열처리 분위기에 따른 MgB_2 초전도의 특성 변화

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MgB_2 Superconducting Properties under Different Annealing Condition

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Abstract : MgB_2 bulk samples were sintered at different ambient. In this work, high purity Ar gas was added with oxygen and hydrogen gas, which can be regarded as impurity in a sense, as a possible dopant in the MgB_2. It was found that oxygen in the sintering ambient leads to a decrease in the critical current density J_c at self field and lower fields. However, we can obtained higher J_c at higher fields. It was also noted that MgB_2 samples sintered with 5% hydrogen in Ar revealed the increased J_c at all fields compared to those processed in pure Ar ambient. From the XRD and FESEM analysis, the impurity gas in Ar can refine the MgB_2 grain size and result in increased grain boundary, which can act as a strong flux pinning sites in MgB_2 samples. Also discussed are the effects of sintering ambient on irreversibility field, H_{irr} and the upper critical field, H_{C2}.

Key Words : MgB_2, Annealing, irreversibility field, upper critical field

Acknowledgements

This work was supported by the Global Partnership Program from the Korea Foundation for International Cooperation of Science & Technology(KICOS) in 2006 (M60602000012) through a grant provided by the Korean Ministry of Education, Science & Technology(MEST).