

Characteristics of a Flux-flow Oscillator Using Layered Oxide Materials

S. -J. Kim^a, T. Hatano^b

^a *Cheju National University, Jeju, Korea*

^b *National Institute for Materials Science, Tsukuba, Japan*

We fabricated a flux-flow oscillator using intrinsic layered structures of Bi-2212 single crystal whiskers. The junction geometry of in-plane area, (10-20) μm x (1-2) μm , were fabricated by 3D focused-ion-beam (FIB) etching method. We used a measurement system that is possible to measure the transport characteristics of the oscillator under high magnetic field up to 7T. Under external magnetic field parallel to in-plane, we investigated the plasma emission characteristics of an oscillator by flux-flow resistance oscillation and by detecting any step structures on the I-V curves of a coupled detector. We expected that the generated electromagnetic wave in THz region by the oscillator would be observed as nonlinear structures on I-V curves. Those samples exhibited the uniform multi-branch structures and the clear upturn curves under magnetic field above 1T. The characteristic behaviors of long intrinsic Josephson junction (IJJs) on a Bi-2212 single crystal will be discussed.

keywords : $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{O}_{8+d}$ (Bi-2212), focused-ion-beam (FIB), multiple branch structures, single crystal whisker