

鈣摻雜對稀土鋇銅氧高溫超導體區域結構之影響

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關鍵詞：延伸 X 光線吸收精細結構、 $R_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$ 、高溫超導

摘要

對高溫超導體而言電洞濃度是很重要的參數，當 Ca^{+2} 取代 R^{+3} 在足氧的 $RBa_2Cu_3O_{7-\delta}$ 時，電洞隨鈣摻雜而增加但超導臨界溫度 T_c 因為過度摻雜效應而下降，於是 Ca 摻入後對區域環境之影響及其引進之電洞所處之位置就成了瞭解此超導系統電導性質之關鍵，我們在室溫下進行了延伸光吸收光譜精細結構對 Ca^{+2} 取代 R^{+3} 足氧的 $R_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$ ($R=Gd, Ho$) 超導體之量測，對 R 與 Ca 之區域環境及相關問題予以解析。

Effects of Ca Doping on the Local Structure of Rare Earth Barium Copper Oxide High T_c Superconductors

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ABSTRACT

It is well known that the hole concentration is a crucial parameter for superconductivity of the high temperature superconductors. When Ca^{+2} replaces part of R^{+3} in fully oxygenated $RBa_2Cu_3O_{7-\delta}$. The hole concentration increases with Ca^{+2} concentration bring the system into the overdoping regime and causing the superconducting transition temperature T_c to drop. The sites of the extra hole and that of the Ca are the key factors to the understanding of the electrical transport property of this Ca doped system. We have performed the EXAFS on $R_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$ ($R=Gd, Ho$) at room temperature to study effect of Ca doping on the local structure.