Book Review

Differential Thermal Analysis

Edited by R. C. MACKENZIE, Vol. 2. 1972. Academic Press Inc., London—New York, 607 pp, 254 figures, 46 tables. Price £ 12.50

The second volume of the monograph, the first volume of which appeared in 1970 and was reviewed in J. Thermal Anal. Vol. 4 (1972) 113, has also appeared. The last words of the book review were: "The greatest deficiency of the book is that its second volume has not yet appeared". This deficiency has ceased to exist with the appearance of the second volume, which bears the subtitle "Applications", and consists of two sections: Section D: Physical Chemistry and Section E: Applications in Industry (General aspects and inorganic and organic substances were dealt with in the first volume.) The book is arranged similarly to the first volume: the different chapters are written by internationally acknowledged experts of the field. The book contains a great number of references (1766 in total) at the ends of the chapters.

The Section of Physical Chemistry consists of 5 chapters. In the first one the thermal constants are dealt with (which, however, change with temperature), such as thermal conductivity, specific heat, heat-diffusivity, etc., and their determination by normal DTA and heat flux methods, as well as their effect on the DTA curve.

In the next chapter devoted to calorimetric measurements, the apparatus and methods for calibration and for the determination of enthalpy changes are dealt with in special detail. It was a good idea to treat Differential Scanning Calorimetry here, since no sharp boundary line can be drawn between the two methods.

In the next chapter one of the most fashionable fields of thermal analysis, reaction kinetics is treated. Various methods are described in connection with homogeneous and heterogeneous reactions and some comments are made concerning kinetic data obtained by the TG and DSC methods. Some reference concerning the processing of kinetic data by computer would be useful here. A separate chapter is devoted to phase studies, including their application to inorganic and organic substances and alloys, and another one to low-temperature DTA.

Section E, "Applications in Industry" covers a wide field. However, there are fields which are not dealt with in as much detail as they deserve, or there are fields which are missing, such as the investigation of coals or the application of DTA to biological and medical problems.

The chapter on ceramics gives a survey from the raw materials to the industrial operations and products. As it is reflected by the great number of references, this is the field where DTA has been used most widely. In the following three chapters the application of DTA to building materials, cements and glass is dealt with. The chapter "Mineral Industries" gives information about various minerals, and is useful for mineralogists, too.

In the next chapter the investigation of soils is treated. Special attention is paid to sample preparation and experimental technique. In the next three chapters rather new fields of application of DTA are described,

namely catalysts, explosives and atomic energy.

Plastics and rubbers are often studied by thermal methods, namely DTA.

In the next chapter the production, physical and chemical changes of plastics and rubbers are described, as well as the problems involved in their qualitative and quantitative analysis. The next two chapters are entitled Textiles and Pharmaceuticals, respectively. In the latter the correlation between DTA data and solubility, polymorphy, stability, etc. are dealt with, but only some words are devoted to biochemical applications. In the next three chapters natural organic substances are dealt with: oils, fats, soaps, waxes, food industries and forest products. This field is expected to develop rapidly in the near future.

The last chapter is entitled "General Applications in Industry with Special Reference to Dusts".

The book will be a good aid for researchers working in the field of thermal analysis as well as for those in other fields. The method which is described is developing rapidly, and the book shows a certain state, nearly the present state of this development.

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