

Effect of Cerium Oxide on the Electromagnetic Properties and Superconducting Mechanism of YBCO Superconductors

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YBCO superconductors with different cerium oxide contents were prepared by a unique method so called a partial melting process to study the effect of the cerium oxide on the electromagnetic properties and superconducting mechanism of the superconductor [1, 2]. Microstructure observation by electron microscopy and chemical analysis by X-ray and electron micro-probe analysis showed that the cerium oxide formed BaCeO₃ phase which separately existed from YBCO phase. The critical temperature of YBCO superconductor was not predominately dependent upon the cerium oxide phase. The maximum magnetism was observed by adding 3% cerium oxide. The addition of cerium oxide to the YBCO superconductors resulted in forming a pinning center of magnetic flux due to BaCeO₃ phase, which was related to the change of electromagnetic properties of the YBCO superconductor.

[1] S. H. Lee, et al., Supercond. Sci. Tech., 15 (2002) 421.

[2] S. H. Lee, Solid State Phenomena, 119 (2007) 319.