

Determination of Current and Magnetic Field Distribution in Multi-Granular Superconducting Film by Numerical Simulation

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We have studied current and magnetic field distribution in those of coated conductor using numerical simulation. Coated conductor shows physical properties which are different from a single crystal, because it has a multi-granular structure. This study is to understand flux penetration phenomena in coated conductors. As varying external magnetic field and transport current, we obtained characteristics of Josephson and Abrikosov vortex penetrations. The current distribution in a film that consists of 20×20 grains was calculated. The magnetic field distribution was also obtained from the current distribution. Determination of the current distribution was based on the critical state model. Kim' model was used to calculate the current distribution with the magnetic field dependent critical current. The distributions of current and magnetic field from the simulation were compared with the experimental results measured by scanning Hall probe method.

Keywords: Coated conductor, Multi-granular structure, Numerical simulation