

INVITED

Recent Development of Bulk High- T_c Superconductors

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In the present paper, recent activities in the field of RE-Ba-Cu-O (RE: rare earth elements) bulk superconductors and their applications are reviewed. In order to produce high performance bulk superconducting devices, R&D have been focused on the following three major issues. One is the enlargement of melt-textured RE123 bulk superconductors, which has been performed using the TSMG(top-seeded melt growth) technique. The second is the enhancement of field-dependent critical current densities, $J_c(B)$ at the liquid nitrogen temperature by introducing the flux pinning sites to the RE123 superconducting matrix. The third is the improvement of the mechanical properties of the bulks, which has been preformed by producing the RE-Ba-Cu-O-Ag composites or by infiltrating a resin into the bulks. The requirements of each application determine a proper bulk spec, which in turn decides the priority of processing issues just mentioned. Recent activities for bulk applications include current leads, fault current limiters, flywheel energy storage system, magnetic field source, magnetic separation device, and etc. Current status of these applications is discussed.

keywords : RE123 bulk superconductors, top-seeded melt growth, flux pinning sites, bulk applications