

Effect of Nb-doping on Superconductivity and Magnetic Properties of $\text{RuSr}_2\text{Gd}_{1.5}\text{Ce}_{0.5}\text{Cu}_2\text{O}_z$

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The ruthenocuprates $\text{RuSr}_2\text{Rcu}_2\text{O}_z$ and $\text{RuSr}_2\text{R}_{2-x}\text{Ce}_x\text{Cu}_2\text{O}_z$ (R=Eu, Gd) have recently found to display the coexistence of superconductivity and ferromagnetism. In the ruthenocuprates, superconductivity is considered to be confined to the CuO_2 planes, and the magnetic ordering is due to the Ru sublattice. In order to get further insight on the role of RuO_2 layer, we have investigated the influence of the substitution of Nb for Ru on properties of $\text{Ru}_x\text{Nb}_x\text{Sr}_2\text{Gd}_{1.5}\text{Ce}_{0.5}\text{Cu}_2\text{O}_z$. We find that the Nb substitution depresses superconductivity only slightly from 27 K for $x=0$ to 24 K for $x=0.5$ in the resistivity measurement, but reduces significantly the ferromagnetic component of the samples. This behavior is discussed in connection with the reduction of the volume fraction of the magnetic phase.

keywords : ruthenocuprates, Nb substitution, superconductivity, magnetization