

1. Record Nr.	UNINA9910823188903321
Titolo	The science and technology of rubber // edited by Burak Erman, Department of Chemical and Biological Engineering, Koc University, Rumeli Feneri Yolu 34450 Istanbul, Turkey, James E. Mark, Department of Chemistry, University of Cincinnati, Cincinnati, OH 45221-0172, USA, C. Michael Roland, Naval Research Laboratory, Chemistry Division, Code 6120, Washington, DC, USA
Pubbl/distr/stampa	Oxford, England, : Academic Press, c2013 Waltham, MA : , : Academic Press, , 2013
ISBN	0-12-394832-0
Edizione	[4th ed.]
Descrizione fisica	1 online resource (xiv, 786 pages) : illustrations (some color)
Collana	Gale eBooks
Disciplina	678/.2
Soggetti	Rubber
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Previous edition: 2005.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Half Title; Title Page; Copyright; Contents; Rubber Elasticity: Basic Concepts and Behavior; 1.1 Introduction; 1.2 Elasticity of a Single Molecule; 1.3 Elasticity of a Three-Dimensional Network of Polymer Molecules; 1.4 Comparison with Experiment; 1.5 Continuum Theory of Rubber Elasticity; 1.5.1 Stress-Strain Relations; (i) Strain-Hardening at Large Strains; (ii) Inflation of a Thin-Walled Tube; (iii) Inflation of a Thin-Walled Spherical Balloon; (iv) Inflation of a Thick-Walled Spherical Shell; (v) Surface Instability of Compressed or Bent Blocks (vi) Resistance of a Compressed Block to Indentation(vii) Torsional Instability of Stretched Rubber Rods (Gent and Hua 2004); 1.6 Second-Order Stresses; 1.7 Elastic Behavior Under Small Deformations; 1.8 Some Unsolved Problems in Rubber Elasticity; Acknowledgments; References; Further Reading; Polymerization: Elastomer Synthesis; 2.1 Introduction; 2.2 Classification of Polymerization Reactions and Kinetic Considerations; 2.2.1 Polyaddition/Polycondensation; 2.2.2 Chain Polymerization; 2.3 Polyaddition/Polycondensation; 2.4 Chain Polymerization by Free Radical Mechanism; 2.4.1 General Kinetics 2.4.2 Molecular Weight Distribution2.4.3 Special Case of Diene

Polymerization; 2.4.4 Controlled Radical Polymerization; 2.5 Emulsion Polymerization; 2.5.1 Mechanism and Kinetics; 2.5.2 Styrene-Butadiene Rubber; (i) Kinetics and Molecular Weights; (ii) Chain Microstructure; 2.5.3 Emulsion Polymerization of Chloroprene; (i) Kinetics; (ii) Chain Structure; 2.6 Copolymerization; 2.6.1 Kinetics; 2.6.2 Emulsion Copolymerization of Dienes; (i) Styrene-Butadiene (SBR); (ii) Butadiene-Acrylonitrile (Nitrile Rubber); (iii) Chloroprene; 2.7 Chain Polymerization by Cationic Mechanism
2.7.1 Mechanism and Kinetics
2.7.2 Butyl Rubber; 2.7.3 Living Cationic Polymerizations; 2.7.4 Other Cationic Polymerizations: Heterocyclic Monomers; 2.8 Chain Polymerization by Anionic Mechanism; 2.8.1 Mechanism and Kinetics; 2.8.2 Chain Microstructure of Polydienes; 2.8.3 Copolymers of Butadiene; 2.8.4 Terminally Functional Polydienes; 2.9 Stereospecific Chain Polymerization and Copolymerization by Coordination Catalysts; 2.9.1 Mechanism and Kinetics; 2.9.2 Ethylene-Propylene Rubbers; 2.9.3 Polydienes; 2.9.4 Polyalkenamers; 2.10 Graft and Block Copolymerization *
2.10.1 Graft Copolymerization by Conventional Free Radical Reactions
(i) Chemical Initiation; (ii) Other Methods; 2.10.2 Block Copolymers by Controlled Radical Mechanisms; 2.10.3 Block Copolymers by Anionic Mechanism; 2.10.4 Block Copolymers by Cationic Mechanism; 2.10.5 Block Copolymers by Ziegler-Natta (Insertion) Mechanism; References; Structure Characterization in the Science and Technology of Elastomers; 3.1 Introduction; 3.2 Chemical Composition; 3.3 Sequence Distribution of Repeat Units; 3.4 Chain Architecture; 3.4.1 Molecular Weight and Its Distribution; 3.4.2 Branching; 3.4.3 Gel
3.5 Glass Transition and Secondary Relaxation Processes

Sommario/riassunto

The 4e of The Science and Technology of Rubber provides a broad survey of elastomers with special emphasis on materials with a rubber-like elasticity. As in previous editions, the emphasis remains on a unified treatment of the material, exploring chemical aspects such as elastomer synthesis and curing, through recent theoretical developments and characterization of equilibrium and dynamic properties, to the final applications of rubber, including tire engineering and manufacturing. Updated material stresses the continuous relationship between ongoing research in synthesis, physics, stru
