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Nota di contenuto	Structure and methods of obtaining CeO ₂ xnanocrystals -- ELECTRONIC STRUCTURE AND LUMINESCENT PROPERTIES OF CeO ₂ x NANOCRYSTALS -- ANTIOXIDANT PROPERTIES OF CeO ₂ x NANOCRYSTALS -- CONTROL OF THE DEFECT STRUCTURE AND REDOX PROPERTIES OF CeO ₂ x NANOCRYSTALS.
Sommario/riassunto	This book provides a comprehensive overview of the structure, optical behavior, and redox properties of cerium oxide nanocrystals (CeO), with a particular emphasis on their defect chemistry and interactions with reactive oxygen species (ROS). It explores both stoichiometric and non-stoichiometric forms of CeO, offering a detailed discussion of how oxygen vacancies, Ce ³ /Ce ions, and defect complexes (such as Ce ³ -Vo-Ce ³) govern the luminescence and redox activity of nanoceria.

Structured in four in-depth chapters, the book begins with methods of synthesis and doping of CeO nanocrystals and continues with an extensive analysis of their electronic structure and luminescent properties. Special attention is paid to the role of defect centers, impurity ions, and energy level distributions in determining the optical response of doped and undoped systems. The third chapter investigates the mechanisms underlying the antioxidant behavior of nanoceria, focusing on their ability to interact with ROS such as hydrogen peroxide, hypochlorite, hydroxyl radicals, and superoxide anions. Luminescence spectroscopy is presented as a powerful tool for probing these dynamic interactions and elucidating redox mechanisms at the nanoscale. Finally, the book examines how environmental factors—including UV irradiation and pH—can be used to modulate the defect structure and redox properties of CeO nanocrystals, with applications in sensing and biomedical contexts. Intended for researchers in nanomaterials, solid-state physics, and bio-nanotechnology, this book offers both a fundamental and application-oriented perspective on cerium oxide nanocrystals as a unique class of redox-active, self-regenerating materials with broad scientific and technological relevance.
