Abstract Submitted
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Homogeneity and connectivity of doped MgB2 bulks and strands as probed by heat capacity and current transport[1] MIKE SUMPTION, MIKE SUSNER, MSE, The Ohio State University, Columbus, OH USA, Z. SHI, Department of Physics, Southeast University, China, E. COLLINGS, MSE, The Ohio State University, Columbus, OH USA — Homogeneity and current percolation have been investigated for MgB2 bulks and strands. Sintered bulks were compared to dense bulks produced by HIPping, infiltration, and spark plasma synthesis in terms of their homogeneity as measured by heat capacity and resistivity. Various levels of carbon based dopants were introduced in each case, with control samples for comparison. The influence of higher temperature processing on inhomogeneity was investigated. These results are compared to those of MgB2 based strands made both with and without C-based doping. In addition, comparisons of transport and magnetization measurements at higher magnetic fields showed the onset of a regime where the anisotropy between Jc parallel to the strand and Jc perpendicular to the strand grows rapidly. This leads to large differences between transport and magnetically measured values of not only critical current, but also the irreversibility fields, Birr. Such effects can be described in terms of three different regimes, defining the dimensionality of the system. These regimes are distinct from the various states of vortex matter present in the magnetic phase diagram of MgB2, but in coexisting with them they influence our estimates of these boundaries.

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