

Comparative study on the critical current density of MgB₂ prepared by mixed boron powders

ABSTRACT

Polycrystalline MgB₂ 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 wt.%, the obtained MgB₂ 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 ≤ 3T.

Keyword: MgB₂; Boron powder