

## Effect of Heat Treatment Temperature on the MgB<sub>2</sub>/Fe Wire Prepared with Mechanically Milled and Glycerin Added Boron Powder

Dan-Bi Kim<sup>a,b,\*</sup>, Byung-Hyuk Jun<sup>a</sup>, Yi-Jeong Kim<sup>a</sup>, Kai Sin Tan<sup>a</sup>,  
Jinho Joo<sup>b</sup>, Chan-Joong Kim<sup>a</sup>

<sup>a</sup> Neutron Science Division, Korea Atomic Energy Research Institute(KAERI), Daejeon, 305-353, Korea

<sup>b</sup> School of Advanced Materials Science and Engineering, SungKyunKwan University, Suwon, Gyeonggi, 440-746, Korea

We have fabricated in situ MgB<sub>2</sub>/Fe wire using pre-treated boron powder. The boron powder was mechanically ball-milled for 2 hours followed by glycerin (C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>) treatment. The aims of mechanical milling and glycerin treatment were to reduce the grain size of MgB<sub>2</sub> and to achieve homogeneous carbon incorporation into the MgB<sub>2</sub>, respectively. A standard in situ MgB<sub>2</sub> wire was also fabricated using as received boron powder for comparison. enhancement of critical current density,  $J_c$  was observed with the use of the pre-treated boron powder. Highest  $J_c$  was obtained for MgB<sub>2</sub>/Fe wire using the pre-treated boron powder heat-treated at 900 °C for 30 min. The influence of heat-treatment temperature on the variations of  $T_c$  and  $J_c$  was studied with X-ray diffraction and correlated microstructural observation.

Keywords: effect of heat treatment, glycerin added, MgB<sub>2</sub>/Fe wire

### *Acknowledgement*

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