



# **Heterogeneous Catalysis of Mixed Oxides: Chapter 3. Catalysis of Perovskite and Related Mixed Oxides (Studies in Surface Science and Catalysis)**

*Makoto Misono*

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The chemistry and catalysis of perovskites are described. “Perovskites” are defined here as double oxides having perovskite (ABO<sub>3</sub>) and related structures. Double oxides are one of the two major groups of mixed oxides. Because of their thermal stability and a variety of physical and chemical properties, which can be controlled by choosing constituent elements, they are widely used as catalysts as well as electronic and magnetic materials. First, an overview is given of the structural characteristics of perovskites, including lattice defects and nonstoichiometry, and the redox properties are interpreted on the basis of the composition and structure. Then the catalysis and catalyst design of perovskites are discussed on the basis of the redox mechanism governed by the redox properties. The strategies for catalyst design are (1) selection of B-site elements, which are usually transition metals; (2) valence control; and (3) synergistic effects of B-site elements and (4) enhancement of surface area by forming fine particles or dispersing on supports.

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