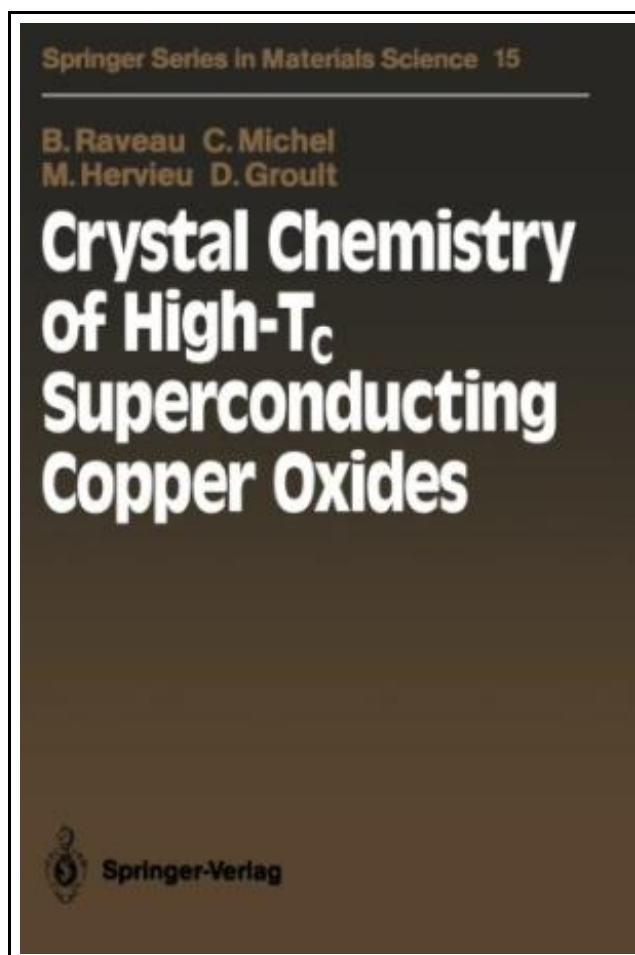


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CRYSTAL CHEMISTRY OF HIGH-TC SUPERCONDUCTING COPPER OXIDES



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Book Condition: New. Publisher/Verlag: Springer, Berlin | The recent discovery of high-temperature superconductivity in copper based oxides is an event of major importance not only with respect to the physical phenomenon itself but also because it definitely shows that solid state chemistry, and especially the crystal chemistry of oxides, has a crucial place in the synthesis and understanding of new materials for future applications. The numerous papers published in the field of high Tc superconductors in the last five years demonstrate that the great complexity of these materials necessitates a close collaboration between physicists and solid state chemists. This book is based to a large extent on our experience of the crystal chemistry of copper oxides, which we have been studying in the laboratory for more than twelve years, but it also summarizes the main results which have been obtained for these compounds in the last five years relating to their spectacular superconducting properties. We have focused on the structure, chemical bonding and nonstoichiometry of these materials, bearing in mind that redox reactions are the key to the optimization of their superconducting properties, owing to the importance of the mixed valence of copper and its Jahn-Teller effect. We have also drawn on studies of extended defects by high-resolution electron microscopy and on their creation by ir radiation effects. | 1. Introduction: Superconductivity in Oxides Before 1986.- 2. Phases of the Systems A-La-Ca-Cu-O and A-Y-Ca-Cu-O (A = Ca, Sr, Ba): Structural Aspects.- 2.1 Copper Chemistry in Oxides: Oxidation States and Coordination.- 2.2 The Ternary Systems La-Cu-O and A-Cu-O (A = Ca, Sr, Ba).- 2.3 The Pseudoternary Systems A-La-Cu-O (A = Ca, Sr, Ba).- 2.3.1 Phases with Oxygen-Deficient Perovskite Structures.- a) $\text{BaLa}_4\text{Cu}_5\text{O}_{13+?}$.- b) $\text{La}_{8?x}\text{Sr}_x\text{Cu}_8\text{O}_{20}$.- c) $\text{La}_3\text{Ba}_3\text{Cu}_6\text{O}_{14}$ and $\text{LaBa}_2\text{Cu}_3\text{O}_{7??}$.- 2.3.2 The Intergrowths Between Perovskite and Rock-Salt-Type Structures.- a) The Oxides $\text{La}_{2?x}\text{AxCuO}_{4?x/2+?}$.- b) The...



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