

LEVITATION FORCE TO TEXTURE CORRELATION IN BULK Y-Ba-Cu-O.

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Abstract

Neutron diffraction Quantitative Texture Analysis is used to show the correlation between magnetic levitation force and texture in large bulk samples of the Y-Ba-Cu-O high-temperature superconducting systems. Samples are elaborated using the top-seeding process, with or without application of a high magnetic field and thermal gradient. The epitaxial-like texture relationships developed between the two main phases are evidenced, for a fraction of the volume.

Keywords: Correlation texture-levitation, full-pattern QTA, superconductors, $\text{YBa}_2\text{Cu}_3\text{O}_7$

1 Introduction

After twelve years of intensive research, the HTSCs are only barely used technologically, mainly because of the difficulties encountered in the elaboration of these complex systems. This has made the relatively easy-to-synthesise phases $\text{YBa}_2\text{Cu}_3\text{O}_{7.5}$ the most studied phase among all others. With critical temperatures around 90 K and relatively high critical magnetic fields, the $\text{YBa}_2\text{Cu}_3\text{O}_{7.5}$ (or Y123) phase have interest for its capability to be used as magnetic bearings. Large samples are needed in order to provide large magnetic levitation forces. However, several major facts limit the achievement of large bulks with suitable magnetic properties. First, the main superconducting phase (Y123) is stabilised through peritectic reaction,