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Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Introduction -- Filamentary-Based Resistive Switching -- Nanoscaled Electrical Characterization -- Conductive Filaments: Formation, Observation and Manipulation -- Three-Dimensional Filament Observation -- Reliability Threats in CBRAM -- Conclusions and Outlook. .
Sommario/riassunto	The thesis presents the first direct observations of the 3D-shape, size and electrical properties of nanoscale filaments, made possible by a new Scanning Probe Microscopy-based tomography technique referred to as scalpel SPM. Using this innovative technology and nm-scale observations, the author achieves essential insights into the filament formation mechanisms, improves the understanding required for device optimization, and experimentally observes phenomena that had previously been only theoretically proposed. .