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VOLUME 16 C

POLYMERS

PART C: Physical Properties

Volume 16

Polymers

PART C: Physical Properties

Edited by

R. A. FAVA

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FOREWORD

The thoroughness and dedication of Ronald Fava in preparing these volumes may be verified by this work's impressive scope and size. This is the first time *Methods of Experimental Physics* has utilized three volumes in the coverage of a subject area.

The volumes, in part, indicate the future development of this publication. Solid state physics was covered in Volumes 6A and 6B (edited by K. Lark-Horovitz and Vivian A. Johnson) in 1959. Rather than attempt a new edition of these volumes in a field that has experienced such rapid growth, we planned entirely new volumes, such as Volume 11 (edited by R. V. Coleman), published in 1974. We now appreciate the fact that future coverage of this area will require more specialized volumes, and *Polymer Physics* exemplifies this trend.

To the authors and the Editor of this work, our heartfelt thanks for a job well done.

L. MARTON
C. MARTON

PREFACE

A polymer must in many ways be treated as a separate state of matter on account of the unique properties of the long chain molecule. Therefore, although many of the experimental methods described in these three volumes may also be found in books on solid state and molecular physics, their application to polymers demands a special interpretation. The methods treated here range from classical, well-tried techniques such as X-ray diffraction and infrared spectroscopy to new and exciting applications such as those of small-angle neutron scattering and inelastic electron tunneling spectroscopy. It is convenient to present two types of chapters, those dealing with specific techniques and those in which all techniques applied in measuring specific polymer properties are collected. The presentation naturally divides into three parts: Part A describes ways of investigating the structure and dynamics of chain molecules, Part B more specifically deals with the crystallization of polymers and the structure and morphology of the crystals, while in Part C those techniques employed in the evaluation of mechanical and electrical properties are enumerated. It should be emphasized, however, that this is not a treatise on the properties of polymeric materials. The authors have introduced specific polymer properties only incidentally in order to illustrate a particular procedure being discussed. The reader is invited to search the Subject Index wherein such properties may be found listed under the polymer in question.

I have endeavored to arrange chapters in a logical and coherent order so that these volumes might read like an opera rather than a medley of songs. The authors are to be commended for finishing their contributions in timely fashion to help achieve this end. I also wish to acknowledge with thanks the support of ARCO Polymers, Inc. and the use of its facilities during the formative stages of the production.

R. A. FAVA

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