

Book Review

THERMAL METHODS

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Series: Analytical Chemistry by Open Learning, ed:
Brian R. Currell, John Wiley and Sons, Chichester on behalf of ACOL,
London 1987. xxi + 337 pp + 16 separate worksheets

The volume belongs to a series of books on analytical chemistry for "distance learners" written almost exclusively by experts teaching analytical chemistry at British polytechnics.

The goal of the book is to present an outline of the basic principles of various thermoanalytical methods, and to give a detailed grounding in the major techniques (including methodology, the effects of experimental conditions, interpretation of results and practical applications) with a necessary minimum of physico-chemical background.

The Introduction contains a very brief overview of thermoanalytical methods, including multiple techniques, and the fields of application with some simple and instructive examples. Chapter 2 is devoted to the instrumentation and techniques of thermogravimetry with separate parts discussing the error sources and the choice of optimum operating conditions. Chapter 3 deals with the evaluation and interpretation of TG and DTG curves. The structure of the discussion of differential thermal analysis and differential scanning calorimetry is somewhat different. The principles of the methods, general features and interpretation of DTA and DSC curves, and the aspects of instrumentation and calibration are presented in Chapter 4, while Chapter 5 describes practical procedures and applications, including a part on the investigation of polymers.

The last chapter is completely devoted to one complex practical task, the high alumina cement (HAC) problem. Starting from real (and dangerous) cases of HAC concrete failure, this section describes the conversion reaction leading to the formation of voids and cracks, lists the available methods to assess the deterioration, and describes the details of using DTA to determine the degree of conversion. At the end of the chapter the learner is instructed to analyse two HAC samples on the basis of real DTA records.

The style of the text and the outlay of the book are perfectly adequate to the goal. It is a pleasure to see how simply and convincingly the usefulness and versatility of thermoanalytical techniques are demonstrated. At the important points of the

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materials, the reader is stopped to answer questions or solve exercises. Some of these tasks try to make the learning process interactive rather than accepting only, others are self assessment questions (SAQ). The SAQ-s are repeated in a separate section after Chapter 6, and the solutions are also given in detail; this section amounts to about one third of the whole volume.

The material of the book and the supporting laboratory course (the elements of which are listed in the preface) were compiled for the senior technician (U.K.) level. (Accordingly, literature references are not given in the text, just a very brief general bibliography is included, mentioning, e.g., this Journal but neglecting *Thermochemica Acta*.) However, "Thermal Methods" may also be useful for university students and graduates starting practical thermoanalytical work, as a supplement to higher level textbooks and monographs.

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