

The Effect of Step Heat Treatment in the Critical Current Density of BSCCO 2223 Tapes

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The sintering process of BSCCO 2223 tapes is a complex process that is very sensitive to parameters, such as temperature, oxygen partial pressure, heating and cooling rate and holding time. During the first heat treatment, 2212 phase of precursor powder is partially transformed into 2223 phase and some residual second phases, such as $(\text{Bi,Pb})_2\text{Sr}_2\text{CuO}_y$ (2201), $(\text{Ca,Sr})_2\text{CuO}_3$ (2/1AEC), $(\text{Ca,Sr})_{14}\text{Cu}_{24}\text{O}_{41}$ (14/24 AEC) etc. The secondary phases are difficult to be removed from the BSCCO 2223 matrix in the fully processed tapes, which gives to degrade the critical current density. In order to minimize the particle size of alkaline earth cuprate(AEC) step heat treatment is applied during the first heat treatment under the varying atmosphere. Experimental results showed that by adapting the step heat treatment process, the amount and particle size of the secondary phases in the final tapes are decreased. Consequently, the BSCCO 2223 grain texture and J_c properties are improved.

keywords : BSCCO 2223, AEC, step heat treatment