Magnetism in Ni-W Textured Substrates for ReBCO Coated Conductors

K. J. Song*[,a], Y. M. Park[a], J. S. Yang[a], S. W. Kim[a], R. K. Ko[a], H. S. Kim[a], H. S. Ha[a], D. W. Ha[a], S. S. Oh[a], C. Park[b], J. H. Joo[c], and C. J. Kim[d]

[a] *Korea Electrotechnology Research Institute, Changwon, Korea*

[b] *Seoul National University, Seoul, Korea*

[c] *Sungkyunkwan Univesity, Suwon, Korea*

[d] *Korea Atomic Energy Research Institute, Daejeon, Korea*

The magnetic properties of a series of both annealed (biaxially textured) and as-rolled (non-textured) Ni-$_x$W alloy tapes with compositions x = 0, 1, 3, and 5 at.%, were studied. Characterization methods included XRD analyses to investigate the biaxial cube texturing of the annealed Ni-W alloy tapes and studies of the magnetization M for both annealed and as-rolled Ni-W alloy tapes. Both the isothermal mass magnetizations M(H) of a series of samples at different fixed temperatures and M(T) in fixed field, employing a PPMS-9 (Quantum Design), were measured. The Ni-W alloys have shown much reduced ferromagnetism as W-content x increases. Both the saturation magnetization M_{sat} and Curie temperature T_c decrease linearly with W-content x, and both M_{sat} and T_c go to zero at critical concentration of $x_c \sim 9.50$ at.% W.

keywords : Ni-W alloy tapes, mass magnetization, saturation magnetization, Curie temperature, critical concentration.

Acknowledgement

This research was supported by a grant from Center for Applied Superconductivity Technology of the 21st Century Frontier R&D Program funded by the Ministry of Science and Technology, Republic of Korea.