



Contribution ID: 795

Type: **Contributed Oral Presentation**

M3Or3B-03: Microstructure and Enhanced Engineering Critical Current Density of Advanced-Internal-Magnesium-Infiltration (AIMI) MgB₂ Wires with Low Heating Temperature and Long Heating Time.

Wednesday, 24 July 2019 14:30 (15 minutes)

Advanced-Internal-Magnesium-Infiltration (AIMI) MgB₂ strands are typically processed with the temperature higher than Mg melting point (650 °C) and heating times of 1 ~ 4 h; therefore, the formation of dense MgB₂ layer in typical AIMI strand results from liquid - solid state reaction between liquid magnesium and nano-sized boron powder. In this study, the microstructures and critical current densities of AIMI strands heated with 625 °C were explored. We observed that more uniform MgB₂ layer were formed in these AIMI strands through solid - solid state reaction between Mg and B. Both optical microscope and SEM were used to observe the uniformity of MgB₂ layer and the distribution of voids and B-rich phases in these AIMI wires. Since the rate of the solid - solid reaction is much lower than that of liquid - solid reaction, long heating times (8 ~ 64 h) were utilized to obtain a thick MgB₂ layer for these strands which reduced J_c variation along the filaments. The further application of this method to increase the engineering critical current density (J_e) of the AIMI strands at 4.2 ~ 20 K is discussed.

Author: WAN, Fang (The Ohio State University)

Co-authors: SUMPTION, Mike (The Ohio State University); ZHANG, Danlu (The Ohio State University); Dr COLLINGS, Edward (The Ohio State University); RINDFLEISCH, Matthew; Mr THONG, Chee (Hyper Tech); Mr TOMSIC, Michael (Hyper Tech Research)

Presenter: WAN, Fang (The Ohio State University)

Session Classification: M3Or3B - MgB₂ and Fe-based Wires