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Critical Current Density and Connectivity Properties of High Jc Ex-situ $\mathbf{Mg(B_{1-X}C_X)_2}$ B. J. SENKOWICZ, R. J. MUNGALL, J. R. MANTEI, E. E. HELLSTROM, D. C. LARBALESTIER, University of Wisconsin - Madison, Applied Superconductivity Center — Using high-energy milling we have obtained J_c (4.2K, 8T) > 5*10^4 A/cm^2 with H*(4.2K) >16T despite high normal state resistivity (ρ(40K) > 100 $\mu\Omega$-cm). Analyzing resistivity curves by the Rowell method has led to the realization that as a result of overmilling and the presence of unincorporated carbon, our active cross section is only one tenth to one third of our total cross section. Therefore the potential exists to improve J_c by a factor of several by increasing connectivity and decreasing grain boundary current obstruction. We examine the effect of composition and milling time on connectivity and superconducting properties. This research was performed under an appointment to the Fusion Energy Sciences Fellowship Program, administered by ORISE under contract between the U.S. DOE and the Oak Ridge Associated Universities. This work was supported by the NSF – FRG on MgB_2, and by DOE – Understanding and Development of High Field Superconductors for Fusion - DE-FG02-86ER52131.

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