

Polymer Alloys and Blends: Thermodynamics and Rheology

L. A. Utracki (Ed)

Carl Hanser Verlag, Munich, 1990,
356 pages, DM 148.00
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I approached the reviewing of this volume from two different points of view. I have been working in the field of polymer blends for over a decade, and have an on-going research effort in several aspects of the fundamentals of the field. At the same time I am a teacher, involved with the education of young research workers. Wearing the first hat, I asked myself 'what does this volume add to the extensive and growing literature on polymer blends and alloys?' Wearing the second hat, the question is whether I would recommend the book to my students, and if so, for what purposes. Clearly the two aspects overlap, and ultimately they both reduce to whether I would want this volume on the shelves in my own office or laboratory, or whether I am content to let it rest in the reference libraries. Having had the book to hand for a few weeks, the answer is that neither I nor my students would care to see it move far from the office or laboratory. It is an extremely valuable addition to the literature, and in fact is quite unique in its contribution so far.

The book is in three sections. Part 1 is an historical, technical and economical survey of the field of polymer blends and alloys. Part 2 covers the thermodynamics of polymer-polymer miscibility, including both the theoretical approaches developed so far, and the many and varied techniques involved in observing miscibility levels and limits. Both of these areas have been covered in textbooks previously, although not perhaps in so pragmatically practical a tone, or so concisely. The third part, however, brings a new addition to this area of the literature. It is a survey of the rheology of both miscible and immiscible systems. A short section on the new but important area of shear-induced miscibility is also included. Since in practice most blends have to be processed, an understanding of the interactions between rheology and thermodynamics is crucial for a complete understanding of the properties of blended polymers. However, the experts in the two areas usually come from quite different backgrounds, so that it has not been usual to see full developments within the same volume.

It is, in part, the juxtaposition of science and technology, of thermodynamics and rheology, that gives this

book its unique flavour. Just as valuable, however, are the numerous tables, appendices and indexes which between them summarize and make accessible the vast and growing literature of blends and alloys. The author claims to have read 20,000 references and patents and to cite over 1,000 in the text. I have not counted myself, but I can vouch for the extensiveness of the tables and the relative ease with which information on a particular blend can be tracked through the text.

It was on these surveys of the current literature that my own students first commented favourably. My own view is that the theory sections are ideal for someone who already knows the field to some extent, but perhaps a little brief for the absolute beginner. The students, however, found the organization and conciseness helpful.

In summary, therefore, both the beginner who wishes to find his way in the field and the expert who wants a concise reference summary will find this volume indispensable.

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Degradation and Stabilization of Polymers: Vol. 2

H. H. G. Jellinek (Ed)

Elsevier Science Publishers,
Amsterdam, 1989, 720 pages,
\$234.25/DFI 445.00
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This book is the second in a series of review volumes, originally edited by Professor H. H. G. Jellinek. The book was in preparation when Professor Jellinek died in 1986 and it has been completed by Dr H. Kachi. The inevitable consequence is a delay in publication, which means that not all of the most recent literature is covered.

There are eight chapters, covering a wide range of topics in polymer degradation. Photodegradation is the subject of three chapters. A review by Scaino covers laser flash photolysis in a general way, with a few polymer examples. Itagaki and Mita provide an extensive review of photophysical processes in polymers and their relevance to photo-oxidation chemistry. Webb *et al.* review photodegradation of polymer films on reflecting surfaces, emphasising the application of infra-red reflection methods for monitoring degradation.

Polymer combustion is the subject of a chapter by Khalturinsky and Berlin. This is extensive but covers the literature only up to 1983, with the result that it has an old-fashioned feel in a field which has been developing very rapidly. Biodegradation is covered in a paper by Zaikov, mainly directed at polymers which are designed for applications in surgery and in drug release, where degradability is encouraged. Ozone-induced degradation of rubbers is discussed by Razumovsky and Zaikov, in a chapter which also has very few recent references. Copper catalysed oxidation of polyolefins, a topic of major importance in the electrical industry, is reviewed by Jellinek in a chapter which is, inevitably, incomplete.

The largest single chapter of the volume, occupying almost one third of the total, is a review by Ivan, Kelen and Tudos, of the degradation and stabilization of poly(vinyl chloride). This is a major compilation of the literature (846 references) but coverage stops at 1985. A number of recent developments, e.g. the applications of high-field n.m.r. and of resonance Raman spectroscopy, are not covered.

This volume contains much of value. It inevitably suffers from the delay in publication and the patchy way in which different authors have (or have not) updated their contributions. It is well produced, from camera-ready typescripts in several different styles. Few individuals will want to buy it, but it should be in the library of any group interested in polymer degradation.

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Infrared Spectroscopic Atlas of Polymers

J. G. Dillon

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Lancaster, PA, USA, 1989, 195
pages
ISBN 87762-615-4

There has been a need for some time for a specialist book on infra-red spectroscopy of polyurethanes in all their manifestations. The information has been available in the literature, of course, to enable the researcher to assign a particular absorption peak to an appropriate chemical entity. However, to this reviewer's knowledge, this is the first time the data have all been gathered together in one work of reference.