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Mg STOICHIOMETRY STUDY ON MgB_2 AT LOW ANNEALING TEMPERATURES

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ABSTRACT

An in-situ reaction of Magnesium (Mg) and Boron (B) at 650°C annealing temperature was used to compare the phase formation of Magnesium Diboride (MgB_2) by varying the nominal Mg. The x-ray diffraction pattern indicates that Magnesium Oxide (MgO) is the major secondary phase. Some of the unreacted Mg phase was found in the nominal MgB_2 stoichiometry and the Mg-excessed samples annealed at 650°C. However, no unreacted Mg was detected by XRD for Mg-deficient sample annealed at 650°C. Highest enhancement of critical current density (J_c) at 5 K and 20 K is found in Mg-deficient samples treated at both annealing temperatures. J_c is increased for the over-added Mg samples as compared to that of the nominal samples. The SEM image show a hexagonal grain structures with nano thickness distributions.

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