

Growth of MgB₂ Thin Films on Textured-Ni (100) Tape by using HPCVD Method

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At the growth temperature of below 500 °C, we tried to grow MgB₂ thin films on a biaxially textured Ni (100) tape by using Hybrid Physical-Chemical Vapor Deposition (HPCVD) method. The superconducting properties of films were investigated by the resistance and the magnetization measurements as functions of temperatures, which indicated that the transition temperatures are in a range of 36 ~ 39K with the transition width of 1 ~ 2K. The scanning electron microscopy (SEM) and X-Ray Diffraction (XRD) analyses showed that the microstructures have polycrystalline MgB₂ patterns with hexagonal-shaped grains of c-axis alignments and some impurities from the interfacial reactions between the Ni substrates and films are detected. It was observed that the average sizes of hexagonal-shaped grains are decreased with lowering the growth temperature. We will discuss the possibility of a large-scale application of MgB₂ thin films on textured-nickel tapes.

Keywords: magnesium diboride, thin film, HPCVD, textured-nickel tape