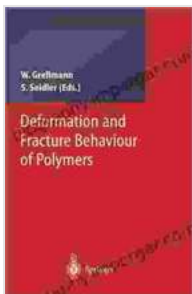


# Deformation and Fracture Behaviour of Polymers Engineering Materials

This book provides a comprehensive overview of the mechanical behavior of polymers, with a focus on deformation and fracture. It covers a wide range of topics, including the basic concepts of polymer mechanics, the different types of deformation and fracture mechanisms, and the factors that influence these mechanisms. The book also includes a number of case studies that illustrate the application of these concepts to real-world problems.



## Deformation and Fracture Behaviour of Polymers (Engineering Materials)

★★★★★ 5 out of 5

Language : English

File size : 13183 KB

Text-to-Speech: Enabled

Screen Reader: Supported

Print length : 625 pages



## Table of Contents

- 
- Basic Concepts of Polymer Mechanics
- Types of Deformation and Fracture Mechanisms
- Factors Influencing Deformation and Fracture Mechanisms

- Case Studies
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Polymers are a class of materials that are composed of long chains of repeating units. They are used in a wide variety of applications, including packaging, construction, and automotive parts. The mechanical behavior of polymers is important for understanding how they will perform in these applications.

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## **Basic Concepts of Polymer Mechanics**

The basic concepts of polymer mechanics are essential for understanding the deformation and fracture behavior of polymers. These concepts include:

- **Stress:** Stress is a measure of the force applied to a material per unit area.
- **Strain:** Strain is a measure of the deformation of a material.
- **Elastic modulus:** The elastic modulus is a measure of the stiffness of a material.

- Yield strength: The yield strength is the stress at which a material begins to deform plastically.
- Tensile strength: The tensile strength is the stress at which a material breaks.

## **Types of Deformation and Fracture Mechanisms**

There are a number of different types of deformation and fracture mechanisms that can occur in polymers. These mechanisms include:

- Elastic deformation: Elastic deformation is a reversible deformation that occurs when a material is stressed below its yield strength.
- Plastic deformation: Plastic deformation is an irreversible deformation that occurs when a material is stressed above its yield strength.
- Fracture: Fracture is the failure of a material under stress.

## **Factors Influencing Deformation and Fracture Mechanisms**

The deformation and fracture behavior of polymers is influenced by a number of factors, including:

- Temperature: Temperature can affect the mechanical properties of polymers. For example, polymers are typically more ductile at higher temperatures.
- Strain rate: Strain rate is the rate at which a material is deformed. Strain rate can affect the mechanical properties of polymers. For example, polymers are typically more brittle at higher strain rates.
- Environmental conditions: Environmental conditions, such as humidity and exposure to chemicals, can affect the mechanical properties of

polymers.

## **Case Studies**

The book includes a number of case studies that illustrate the application of the concepts of polymer mechanics to real-world problems. These case studies include:

- The use of polymers in packaging
- The use of polymers in construction
- The use of polymers in automotive parts

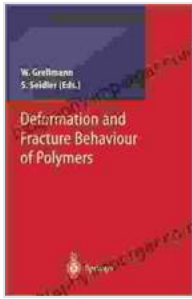
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This book is a valuable resource for engineers, scientists, and anyone else who is interested in the mechanical behavior of polymers.

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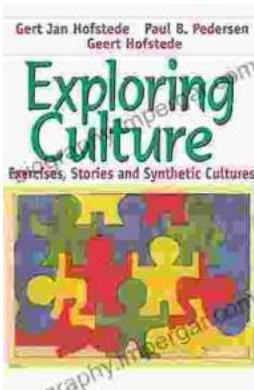
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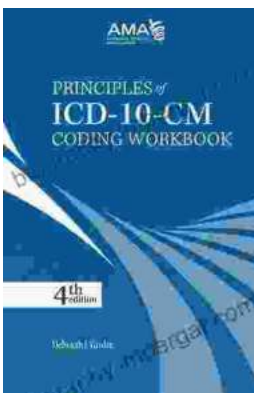
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