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Texture analysis of Bi-2212 and 2223 tapes and wires by neutron diffraction

H.-R. Wenk^{a,b,*}, D. Chateigner^{a,b}, M. Pernet^b, J. Bingert^c, E. Hellstrom^d,
B. Ouladdiaf^e

^a Department of Geology and Geophysics, University of California, Berkeley CA 94720, USA

^b Laboratoire Cristallographie-CNRS, BP 166, F-38042 Grenoble Cedex 9, France

^c Center for Materials Science and MSTG-LANL, Los Alamos, NM 87545, USA

^d Applied Superconductivity Center, University of Wisconsin, Madison, WI 53706-1687, USA

^e ILL, BP 156, F-38042 Grenoble Cedex 9, France

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Abstract

The crystallographic texture of silver sheathed monocoil tapes and wires, and multifilamentary tapes containing $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$ (Bi-2212) and $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_x$ (Bi-2223) superconducting oxides was determined by neutron diffraction, using a position sensitive detector. The orientation distribution (OD) was obtained from measurements of 4-6 pole figures. The oxide textures of these tapes and wires displayed axial symmetry, indicative of a grain-shape-controlled orientation mechanism. In monocoil and multifilamentary tapes the *c*-axes of Bi-2212 and Bi-2223 are oriented perpendicular to the rolling plane, in wires they are perpendicular to the wire direction. The multifilamentary tape has the strongest texture with an OD maximum of 46 times that of a random sample. Monocoil tapes are 26 and 35 mrd, and wires are 2.1 and 1.5 mrd. For comparison, a sinter-forged Bi-2223 barpowder was analyzed and exhibited *c*-axes parallel to the compression direction with a maximum of only 3.4 mrd. The texture of the silver sheaths depends on the processing conditions.
