X-ray photoelectron spectroscopies of Ni-doped Bi-2212 compounds

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Abstract: Samples with the nominal composition $Bi_2Sr_2Ca_1Cu_{2-x}Ni_xO_{8+??}$ (x = 0.00, 0.02, 0.10, 0.20) have been studied by X-ray photoelectron spectroseopy (XPS). From deconvolution of Bi 4f and O 1s XPS core-level spectra, we propose that the main reason leading to the decrease of superconducting transition temperature (T_c) with increasing Ni content, is the distortion of the Bi-2212 crystal structure by extra oxygen being intercalated between the adjacent Bi-O layers which then affects the hole concentration (n_h) of the CuO_2 planes.

Author Keywords: Superconductors - high-T_c; Valence state; XPS

Index Keywords: Crystal structure; Electric conductivity; Electron energy levels; High temperature superconductors; Magnetic permeability; Nitrogen; Oxide superconductors; Superconducting transition temperature; X ray photoelectron spectroscopy; X ray powder diffraction; Hole concentration; Valence state; Bismuth compounds

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