this applies to the selection of thermal analysis literature.

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Heats of Vaporization of Fluids
Vladimir Majer, Václav Svoboda and Jiri Pick
Elsevier, Amsterdam - Oxford - New York - Tokyo,
1989. 344 pp. Price: US $ 155.25

The book is the 9th volume of the series "Studies in Modern Thermodynamics".

The work has been compiled with rigorous coherence and provides a full description of the subject. The book summarizes the present knowledge concerning the heats of vaporization of both pure substances and mixtures, with emphasis on organic fluids.

"The Heats of Vaporization of Pure Substances", as Part I of the book, consists of eight chapters. The first chapter is a very expert and exact thermodynamic interpretation of the topic, while the second to sixth chapters describe approaches to the determination of heats of vaporization from the experimental calorimetric (direct) methods through calculations as a function of temperature and vapour pressure and the reference substance concept to "simple" empirical expressions. The seventh chapter is a concentrated summary of the previous five chapters, and gives a very critical comparison of the introduced methods, their suitability for the determination of ΔH for different types of substances, requirements on the input data, applicability to a given pressure region and facility of calculation. The eighth chapter surveys the use of heat of vaporization and other derived quantities in thermodynamics, thermochemistry, molecular theory of fluids and chemical engineering. The main applications encountered in the literature are discussed and critically evaluated in this chapter.

"The Heats of Vaporization of Mixtures", as Part II of the book, does not have exactly the same structure as Part I because of the variety of mixtures and the greater complexity of the relationships. The authors present primarily a rigorous thermodynamic description of the subject, giving detailed relationships and recommendations in the first four chapters. The experimental determination of the heats of vaporizations of mixtures is analysed in the fifth chapter. The next three chapters deal with special cases of vaporization of azeotropic mixtures, solutions containing non-volatile components and associating systems.

The closing part of the book is the "Appendix", with equations and practical information that are of great use in the calculation of the pVT properties and thermodynamic departure functions.

As a result of the manysided, critical, analytical, evaluative introduction and survey of the subject, the book is more than a monograph. The aim of the authors is not only to provide an optimally concise and exact review of the subject; they also strive to help the work of the extremely different users through attentive construction, by reliable information, with tables of method comparisons and with illustrative examples and calculations. The single criterion of the usage of the book is the reader's knowledge of thermodynamics at the level of normal university study.

The 368, 127 and 39 references in Part I, Part II and the Appendix, respectively, can be regarded as the complete, fully discussed literature on the subject. This literature is an organic part of the book from the aspect of its utilization. The style and the layout of the book are perfectly adequate to the aim.

This book seems to be a very useful tool from both theoretical and practical aspects for all those who deal with or come into contact with the subject.

The manuscript was completed in 1986 and its use will scarcely be limited for a long time.

Zoltán Adonyi