Effects of Sintering Temperature on the Microstructure and Superconducting Properties of In-situ MgB_2 Wires

Soo Min Hwang [a], Jun Hyung Lim [a], Seung Yi Lee [a], Chang Min Lee [a], Si Hong Park [a], Jun Hyuk Choi [a], Jinho Joo [a*] Chan-Joong Kim [b]

[a] *School of Advanced Materials Science and Engineering, Sungkyunkwan University, Suwon, Korea*

[b] *Nuclear Nanomaterials Development Laboratory, Korea Atomic Energy Research Institute, Daejeon, Korea*

We fabricated the PIT MgB_2 wires using the in-situ process and investigated the effects of sintering temperature on the microstructure and superconducting properties of MgB_2 wires. A mixture of Mg and B powders with stoichiometric composition was packed in iron tubes under an Ar atmosphere and these tubes were then drawn into wires with a diameter of 1.2 mm. Sintering was performed at 700℃-1000℃ for 30 minutes in a flow of Ar gas.

Phase identification was carried out by X-ray diffraction (XRD) method and the microstructure of MgB_2 core was observed by scanning electron microscopy (SEM). The critical temperature (T_C) was measured by the standard four-probe resistive method in a cryostat and the critical current (I_C) was measured by a magnetic property measurement system (MPMS). It was observed that the sintering temperature had significant effects on the critical properties. The effects of sintering temperature on the microstructural evolution and resultant critical properties of in-situ MgB_2 wires will be discussed in detail.

keywords : in-situ, MgB_2, sintering

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