

JAN F. RABEK

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Photodegradation of Polymers

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Jan F. Rabek

# Photodegradation of Polymers

Physical Characteristics and Applications

With 94 Figures and 26 Tables



Springer

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*In memory of my father,  
Professor T.I. Rabek, founder of the  
Polymer Technology Institute  
at Wrocaw Technical University, Poland,  
an outstanding scientist and teacher  
who introduced me to the study  
of polymer chemistry*

*Books must follow sciences,  
and not sciences books  
Robert Greene (1560–1592)*

## Preface

The last two decades have seen dramatic advances in the understanding of the chemical reactions involved in the photodegradation of polymers. However, there are still many unanswered questions regarding the effects of UV radiation on the physical, rheological and mechanical properties of polymers.

This book was written to introduce scientists, engineers and advanced students working in polymer science and technology to the physical characteristics and practical aspects of polymer photodegradation. The changes in the structure-property relationships under UV and visible light irradiation are presented. Rather than providing a theoretical treatment of a subject only, experimentally collected and practical information on experimental work is offered. The reader can use this to complete his or her knowledge of the chemical aspects of polymer photodegradation, i.e. the mechanisms of reactions. Many issues are deliberately not considered in detail, as it has been necessary to keep this book within manageable portions (200–250 pages). The published literature on the photodegradation of polymers is vast, probably amounting to several thousand references. Only some of the most important references are mentioned to provide the reader who wishes to explore the literature in greater depth with a small number of useful starting points.

This book represents the author's experience, based on his 30 years in research on the photodegradation and photostabilization of polymers. The author has never abandoned the laboratory in that time and has maintained his enthusiasm for empirical science. It is hoped that the information provided in this book will enable the reader to become more familiar with the physical characteristics and applied aspects of polymer photodegradation in greater depth and on a broader front.

I must acknowledge my gratitude to my wife Ewelina whose patience, support and companionship have always facilitated my work, and who is firmly on my side in difficult times.

The author is grateful to Professor Otto Vogl from Polytechnic University, Brooklyn, USA for his recommendation to the Editor that allowed this book to be written.

The author would also like to express his gratitude to Professor Lars-Åke Lindén, Head of the Department of Dental Biomaterials, Karolinska Institute, Royal Academy of Medicine in Stockholm for giving him the opportunity to continue to work on polymer photodegradation. Working in a well managed and professional establishment in a friendly atmosphere is a most rewarding experience.

JAN F. RABEK  
Stockholm, 1996

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