

FOREWORD AND ACKNOWLEDGMENTS

There has been a tremendous growth in the development of the principles and techniques of various physico-chemical methods of investigation during recent years. Perhaps one of the fastest growing areas has been that of thermal analysis techniques. As a result of this growth, many investigators find it difficult to maintain an understanding of the entire field of thermal analysis, especially as applied to heterogeneous processes. The purpose of this short monograph is to present to the wide variety of thermoanalysts in the different fields of science and engineering, a comprehensive introduction to the study of heterogeneous reactions by means of these techniques using a physico-chemical approach. Particular attention is paid to the technique of differential thermal analysis (DTA), perhaps the most important thermal analysis technique, and to the significance of the activation energy (E) which is one of the most commonly obtained kinetics measurements. The mathematics used is at a simple level while the topics discussed will be familiar to anyone with a chemical or engineering background. In contrast to existing monographs in which the thermal analysis techniques are used as analytical tools, this approach is the first to emphasize the physico-chemical side of the investigated process and the choice of instrumentation needed. The latter approach is, in fact, identical to the method of actual investigation in the laboratory.

The contents of this monograph were formulated in three different locations by three different authors, each an expert in a different field of physical chemistry or thermal analysis. Dr. J. Šesták, who conceived the general plan of the book, is a principal scientist in the Department of Solid-State Chemistry and Technology of Ferrites, Institute of Solid-State Physics in Prague. His main field of research is in the kinetics of chemical reactions. Dr. J. Šatava is head of the Independent Laboratory for Silicate Research of the Czechoslovak Academy of Sciences and The University of Chemical Technology. He is also professor of physical chemistry of silicates and has made many contributions to chemical thermodynamics.

Besides my contribution to this monograph, I have edited the portions written by my other two colleagues, Drs. Šesták and Šatava, and I have attempted to phrase some of the sentences in a more concise style of English. I hope that most of the grammatical errors were corrected without changing the intended meaning of the sentences or phrases.

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