

## Role of the Sintering on Superconducting Properties of MgB<sub>2</sub> Wires Fabricated by the Ex-situ and In-situ Process

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We fabricated MgB<sub>2</sub> wires by the powder-in-tube (PIT) method with both the ex-situ and in-situ processes and evaluated the role of the sintering on the microstructure and critical properties. For PIT fabrication, pure iron tubes were filled with MgB<sub>2</sub> and Mg/B powder, respectively. The sintering was performed at the temperature of 850 °C in an Ar atmosphere. The phase of the sintered wires was identified by XRD and the microstructures were observed by SEM. The critical current density (J<sub>c</sub>) and critical temperature (T<sub>c</sub>) were measured by magnetic property measurement system (MPMS) with the four probe method in a cryostat. It was observed that the critical properties of the sintered MgB<sub>2</sub> wire were superior to those of the as-drawn MgB<sub>2</sub> wire (without sintering) and the J<sub>c</sub> and T<sub>c</sub> of the sintered MgB<sub>2</sub> wire were 155 kA/cm<sup>2</sup> (at 5 K, 1.6 T) and 35 K, respectively. The influences of sintering process on critical properties of MgB<sub>2</sub> wires will be discussed with microstructural observation.

Keywords : sintering, PIT, MgB<sub>2</sub>, ex-situ

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