Superconducting Properties of $Ba_2Ca_7Cu_8O_{16}(O_{0.8+\delta}F_{1.2})$ from the Equilibrium Magnetization

Kyu Hwan Oh [a], Jung-Dae Kim [a], Sung-Ik Lee [a], Akira Iyo [b]

[a] *National Creative Research Initiative Center for Superconductivity and Department of Physics, Pohang University of Science and Technology, Pohang 794-784, Republic of Korea*

[b] *National Institute of Advanced Industrial Science and Technology (AIST), Central 2, Tsukuba, Ibaraki 305-8568, Japan*

The F-0278 superconductor which is known to have the highest number of the Cu-O planes, 8, in the unit cell among the cuprate superconductors were synthesized and the reversible magnetization was measured. The observed crossing magnetization which does not depends on the magnetic field is explained by the positional fluctuation of the vortex, called vortex fluctuation. Thermodynamic critical field H_c and Ginzburg-Landau parameter κ were obtained from the Hao-Clem model. The important superconducting parameters such as penetration depth λ_{ab}, coherence length ξ_{ab} and upper critical field H_{c2} were also obtained and compared with the other cuprate superconductors.