

The Application of Hydrated Fine MgO Particles as Flux Pinning Center in the HTS-BSCCO System

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To introduce flux pinning center in HTS-BSCCO system, nano-size MgO particles were uniformly distributed within the Bi-2223 grain by partial hydration of MgO. The existing method MgO doped Bi-2223 used nano-size MgO powders, which resulted in agglomeration during mixing or grain growth during heat-treatment due to the high surface energy of the fine particles. By hydration of the MgO surface, the agglomeration of the MgO powders could be avoided and the size of remaining MgO core could be controlled by changing hydration medium and time. The thin film obtained by spin coating of $(\text{Bi}_{1.8}\text{Pb}_{0.4})\text{Sr}_2\text{Ca}_{2.2}\text{Cu}_3\text{O}_y$ nitrate solution mixed with hydrated MgO showed increase in critical current density(J_c) which might resulted from the even distribution of nano-size MgO particles in the Bi-2223 grains.

Keywords: Flux pinning center, nano-size MgO particle, hydration, spin coating, Bi-2223