

Microstructural properties of Pt-doped $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ high T_c superconductor prepared by melting method.

Jin-Tae Song

Dept. of Materials Engineering, Hanyang University,
SEOUL, 133-791 KOREA

Abstract

We have studied the effect of platinum addition on the superconducting properties of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ (123) compound and elucidated the mechanism of fine dispersion of Y_2BaCuO_5 (211) particles in $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ superconductor prepared by melting method from the metallurgical point of view. In this study, BaCuO_2 and CuO-rich phase unreacted during the peritectic reaction markedly decreased by the 211 powder addition. The 211 particle of Pt-free sintered samples exhibited $8\sim 10\mu\text{m}$ in size, but in 1wt%Pt-added sample, 211 particles were finely dispersed in 123 matrix and the size of 211 particle was about $1\sim 2\mu\text{m}$. And, the critical temperature($T_{c, \text{zero}}$) of Pt doped samples was 91.5K and the transport critical current density (J_c) of Pt-doped samples was much more than 10^4 A/cm^2 . The high J_c and fine dispersion of 211 particles of Pt doped $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ superconductor are attributed to $\text{Ba}_4\text{CuPt}_2\text{O}_8$ compounds formed during the partial melting, which were considered as nucleation sites of 211 particles, rather than Pt itself.

Key word :

211 precursor
 $\text{Ba}_4\text{CuPt}_2\text{O}_8$ compound
critical current density(J_c)
nucleation site
partial melting