

## Effect of Pre-annealing Conditions on Mechanical and Superconducting Properties of Bi-2223/Ag Tapes

J. S. Yang<sup>a,\*</sup>, D. W. Ha, D. H. Lee, J. G. Choi, S. Y. Hwang,  
H. S. Ha, S. S. Oh, Y. K. Kwon

<sup>a</sup> *Changwon National University, Changwon, Korea*  
*Korea Electrotechnology Research Institute, Changwon, Korea*

Many of research efforts have been focused on the improvement of critical current density  $J_c$  of silver-sheathed Bi-2223 tapes for practical applications of this material. In this study, the transformation of Bi-2212 phase was investigated, which was transformed to orthorhombic from tetragonal through pre-annealing during powder packing and drawing process. The relationship between hardness of Bi-2212 orthorhombic phase and workability of Bi-2223/Ag tape was investigated. Bi-2223 superconducting wires with 55 filaments were fabricated by stacking, drawing process with different heat-treatment histories. Two kinds of powders were prepared. Before rolling process, round wires were pre-annealed at 760 and in a low oxygen partial pressure. We confirmed that pre-annealing step was to transform Bi-2212 orthorhombic structure from Bi-2212 tetragonal structure and to reduce the formation of second phases at superconducting wire. However the breakages were created at Ag-alloy clad during rolling after pre-annealed Bi-2223/Ag tapes. Several pre-annealing scenarios were introduced to reduce the breakages during rolling process. Microstructure and critical current density of pre-annealed Bi-2223 superconducting tapes were investigated. We could achieve proper pre-annealing conditions for Ag-alloy clad Bi-2223 superconducting tapes

keywords : Bi-2223, pre-annealing, low oxygen partial pressure