

Perforated monodomain $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ bulk superconductors prepared by infiltration-growth process

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Abstract : For various applications such as FCL, motor flywheel or bearing, ... the core of bulk superconductors need to be fully oxygenated and some defects like cracks, pores and voids suppressed, in order that the material can carry high current densities. In order to study and minimise the above defects, we have developed a new elaboration technique. $\text{YBa}_2\text{Cu}_3\text{O}_y$ (Y123) bulks have been prepared by combining liquid infiltration and top seed growth (ITSG) process. This process involves negligible shrinkage and an uniform distribution of Y211 inclusions. In addition, we prepare a regular perforation of the Y123 sample in view to magnify the specific surface and by then increase oxygen diffusion into the core of the material. Neutron texture analysis demonstrates the non-perturbative effect of the holes in the bulk from the orientation point of view. The advantages of the ITSG-process and of the novel perforated Y123 bulk are discussed.