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Autore	Wang Changzhen
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Nota di contenuto	Chapter 1 Quantum Chemical Basis and Chemical Bonds -- Chapter 2 Occurrence States and Resources of Rare Earth Elements -- Chapter 3 Properties, Compounds and Complexes of Rare Earth Elements -- Chapter 4 Rare Earth Invar Alloys, Intermetallic Compounds, and Composite Oxides -- Chapter 5 Rare Earth Nanomaterials -- Chapter 6 Solid Electrolytes Based on Rare Earth Oxides and Fluorides -- Chapter 7 High-Temperature Proton Conductors with Rare Earth -- Chapter 8 Role and Application of Rare Earth in Steel -- Chapter 9 Application of Rare Earth in Nodular and Vermicular Cast Iron -- Chapter 10 Role of Rare Earths in Non-Ferrous Metals and Alloys -- Chapter 11 Application, Mechanism and Function of Rare Earth in Agriculture, Forestry and Animal Husbandry -- Chapter 12 Rare Earth Catalysts and Catalytic Activity -- Chapter 13 Rare Earth Hydrides and Hydrogen-Storage Alloys -- Chapter 14 Theory and Application of Superconducting Materials -- Chapter 15 Rare Earth Magnetic Materials

-- Chapter 16 Rare Earth Luminescent Materials and Laser Materials -- Chapter 17 Rare Earth Functional Ceramics -- Chapter 18 Gemstones, Jade and Rare Earth Optical Glass and Ceramics -- Chapter 19 Scandium and Materials Applications -- Chapter 20 Rare Earth Research, Production, Policy and Future Development. .

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## Sommario/riassunto

This book starts with a theoretical introduction of the rare earth materials, and it subsequently analyzes the essential characteristics of these materials from elements, compounds to physical chemistry and metal materials, etc. Under the supplementary explanation of experimental data and results, the research is gradually guided into the multi-domain application scene. Through extensive analyses, this book displays comprehensively the distinguished values of the rare earth materials and the theoretical, empirical, and practical significance of rare earth materials is unraveled. It also covers an exhaustive review of 17 rare earth elements, their characteristics, and more possibilities in physical chemistry, functional materials, metallurgy, composites and engineering, and their prospects in production and technical applications. In-depth account of the whole spectrum of rare earth material research makes this book a unique reference to academic researchers, students, and engineers.

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