

## Book Reviews

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E. CIANETTI, G. PECCI, N. VINCIGUERRA and P. MOCERINO: *Studio sul comportamento degli elastomeri crudi e vulcanizzati al calore e alle radiazioni nucleari (Study of the behaviour of raw and vulcanized elastomers to heat and to nuclear radiations)*. Associazione Nazionale fra le Industrie della Gomma, Cavi Elettrici ed Affini, Milan, 1970. Text both in English and Italian, 169 pages, 111 figures and 196 references.

The book is divided into six chapters: 1. Introduction; 2. Plan of the present work; 3. Tests on raw materials; 4. Tests on vulcanized specimens; 5. Final considerations; 6. Proposal for a specification.

In Chapter 1 the purpose of the study is dealt with. This consists of the investigation of the changes taking place in macromolecular substances on heating, on long-lasting thermal effects and on nuclear radiation. The thermal sensitivities of these materials are important for many industrial applications, particularly in aircraft, where the materials are subject, sometimes for long periods, to very severe conditions of use. In this chapter the literature concerning the thermal behaviour of macromolecular materials, primarily natural and synthetic rubbers, is thoroughly surveyed, as is that on the aging of rubbers. In this section the methods suggested for studying this phenomenon are compared.

In Chapter 2 the results of the experiments of the authors are given. The changes taking place in macromolecular substances on heating and irradiation are followed by thermogravimetry and differential thermal analysis. Among the samples examined there

are some relatively new products or at least still little-known ones. The measurements were made with a Netzsch apparatus.

In Chapter 3 are given the TG and DTA curves of 17 tested products, the curves of the untreated and irradiated products being shown one under the other. The efforts to ensure complete accuracy by presenting the original curves are justified in most cases. In the present case, however, the coupling of TG and DTA curves, and for connected figures plotting the curve versus time in one case and versus the temperature in the other is detrimental to clearness. Although the aim is clearly to present the reader with a collection of original graphs, it might have been more useful in some cases to interpret the changes indicated by the TG and DTA curves.

In Chapter 4, Tests on vulcanized specimens, investigations were made to establish up to what point the various ingredients might influence the thermal characteristics of the basic macromolecular compounds.

The decomposition curves of 15 various vulcanized rubber specimens are given, the compositions being known. In Chapter 5 the thermal behaviour of the samples tested is interpreted on the basis of a thorough analysis of their TG and DTA curves.

The phenomenon of vulcanization is dealt with, and special attention is given to the role of vulcanizing agents, accelerators, activators, carbon blacks and anti-aging agents in the process of vulcanization. At the end of the chapter the mechanical tests of vulcanized rubbers are described by means of 50 figures.

In the last chapter a proposal is made for the specification of materials produced for practical applications. This proposal follows

directly from the investigations and theoretical considerations given in the publication.

The book is of use for both theoretical and practical research workers. Similar treatises would be very useful in the future.

J. SIMON

*Atlas of thermoanalytical curves (TG-, DTG-, DTA-curves measured simultaneously)*. Edited by G. LIPTAY, Akadémiai Kiadó, Budapest, and Heyden and Son Ltd. London. Price: \$ 28.00, £11.50

The Atlas starts with a short preface in which the aim of the collection is outlined. Following this the thermoanalytical curves mentioned in the subtitle are presented for 50 substances.

At least two sets of curves are given for each substance with two different sample sizes and heating rates. The sample sizes generally differ by one order of magnitude. The heating rate is 1°/min or 3°/min for the smaller, and 3°/min or 10°/min for the bigger sample.

Of the two diagrams obtained under the above conditions, one is given in red on transparent paper and the other in black on white paper, so that the diagrams can be laid on each other, and the effect of the experimental conditions can readily be studied.

The experimental conditions, some notes and references are given on the back of the diagrams; these facilitate the evaluation.

Collections of this type meet requirements only if they comprise as much material as possible. The publishing of the further volumes mentioned will therefore be very useful. It is not very fortunate that the substances are treated in an arbitrary order, and not even organic and inorganic materials are treated separately. However, the reader can arrange the diagrams at will, as the ring-bonding system facilitates this.

The inside and outside appearance of the Atlas is praiseworthy: clearness, practicality, good quality and a pleasant form harmonize well.

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