STRUCTURE EVOLUTION OF $La_{2-x}Sr_x(Cu,Ni)O_4$ ASSESSED BY THE RIETVELD METHOD

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High-temperature superconductors $La_{2-x}Sr_xCuO_4$ (LSCO) with the K_2NiF_4 structure have been the focus of much recent theoretical [1] and experimental [2] study. Doping LSCO with magnetic elements such as Fe, Co, Ni destroys the superconductivity. The cause of this phenomenon remains unexplained. For understanding of these changes, determination of the structure evolution with increasing transition metal content in LSCO may be helpful.

In this work, we focus on Ni doped LSCO. Previous studies [3-5] show mainly the lattice-parameters dependence on Ni concentration whereas the information on atomic positions and bond lengths is limited. The aim of present study is to fill the gap in this knowledge.

The polycrystalline samples of tetragonal (SG *I*4/*mmm*) $La_{1.85}Sr_{0.15}Cu_{1-x}Ni_xO_4$ ($0 \le x \le 0.19$) were synthesized by means of a conventional solid-state reaction method. The powdered samples were pressed back into pellets and sintered in the identical way again. In total, the whole procedure was repeated three times. The diffraction measurements were carried out at a modern laboratory Bragg-Brentano diffractometer (Philips X´Pert Pro Alpha1 MPD, Panalytical) using an internal X-ray diffraction standard Crystallographic characterization was done by using Rietveld method with help of Fullprof.2k. The lattice parameters, free atomic position and bond distances are determined. A smooth variation with Ni concentration is observed.

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