

Superconducting Properties of MgB₂/Fe Wire Fabricated by Low Temperature Annealing Process

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Enhancement in the reactivity of the MgB₂ formation by mechanical milling of the precursor powder has been shown by many studies. In this study, the influence of low temperature annealing of MgB₂/Fe wires prepared by mechanically milled precursor powder was investigated. The boron precursor powder was first ball-milled. Then, the pre-treated boron powder was mixed with magnesium powder in a stoichiometric Mg : 2B composition for fabricating into wire by a powder-in-tube(PIT) process. A standard in situ PIT wire using as-received was also fabricated as a comparison. Heat treatment were performed at 500, 550 and 600°C with solid state reaction. Experimental result showed improved critical current density for mechanically milled sample as compared to un-milled sample. The microstructure of the wire was observed and discussed in correspond to the critical temperature, T_c and critical current density, J_c .

Keywords : MgB₂ wire, Low temperature, milling