the thermal oxidation of polypropylene is demonstrated and a mechanism is proposed. This account gives some insight into the development of a commercial antioxidant system.

In his review of the dithiophosphates as antioxidants Ivanov considers their preparation and properties and discusses in detail their role as radical scavengers and peroxide decomposers.

The final two papers are concerned with what happens to stabilisers in polyolefins. Vink reviews the chemical fate of the common UV stabilisers. He points out that whereas hydroxybenzophenones and metal complexes are consumed in their roles as radical scavengers and peroxide decomposers respectively the benzotriazoles remain intact for some considerable time before they are diminished by interaction with polymer degradation products. From a comparison of rates of stabiliser consumption during photo-oxidation, inferences are drawn as to the stabilising mechanisms of the various groups of additives.

In the final paper of this volume the physical chemistry of polyethylene and polypropylene oxidation and stabilisation is reviewed by Billingham and Calvert. They consider the vital but often neglected question concerning the importance of oxygen diffusion in determining the rate of thermal and photo-oxidation and conclude that in film form at least it is not the controlling process. They also present evidence which indicates that oxidation is confined to the amorphous region and consider that crystalline morphology has lettle direct effect on the extent of oxidation.

Recognising that a stabiliser has to be retained by the host polymer if it is to be effective the authors develop a model in which additive retention is treated in terms of its volatility, diffusivity and solubility within the polymer. They argue that as the relevance of these three parameters are lost in model compound studies in solution and in accelerated ageing tests these two avenues of investigation should be explored with caution. This is a valuable review as it presents in a digestible form knowledgeable views on processes which are of practical importance.

The five articles in this volume contain detailed information and educated opinion on a wide range of specialised topics in polymer stabilisation and should be well received by those active in the field.

A. Davis

Principles of Polymerization. Second Edition

G. Odian

Wiley-Interscience, 1981. 731 + xxvi pp. £26.25

Following publication of the first edition in 1970, the reviewer commented (*Polymer*, 1972, **13**, 412) that the book could be recommended to those studying high polymers and, indeed, it has proved most useful during the past decade, both in teaching the subject and for consultation or reference on some unfamiliar item. One therefore welcomes the appearance of this very much enlarged and up-dated second edition.

Although there has been extensive revision, the author has retained his original treatment of the subject in presenting nine chapters, the first dealing with general concepts of chemical and physical structure and related properties. This is followed by others dealing specifically and in detail with the organic and physical chemical, kinetic and statistical aspects of polymer synthesis as accomplished by step (polycondensation), free radical, emulsion and ionic methods. Further chapters cover chain copolymerization, ring-opening syntheses, and stereoregular polymers and their formation, while the final chapter discusses reactions for the modification of polymers as well as their uses as supports or media for other reactions.

As would be expected, in order to record and discuss the many developments of recent years these revised chapters have much new material, notably in new polycondensates, radical, ionic and ring-opening syntheses, stereospecific polymerization, grafting, and polymers as reagents, catalysts and substrates. The reference lists (placed at the end of each chapter) contain many more literature entries—some as recent as 1980—as well as references to the considerable number of books on specific areas of polymer science which have been published in recent years. Some additions have been made also so as to exemplify the various processes adopted commercially for polymer manufacture but on the whole these are less adequate than is the extensive, thorough and informative treatment of the principles involved. It is noticed that, as with many other textbooks, this publication omits the important subject of polymer degradation and stabilization, of special interest to many polymer technologists. But this is perhaps regarded as 'depolymerization' rather than 'polymerization' and thus not within the remit of the title!

The numerous diagrams and tables are clearly presented (and generally revised to SI units where appropriate), printing errors are few, and the layout is pleasing, making it a book easy to read. It can be recommended to final and higher degree polymer science students and to those in research and development posts who wish to have at hand some source of reference over this widely ranging subject of polymer synthesis by the many methods and from the many precursors now available.

R. J. W. Reynolds