

Abstract Submitted
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Phase Identification for Cu-sheathed MgB₂ Superconducting wires GAN LIANG, Sam Houston State University, DAVID KATZ, HUI FANG, University of Houston, KAMEL SALAMA, ZHONGJIA TANG — X-ray diffraction (XRD) and SEM measurements have been performed for Cu-sheathed MgB₂wires fabricated using ultra-fine Mg and B precursor and powder-in-tube method. Thirteen samples sintered at temperatures ranging from 450 °C to 875 °C, each for 5 minutes, were measured. It is found that MgB₂ phase can be formed in all these samples. From 400 °C to 550 °C, the fraction of the Mg₂Cu phase increases with sintering temperature while the Mg-phase decreases. Between 550 °C and 725 °C, the Mg₂Cu phase disappears, only MgB₂ and MgCu₂ phase co-exist. At or above 725 °C, MgB₂, MgB₄, and Mg_{1+y}Cu_{32+δ} phase coexist, and the fraction of the Mg_{1+y}Cu_{32+δ} phase increases with sintering temperature while the other two phases decrease. With the help of the measured XRD pattern for standard compound MgCu₂, the MgCu₂ phase in the Cu-sheathed MgB₂ wire samples can be clearly identified. We also for the first time identify a new phase, the Mg_{1+y}Cu_{32+δ} phase, in Cu-sheathed MgB₂ wires. The XRD results are analyzed together with SEM and current density (J_c) measurement results.

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