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Study on the formation of MgB₂ and other phases in Cu-sheathed /MgB₂ wires. GAN LIANG, Sam Houston State University, HUI FANG, University of Houston, DAVID KATZ, Sam Houston State University, KEMAL SALAMA, University of Houston, ZHONGJIA TANG, University of Houston, GAN LIANG COLLABORATION, HUI FANG COLLABORATION, ZHONGJIA TANG COLLABORATION — We report the results from a systematic x-ray diffraction, SEM, and critical current density measurements for Cu-sheathed MgB₂wires fabricated using the powder-in-tube method and ultra-fine Mg and B precursor prepared by high-energy ball milling. The samples were sintered at temperatures ranging from 450 °C to 900 °C for 5 minutes. It is found that MgB₂ phase can be formed in this whole temperature range. Below 550 °C, the weight 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. These results are supported by our SEM and J_c measurement results.

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