

## Frontiers of 4d- and 5d-Transition Metal Oxides

Gang Cao, Lance De-Long



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This book is aimed at advanced undergraduates, graduate students and other researchers who possess an introductory background in materials physics and/or chemistry, and an interest in the physical and chemical properties of novel materials, especially transition metal oxides.

New materials often exhibit novel phenomena of great fundamental and technological importance. Contributing authors review the structural, physical and chemical properties of notable 4d- and 5d-transition metal oxides discovered over the last 10 years. These materials exhibit extraordinary physical properties that differ significantly from those of the heavily studied 3d-transition metal oxides, mainly due to the relatively strong influence of the spin-orbit interaction and orbital order in 4d- and 5d materials. The immense growth in publications addressing the physical properties of these novel materials underlines the need to document recent advances and the current state of this field. This book includes overviews of the current experimental situation concerning these materials.

#### **Contents:**

- Introduction (Gang Cao and Lance E DeLong)
- Spectroscopic Studies of Strong Spin-Orbit Coupling in 4d and 5d Transition Metal Oxides (Soon Jae Moon and Tae Won Noh)
- X-Ray Scattering Studies of 4d- and 5d-Electron Transition Metal Oxides (Ioannis Zegkinoglou and Bernhard Keimer)
- Exploring the Magnetostructural Phases of the Layered Ruthenates with Raman Scattering (S L Cooper)
- Metal-Insulator Transitions in n = 1 Ruddlesden-Popper Ruthenates (Rongying Jin)
- The Contradictory Physical Properties and Extreme Anisotropy of Ca<sub>3</sub>Ru<sub>2</sub>O<sub>7</sub> (G Cao, L E DeLong and P Schlottmann)
- Surfaces of Transition-Metal Compounds: The Interplay Between Structure and Functionality (Xiaobo He, Jing Teng, Von Braun Nascimento, R G Moore, Guorong Li, Chen Chen, Jiandi Zhang and E W Plummer)
- Instability of the  $J_{eff} = 1/2$  Insulating State in  $Sr_2IrO_4$  and  $Sr_3Ir_2O_7$  (n = 1 and 2) (G Cao and L E DeLong)

**Readership:** Graduate students and researchers interested in the physical and chemical properties of novel materials, especially transition metal oxides.



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