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# Characteristics of Nano-Scale Superconducting Josephson Junctions

**S. Saini* and S. -J. Kim#**

Nano Materials and System Lab., Dept of Mechanical System Engineering,
Cheju National University, Jeju690-756, Korea.
Email: *ssaini@cheju.ac.kr, #kimsangj@cheju.ac.kr

Superconducting $Bi_2Sr_2CaCu_2O_{8+x}$(Bi-2212) single crystal is a naturally grown Josephson junction. Conducting $CuO_2$ bilayer plane (thickness≈0.3nm) is separated by an insulator BiO-SrO layer (thickness≈1.2nm). We are going to report characteristics of nano-scale superconducting junction. Nano-scale junction has been fabricated through focused ion beam (FIB) to study inter layer characteristics of single crystal whisker. We have measured resistance(R) - temperature(T) characteristics in *ab*-plane and found first critical transition temperature ($T_c$) at 110 K ,with transition width of 4 K. Resistance of sample has become zero at 80 K and showed metallic behavior before transition temperature. We fabricated a stack with in-plane area of 2 μm x 2 μm and height of about 200 nm using focused ion beam (FIB) etching method, which have several hundred of elementary Josephs on junctions in *c*-axis. This stack has been fabricated by rotation and tilt of sample stage in FIB.

Keywords: Josephson junction, single crystal whiskers, focused ion beam