

Influence of Magnesium Powder and Heat Treatment on the Superconducting Properties of MgB₂/Fe Wires

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The most common technique to fabricate MgB₂ superconducting wire is by powder-in-tube (PIT) technique. Therefore, the starting powder for the processing of MgB₂ superconductors is an important factor influencing the superconducting properties and performance of the conductors. In this study, the influence of magnesium precursor powders and annealing temperatures on the transition temperatures (T_c) and critical current densities (J_c) of MgB₂/Fe wires was investigated. All the MgB₂/Fe wires were fabricated by *in situ* PIT process. It was found that higher J_c was obtained for MgB₂ wires with smaller particle size of magnesium precursor powders. It was also found that the J_c increases with decreasing annealing temperatures. X-ray diffraction (XRD) was used to characterize the precursor powders and annealed samples. The cross-sectional images of the wires were analyzed by scanning electron microscopy (SEM). The variation in T_c and J_c with precursor powders and annealing temperatures of MgB₂/Fe wires will be reported and discussed.

Keywords: MgB₂, heat treatment, superconducting wires, critical current density

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