

Fabrication of the C-Doped MgB₂ Wires Using Mechanical Alloying and Combination of In-situ and *Ex-situ* Processes

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Ex-situ processed C-doped MgB₂ wires were fabricated by two different methods such as mechanical alloying (MA) and combined process (CP) of in-situ and ex-situ. In the MA, the mixture of MgB₂ and 1 at% C powders was subjected to planetary ball milling for 0-100 h in Ar atmosphere. In the CP, on the other hand, in-situ processed C-doped MgB₂ powder was prepared with Mg, B, and C powders via compaction, sintering, and crushing. The precursor powders prepared by two methods were put into Fe tube and then drawn into wires using a conventional powder-in-tube technique.

The MA process of C-mixed MgB₂ reduced the particles/grains size and resulted in C-doping into MgB₂ after sintering, leading to improvement of the critical current density (J_c) in high magnetic field. The CP also gave rise to C-doping into MgB₂ and improved the J_c in high field. The phase formation, lattice change, and microstructure were correlated with the variations of J_c and T_c of the MgB₂ wires, which will be presented.

Keywords: Critical current density, Ex-situ, In-situ, Mechanical alloying, MgB₂

Acknowledgments

This research was supported by a grant (R-2006-1-248) from Electric Power Industry Technology Evaluation & Planning center (ETEP), Republic of Korea