

Abstract « Texture and anisotropy 2012 »

Combined analysis method: from sample to texture

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Texture of bulk superconducting materials of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$ is studied to correlate the preferred orientation of grains with their macroscopic properties. This correlation may reveal how each studied parameter (shape, synthesis parameter) affect the superconducting current and how it is possible to improve it.

Combined analysis method is used to study preferred orientation at various length scales, from macroscopic (neutron experiments) to surface (X-ray experiments) down to microscopic (electron back-scattering diffraction). The complementarity of the sources will be a plus to characterize texture. Resulting data, even the pictures of Debye-Scherrer rings are implemented as raw data in the Rietveld refinement program Maud. Maud offers many possibilities from data implementation to data treatment. Particularly in the case of this study, the program gives the possibility to obtain pole figures.

Results showed that the studied samples are multiphasic and mainly composed of the weakly textured superconducting phase $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$. We also found that texture varies in the tubes across their wall thickness due to the synthesis process.

Further studies have to be performed to achieve the correlation between texture and macroscopic properties of bulk samples but these first results are very promising. These results reveal the possibility of applying the combined analysis method on our materials.

Keywords: Texture, Combine analysis, Superconductor, Maud, Rietveld