



Catalysis by Ceria and Related Materials: 12 (Catalytic Science Series)

By Alessandro Trovarelli, Paolo Fornasiero

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This book follows the 2002 edition of *Catalysis by Ceria and Related Materials*, which was the first book entirely devoted to ceria and its catalytic properties. In the ten years since the first edition a massive amount of work has been carried out in the field, and ceria has gained a prominent position in catalysis as one of the most valuable material for several applications. This second edition covers fundamental and applied aspects of the latest advances in ceria-based materials with a special focus on structural, redox and catalytic features. Special emphasis is given to nano-engineered and nano-shaped systems which are a key factor in the predictive and rational design of ceria with novel properties.

In addition, the book presents recent advances in emerging and traditional large-scale applications of ceria in catalysis, such as the treatment of emissions from mobile sources (including diesel and gasoline engines). The primary readership includes catalysis and material science researchers from academy and industry and postdoctorate and graduate students in chemistry, chemical engineering and physics.

Contents:

- Crystal and Electronic Structures, Structural Disorder, Phase Transformation, and Phase Diagram of Ceria-Zirconia and Ceria-Based Materials (*Masatomo Yashima*)
- Understanding Ceria-Based Catalytic Materials: An Overview of Recent Progress (*Juan José Delgado, Eloy del Río, Xiaowei Chen, Ginesa Blanco, José María Pintado, Serafín Bernal and José Juan Calvino*)
- Investigation of the Oxygen Storage and Release Kinetics of Model and Commercial Three-Way Catalytic Materials by Transient Techniques (*Angelos M Efthathiou and Stavroula Y Christou*)
- Interaction of Nitrogen Oxides with Ceria-Based Materials (*Avelina García-García and Agustín Bueno-López*)
- Atomistic Modelling of Ceria Nanostructures: Introducing Structural Complexity (*Dean C Sayle and Thi X T Sayle*)
- Two-Dimensional and Three-Dimensional Ceria-Based Nanoarchitectures

(*Zhen-Xing Li, Wei Feng, Chao Zhang, Ling-Dong Sun, Ya-Wen Zhang and Chun-Hua Yan*)

- Core-Shell-Type Materials Based on Ceria (*Matteo Cargnello, Raymond J Gorte and Paolo Fornasiero*)
- New Developments in Ceria-Based Mixed Oxide Synthesis and Reactivity in Combustion and Oxidation Reactions (*Benjaram M Reddy, Thallada Vinod Kumar and Naga Durgasri*)
- Design and Modeling of Active Sites in Metal–Ceria Catalysts for the Water Gas Shift Reaction and Related Chemical Processes (*Jose A Rodriguez*)
- Ceria-Based Gold Catalysts: Synthesis, Properties, and Catalytic Performance for the WGS and PROX Processes (*Donka Andreeva, Tatyana Tabakova and Lyuba Ilieva*)
- Ceria-Based Formulations for Catalysts for Diesel Soot Combustion (*Eleonora Aneggi, Carla de Leitenburg and Alessandro Trovarelli*)
- Ceria and Its Use in Solid Oxide Cells and Oxygen Membranes (*Christodoulos Chatzichristodoulou, Peter T Blennow, Martin Søgaard, Peter V Hendriksen and Mogens B Mogensen*)
- Transformation of Oxygenated Compounds Derived from Biomass into Valuable Chemicals Using Ceria-Based Solid Catalysts (*Laurence Vivier and Daniel Duprez*)
- Ceria-Based Catalysts for Air Pollution Abatement (*Anna Maria Venezia, Leonarda Francesca Liotta, Giuseppe Pantaleo and Alessandro Longo*)

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Editorial Review

From the Inside Flap

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