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COMPARATIVE STUDY ON THE CRITICAL CURRENT DENSITY OF MgB_2 PREPARED BY MIXED BORON POWDERS

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ABSTRACT

Polycrystalline MgB_2 was prepared from Mg and boron precursors consisting of boron powders with varying purity and form. T_c does not change largely for all samples. By replacing 10 wt.% of high purity amorphous boron with impure crystalline boron, comparable J_c to that of samples prepared from high purity amorphous boron powder alone can be obtained. High J_c can also be retained by replacing 20 wt.% of the high purity amorphous boron with impure amorphous boron. However, J_c decreases more rapidly with field by increasing the proportion of impure amorphous boron. By mixing both impure amorphous and crystalline boron powders even up to the proportion of 50 – 50 wt.%, the obtained MgB_2 exhibit enhanced J_c compared to samples prepared from the respective boron powder alone. The enhancement in J_c at 6K and 20K is more pronounced for applied field $\leq$ 3T.

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