

Measurements and Analyses of Hysteretic Field Dependences of Critical Currents in Bicrystalline $Y_1Ba_2Cu_3O_{7-\delta}$ Films

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We measured the critical current densities (J_{cb}) in the bicrystalline $Y_1Ba_2Cu_3O_{7-\delta}$ films of 24° , 30° , 36.8° , and 45° -misorientation angles and obtained hysteretic curves of J_{cb} as functions of applied fields for various temperatures. The main features of the data were qualitatively consistent with the calculation results, where J_{cb} 's were expressed as functions of the densities of Josephson vortices using the modified Kim's model and those densities were estimated from the field distributions around the grain boundary. We calculated the field distributions using the Brandt's formula.

keywords : High T_c superconductor, grain boundary, hysteresis, critical current density