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Nota di contenuto	Cover; Contents; List of Contributors; List of Abbreviations and Symbols; Preface; Chapter 1 Biodegradable Polyesters: Synthesis, Properties, Applications; 1.1 Historical Overview on the Origin of Polymer Science and Synthesis of Polyamides and Polyesters; 1.1.1 Synthesis of Polyamides; 1.1.2 Initial Knowledge about Polyesters; 1.2 Publication Trend of Representative Biodegradable and Nonbiodegradable Polyesters in the Past Century; 1.3 Biodegradable Polyesters; 1.3.1 Biodegradable Aliphatic Polyesters and Their Copolymers; 1.3.1.1 Poly(lactic acid) 1.3.1.2 Polyglycolide or Poly(glycolic acid)1.3.1.3 Poly(caprolactone); 1.4 Concluding Remarks; Acknowledgment; References; Chapter 2 Functional (Bio)degradable Polyesters by Radical Ring-Opening Polymerization; 2.1 Introduction; 2.2 Radical Ring-Opening Polymerization (RROP) of Cyclic Ketene Acetals; 2.2.1 Starting Monomers: Cyclic Ketene Acetals; 2.2.2 Radical Ring-Opening Polymerization Mechanism; 2.2.3 Functional Polyesters by Conventional and Controlled Radical Homopolymerization of CKAs; 2.2.4 Functional Polyesters by Copolymerization of CKAs and Vinyl Monomers; 2.3

Conclusions

References Chapter 3 Microbial Synthesis of Biodegradable Polyesters: Processes, Products, Applications; 3.1 Introduction; 3.2 Biogenesis of Microbial Polyhydroxyalkanoate Granules; 3.3 The Diversity of Biopolyesters; 3.4 Polyester (PHA) Synthases are the Key Enzymes; 3.5 Catalytic Reaction Mechanism; 3.6 PHA Inclusions: Self-Assembly and Structure; 3.7 Industrial Production of Bacterial Polyhydroxyalkanoates: PHAs via Fermentation; 3.8 Application Opportunities of Bacterial Polyhydroxyalkanoates; 3.8.1 In Energy Industry: Biofuels Based on PHAs

3.8.2 In Material Industry: PHAs as Polymeric Materials 3.8.2.1 PHAs as Biodegradable Plastics and Fiber Materials; 3.8.2.2 PHAs as Medical Implant Materials; 3.8.2.3 PHAs as Drug Delivery Carrier; 3.8.3 Fine Chemical Industry: PHA Chiral Monomers; 3.8.4 Application of PHA Granule Surface Proteins; 3.8.5 Production of Tailor-Made Biopolyester Nanoparticles and Potential Applications; 3.8.6 Future Development of PHA-Based Industry; 3.8.6.1 The Development of Low-Cost PHA Production Technology; 3.8.6.2 Unusual PHAs with Special Properties; 3.8.6.3 High Value Added Applications

3.8.6.4 Other Future Applications 3.8.6.5 Microbial Synthesis of Poly (lactic acid) (PLA); 3.8.7 Applications of PHA Inclusions as Functionalized Biobeads; 3.8.7.1 Bioseparations; 3.8.7.2 Drug Delivery; 3.8.7.3 Protein Purification; 3.8.7.4 Enzyme Immobilization; 3.8.7.5 Diagnostics and Imaging; 3.8.7.6 Vaccine Delivery; 3.9 Conclusions and Outlook; Acknowledgments; References; Chapter 4 Synthesis, Properties, and Mathematical Modeling of Biodegradable Aliphatic Polyesters Based on 1,3-Propanediol and Dicarboxylic Acids; 4.1 Introduction; 4.1.1 Aliphatic Polyesters

4.1.2 Production of 1,3-Propanediol

Sommario/riassunto

Collating otherwise hard-to-get and recently acquired knowledge in one work, this is a comprehensive reference on the synthesis, properties, characterization, and applications of this eco-friendly class of plastics. A group of internationally renowned researchers offer their first-hand experience and knowledge, dealing exclusively with those biodegradable polyesters that have become increasingly important over the past two decades due to environmental concerns on the one hand and newly-devised applications in the biomedical field on the other. The result is an unparalleled overview for the

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Autore	Serpieri Roberto
Titolo	Variational Continuum Multiphase Poroelasticity : Theory and Applications / / by Roberto Serpieri, Francesco Travascio
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Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (XIII, 198 p. 20 illus., 16 illus. in color.)
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Nota di contenuto	Variational Multi-Phase Continuum Theories of Poroelasticity: a Short Retrospective -- Variational Macroscopic Two-Phase Poroelasticity. Derivation of General Medium-Independent Equations and Stress Partitioning Laws -- The Linear Isotropic Variational Theory and its Recovery of Biot’s Equations -- Stress Partitioning in Two-Phase Media: Experiments and Remarks on Terzaghi’s Principle -- Analysis of the Quasi-Static Consolidation Problem of a Compressible Porous Medium. .
Sommario/riassunto	This book collects the theoretical derivation of a recently presented general variational macroscopic continuum theory of multiphase poroelasticity (VMTPM), together with its applications to consolidation and stress partitioning problems of interest in several applicative engineering contexts, such as in geomechanics and biomechanics. The theory is derived based on a purely-variational deduction, rooted in the least-Action principle, by considering a minimal set of kinematic descriptors. The treatment herein considered keeps a specific focus on the derivation of most general medium-independent governing equations. It is shown that VMTPM recovers paradigms of consolidated use in multiphase poroelasticity such as Terzaghi's stress partitioning

principle and Biot's equations for wave propagation. In particular, the variational treatment permits the derivation of a general medium-independent stress partitioning law, and the proposed variational theory predicts that the external stress, the fluid pressure, and the stress tensor work-associated with the macroscopic strain of the solid phase are partitioned according to a relation which, from a formal point of view, turns out to be strictly compliant with Terzaghi's law, irrespective of the microstructural and constitutive features of a given medium. Moreover, it is shown that some experimental observations on saturated sandstones, generally considered as proof of deviations from Terzaghi's law, are ordinarily predicted by VMTPM. As a peculiar prediction of VMTPM, the book shows that the phenomenon of compression-induced liquefaction experimentally observed in cohesionless mixtures can be obtained as a natural implication of this theory by a purely rational deduction. A characterization of the phenomenon of crack closure in fractured media is also inferred in terms of macroscopic strain and stress paths. Altogether the results reported in this monograph exemplify the capability of VMTPM to describe and predict a large class of linear and nonlinear mechanical behaviors observed in two-phase saturated materials. .