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Nota di contenuto	Front Cover; Fractography in Failure Analysis of Polymers; Copyright Page; Contents; Foreword; Preface; Acknowledgments; 1 Introduction; 1.1 Motivations; 1.2 What Is Fractography?; 1.3 Plastic Material Structure-Property Relationship; 1.4 Components of a Failure Investigation; References; 2 Fractography as a Failure Analysis Tool; 2.1 Failure Analysis Fundamentals; 2.1.1 Causes Versus Mechanisms; 2.1.2 Primary Versus Secondary Causes; 2.1.3 Types of Root Causes; 2.1.4 Defects Versus Imperfections; 2.1.5 Deficiencies in Design and Material Selection; 2.2 The Scientific Method 2.2.1 Deductive Versus Inductive Reasoning and Fallacies2.3 Application of the Scientific Method; 2.3.1 Multidisciplinary Approach; 2.3.2 The Litigation Standard; 2.4 The Role of Fractography in Failure Analysis; References; 3 Instrumentation and Techniques; 3.1 Field or Site Instrumentation and Techniques; 3.1.1 Information Gathering; 3.1.2 Visual Inspection for Product Specific Information; 3.1.3 Visual ("Naked Eye") and Photographic Techniques; 3.1.4 Field Microscopy; 3.1.5 Photogrammetry and Digitization; 3.2 Microscopic Examination of Fracture Surfaces in a Laboratory 3.2.1 Optical Microscopy3.2.2 Scanning Electron Microscopy; 3.2.2.1 Environmental SEM; 3.3 Consideration and Selection of Instruments in Failure Analysis; 3.4 Summary; 3.5 Regulatory Agencies; References; 4 Fractography Basics; 4.1 Fracture Surface Features and Interpretation;

4.1.1 What Failure Characteristics Are Normally Associated with This Material?; 4.1.2 What Is the Location and Nature of the Fracture Origin?; 4.1.3 Is the Fracture Surface Brittle or Ductile-How Ductile?; 4.1.4 Is the Fracture Surface Smooth or Rough, Dull or Glossy? 4.1.5 Is Stress Whitening Present Anywhere on the Fracture Surface? 4.1.6 What Is the Nature of Striations and Other Marks on the Fracture Surface-Was the Fracture Fast or Slow?; 4.1.7 Do the Mating Halves of the Fracture Show the Same Crack Direction?; 4.1.8 Is the Crack Straight or Curved?; 4.1.9 Are There Branches, Bifurcations, or T-Junctions of the Crack in the Part?; 4.1.10 Are Both SCG and Fast Fracture Areas Present on the Fracture Surface?; 4.1.11 Is There Any Foreign Material or Chemical Evident on the Surface?; 4.2 Brittle Versus Ductile Failures in Polymers 4.2.1 Plane Stress and Plane Strain 4.2.2 Cautions; 4.3 Crack Path Analysis; 4.4 Fracture Features; 4.4.1 Fracture Origin(s); 4.4.2 Mirror Zone; 4.4.3 Mist Region; 4.4.4 Rib Markings/Beach Marks; 4.4.5 Hackles; 4.4.6 River Patterns or River Markings; 4.4.7 Wallner Lines; 4.4.8 Fatigue Striations; 4.4.8.1 Fatigue Crack Growth Versus SCG; 4.4.9 Conic or Parabolic Markings; 4.4.10 Ratchet Marks or Ledges; 4.5 Application of Fractography to Failure Analysis; References; 5 Long-Term Failure Mechanisms in Plastics; 5.1 Introduction; 5.2 Creep; 5.3 SCG/Creep Rupture; 5.4 Environmental Stress Cracking 5.4.1 Differentiating SCG/Creep from ESC

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## Sommario/riassunto

Fractography in Failure Analysis of Polymers provides a practical guide to the science of fractography and its application in the failure analysis of plastic components. In addition to a brief background on the theory of fractography, the authors discuss the various fractographic tools and techniques used to identify key fracture characteristics. Case studies are included for a wide range of polymer types, applications, and failure modes, as well as best practice guidelines enabling engineers to apply these lessons to their own work. Detailed images and their appropriate context are present

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