

**Review on
POLYMERS: An Encyclopedic Sourcebook
of Engineering Properties**

REVIEWED BY RANGA KOMANDURI¹

Polymers—an encyclopedic sourcebook of engineering properties is a welcome addition to the reference literature on this subject. It is concise and contains relevant topics. This volume is one of an Encyclopedia Reprint Series offered by John Wiley & Sons, Inc. It contains selected reprints in their entirety from the original 19 volume series of Encyclopedia of Polymer Science and Engineering with the intention of tailoring the needs of a community interested in the knowledge-base of engineering polymers—materials, properties, and performance. The Executive Editor of this volume is Jacqueline Kroschwitz and the members of the Editorial Board are Herman F. Mark, Norbert M. Bikales, Charles G. Overberger, and Georg Menges. The topics selected are appropriate and the authors of these articles represent a good balance between university and industry/research laboratories.

The 665 page volume contains 18 topics; a section on conversion factors, abbreviations, and unit symbols; and a subject index. The following topics organized alphabetically in the encyclopedic style are covered in this volume.

- Abrasion and Wear
- Aging, Physical
- Chemically Resistant Polymers
- Composites
- Composites, Fabrication
- Composites, Testing
- Crazing
- Dynamic Mechanical Properties
- Engineering Plastics
- Fatigue
- Fibers, Engineering
- Fracture
- Hardness
- Heat-Resistant Polymers
- High Modulus Polymers
- Impact Resistance
- Liquid Crystalline Polymers
- Mechanical Properties

The subject matter can be broadly divided into three groups—polymeric materials (including composites), their engineering properties and response. Materials covered include chemically resistant polymers; engineering plastics; fibers; composites—mechanics, materials, fabrication, and testing; heat-resistant polymers; high modulus polymers; and liquid crystalline polymers. Properties covered include

mechanical properties, dynamic mechanical properties, impact resistance, hardness, fatigue. Topics covered under polymer response include abrasion and wear, aging (physical), crazing, and fracture.

Normally, some of the properties, such as hardness, and fatigue are considered under mechanical properties. However, we have here in this volume separate topics which could have been part of the broad area of mechanical properties. This is unavoidable, since this volume is composed of selected reprints in their entirety and not rewritten to avoid such an issue. However, the material contained in these topical areas is far from repetitive and addresses different intellectual issues.

This volume is not a handbook, where the emphasis is on the tabulation of data but an encyclopedia, where the emphasis is on the knowledge-base. Nevertheless, it does contain some physical and mechanical data, and standards and specifications for materials. The content of this volume, as pointed out in the Preface, would be of value to researchers interested in the design, manufacturing, and use of current lightweight, tough engineering polymers for such applications as in consumer goods, automotive, and aerospace. The book is recommended as a reference volume for researchers and teaching professionals, and to engineering libraries.

**Review on
RELIABILITY ENGINEERING,
P.D.T. O'CONNOR
Reviewed by Ranga Komanduri¹**

“Reliability Engineering,” by Patrick D. T. O'Connor is the edited version of the proceedings of a seminar on “Reliability” held in Syria during July of 1986. A team of speakers, all from the U.K., presented the seminar. Part of the book has been extracted (by permission) from “Practical Reliability Engineering” (2nd Edition), written by the editor (O'Connor) and published by John Wiley & Sons.

The 305 page book contains 20 chapters contributed by eight authors. Ten of those chapters were written by the editor of this volume. The book deals with the practical engineering and management approaches to reliability of new technology products and systems. The approach reflects a move away from the conventional academic approach to reliability with only a brief treatment of probability techniques and reliability analysis.

In the introduction (Chapter 1) the author defines reliability as the probability a product meets the performance requirements (without failure) for a given period of time, under stated conditions of use. This definition implies that measurements or forecasts of reliability are to be based on probability theories, and therefore on statistics. While they do provide a basis, the author points out the need to control the source of variation and cautions the need to establish cause

Murayama, T. (1987) *Polymers: An Encyclopedic Source Book of Engineering Properties Encyclopedia Reprint Series*. John Wiley & Sons, New York. has been cited by the following article: TITLE: Structure, Plastic Deformation of Polyethylene: A Molecular Dynamics Method. AUTHORS: Dung Nguyen Trong, Tuan Tran Quoc, Hue Dang Thi Minh, Cuong Nguyen Chinh, Van Duong Quoc. KEYWORDS: Molecular Dynamics, Atoms Number, Annealing Time, Polyethylene, Plastic Deformation. A polymer is a substance composed of macromolecules. A macromolecule is a molecule of high relative molecular mass, the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of low relative molecular mass. A polymer (from the Greek poly-, "many" + -mer, "part") is a substance or material consisting of very large molecules, or macromolecules, composed of many repeating subunits. Due to their broad spectrum of properties, both Polymers: An Encyclopedic Source-book of Engineering. I was sure no man had ever spoken to her in that tone of voice. She realized tears were streaming down her face and she tried to blink them away. Researchers can now predict properties of disordered polymers. Polymers: An Encyclopedic Sourcebook of Engineering. Polymers, An Encyclopedic Sourcebook of Engineering. Polymers: An Encyclopedic Source-book of Engineering Properties Edited by Jacqueline I. Kroschwitz (John Wiley & Sons, 605 Third Ave., New York, NY 10158, 1987, 665 pp., \$64.95). Graffiti artists had spray-painted several carriages of the elegant old Scarborough-to-York steam train, then smacked the snake.