Structure and properties of YBa$_2$Cu$_3$O$_{7-\delta}$ superconductor doped with bulk cadmium oxide

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Abstract
In this paper, the Y$_{1-x}$Cd$_x$Ba$_2$Cu$_3$O$_{7-\delta}$ superconductor with $x=0, 0.05, 0.1, 0.15, 0.2, 0.3, 0.4, 0.5$ are prepared using the solid state method and the structure, electrical resistance, critical current density and critical temperature of it, have been studied. The results show that these doping do not affect so much on the structure and lattice parameters. The electrical resistance of samples increased with doping. A little amount of doping cadmium improve critical current density such that the sample $x=0.1$ has a maximum critical current density among the samples. The critical temperature with doping cadmium up to $x=0.2$ has little fluctuation and its variation can be ignored, but by increasing up to $x=0.5$ the critical temperature decreases gradually.

Keywords: superconductor, critical current density, critical temperature, electrical resistance, cadmium oxide, dope

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