The Effects of the Platelet Structures on the Superconductivity in Melt Textured YBCO Superconductors

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Melt textured YBCO superconductors were fabricated by the top seeding method using Sm1.8($Sm_{1.8}Ba_{2.4}Cu_{3.4}O_{7-Y}$) seed. We investigated the platelet structures using the optical microscope, SEM, and TEM. The platelet structures formed during the tetragonal to orthorhombic transition which occurred at 450°C in sample oxidization. The platelet structures were commonly observed around the 211 particles and micro defects (twins) were perpendicular to platelet structures. The platelet structures were increased as the oxygenation heat treatment time increased from 1hr to 50hr. We measured Tc of samples. The platelet structures were considered to be related to the flux pinning center, as the 211 particles were. The results suggested a new solidification model for the formation of the platelet structure layers.

Keywords: platelet structure, micro defects(twins)