

## WBP1-8

### Effect of Carbon Nanotube doping on superconducting properties in Y-Ba-Cu-O Bulk Superconductors

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Melt-processed Y-Ba-Cu-O bulk superconductor can trap strong magnetic field at liquid nitrogen temperature and can act as a strong compact magnet, which is considered to be applicable for magnetic separation device, compact NMR and so on. In order to improve the performance of the field trapping Y-Ba-Cu-O bulk magnet, enhancement in critical current density  $J_c$  is required by embedding finely dispersed non-superconducting particles in the superconducting phase as effective pinning centres. Till now, an enormous number of works have been performed to increase in  $J_c$  by controlling the size and distribution of Y211 second phase. Recently, we have found that the addition of carbon nanotube (CNT) in the Y-Ba-Cu-O bulk superconductors is effective in increasing  $J_c$ . In this report, we have investigated the effects of two kinds of CNT addition on superconducting properties, such as single layer carbon nanotube (SWCNT) and multi-layered carbon nanotube (MWCNT). As a result,  $J_c$  value was improved when the SWCNT was employed rather than the case of MWCNT addition. From the microstructural observations, carbon-contained fine phases could be observed by SEM and compositional analyses by EPMA. We will present the distribution of the carbon contained phases and the affect to the superconducting properties ( $T_c$ ,  $J_c$ , *etc*).

Keywords: carbon nanotube, melt-process, pinning centers, critical current density