# On the influence of magnetic field processing on the texture, phase assemblage and properties of low aspect ratio $Bi_2 Sr_2 CaCu_2 O_x$ /AgMg wire

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**Abstract.** $Bi_2 Sr_2 CaCu_2 O_x$ /AgMg conductors are potentially important for many applications up to 20 K, including magnets for cryogen-free magnetic resonance imaging and high field nuclear magnetic resonance research. One promising approach to increased critical current density is partial-melt processing in the presence of a magnetic field which has been shown to enhance *c*-axis texturing of wide, thin tape conductors. Here, we report on low aspect ratio rectangular conductors processed in an 8 T magnetic field. The magnetic field is applied during different stages of the heat treatment process. The conductors are electrically characterized using four-point critical current measurements as a function of magnetic field and magnetic field orientation relative to the conductor. The superconductive transition and magnetization hysteresis are measured using a SQUID magnetometer. The microstructures are characterized using scanning electron microscopy and energy dispersive spectroscopy and analyzed using digital image processing. It is found that the presence of a magnetic field during split melt processing enhances the electrical transport and magnetic behavior, but that the anisotropy is not consistently affected. The magnetic field also affects development of interfilamentary Bi2212 bridges, and that this depends on the initial shape of the Bi2212 filament. At least two behaviors are identified; one impacts the oxide phase assemblage and the other impacts textured growth.

*Keywords:* magneto science, Bi2212, texture, critical current density

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