

1. Record Nr.	UNINA9910137395803321
Titolo	Resistive switching : from fundamentals of nanoionic redox processes to memristive device applications // edited by Daniele Ielmini and Rainer Waser ; contributors, Hiro Akinaga [and sixty-four others]
Pubbl/distr/stampa	Weinheim an der Bergstrasse, Germany : , : Wiley-VCH, , 2016 ©2016
ISBN	3-527-68087-X 3-527-68094-2 3-527-68093-4
Descrizione fisica	1 online resource (954 pages)
Disciplina	621.381
Soggetti	Nanoelectronics Memristors
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Related Titles; Title Page; Copyright; Table of Contents; Preface; List of Contributors; Chapter 1: Introduction to Nanoionic Elements for Information Technology; 1.1 Concept of Two-Terminal Memristive Elements; 1.2 Memory Applications; 1.3 Logic Circuits; 1.4 Prospects and Challenges; Acknowledgments; References; Chapter 2: ReRAM Cells in the Framework of Two-Terminal Devices; 2.1 Introduction; 2.2 Two-Terminal Device Models; 2.3 Fundamental Description of Electronic Devices with Memory; 2.4 Device Engineer's View on ReRAM Devices as Two-Terminal Elements; 2.5 Conclusions; Acknowledgment ReferencesChapter 3: Atomic and Electronic Structure of Oxides; 3.1 Introduction; 3.2 Crystal Structures; 3.3 Electronic Structure; 3.4 Material Classes and Characterization of the Electronic States; 3.5 Electronic Structure of Selected Oxides; 3.6 Ellingham Diagram for Binary Oxides; Acknowledgments; References; Chapter 4: Defect Structure of Metal Oxides; 4.1 Definition of Defects; 4.2 General Considerations on the Equilibrium Thermodynamics of Point Defects; 4.3 Definition of Point Defects; 4.4 Space-Charge Effects; 4.5 Case Studies; References; Chapter 5: Ion Transport in Metal Oxides

5.1 Introduction; 5.2 Macroscopic Definition; 5.3 Microscopic Definition; 5.4 Types of Diffusion Experiments; 5.5 Mass Transport along and across Extended Defects; 5.6 Case Studies; Acknowledgments; References; Chapter 6: Electrical Transport in Transition Metal Oxides; 6.1 Overview; 6.2 Structure of Transition Metal Oxides; 6.3 Models of Electrical Transport; 6.4 Band Insulators; 6.5 Half-Filled Mott Insulators; 6.6 Temperature-Induced Metal-Insulator Transitions in Oxides; References; Chapter 7: Quantum Point Contact Conduction; 7.1 Introduction; 7.2 Conductance Quantization in Metallic Nanowires; 7.3 Conductance Quantization in Electrochemical Metallization Cells; 7.4 Filamentary Conduction and Quantization Effects in Binary Oxides; 7.5 Conclusion and Outlook; References; Chapter 8: Dielectric Breakdown Processes; 8.1 Introduction; 8.2 Basics of Dielectric Breakdown; 8.3 Physics of Defect Generation; 8.4 Breakdown and Oxide Failure Statistics; 8.5 Implications of Breakdown Statistics for ReRAM; 8.6 Chemistry of the Breakdown Path and Inference on Filament Formation; 8.7 Summary and Conclusions; References; Chapter 9: Physics and Chemistry of Nanoionic Cells; 9.1 Introduction; 9.2 Basic Thermodynamics and Heterogeneous Equilibria; 9.3 Phase Boundaries and Boundary Layers; 9.4 Nucleation and Growth; 9.5 Electromotive Force; 9.6 General Transport Processes and Chemical Reactions; 9.7 Solid-State Reactions; 9.8 Electrochemical (Electrode) Reactions; 9.9 Stoichiometry Polarization; Summary; Acknowledgments; References; Chapter 10: Electroforming Processes in Metal Oxide Resistive-Switching Cells; 10.1 Introduction; 10.2 Forming Mechanisms; 10.3 Technical Issues Related to Forming; 10.4 Summary and Outlook

---