

# Ni-Cu Alloy Tapes as Substrates for YBCO Superconductors

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A Ni tape is used as a substrate for YBCO coated conductors because of the lattice constants similar to YBCO and the easy formation of cube texture by mechanical working and annealing. However, the Ni tape has a problem of ferromagnetic property and poor mechanical properties. It is thus necessary to improve the properties by addition of alloying elements. We selected Cu as an alloying element because it makes complete solid solution with Ni, and has the same crystal structure as Ni and lattice constants similar to Ni. We made various compositions of Ni-5%Cu, Ni-10%Cu, Ni-20%Cu, Ni-40%Cu and Ni-60%Cu by powder metallurgy process. The higher Cu composition samples of 40% and 60% could not be made into tapes due to the fracture of the samples during cold working, which is attributed to the brittleness of the samples. The powder compacts with lower Cu contents were successfully made into thin tapes with a thickness of 80-100 microns by cold rolling with a 5% reduction at each path. The recrystallization heat treatment was carried out for the tapes at a 5%H<sub>2</sub>-96%Ar atmosphere for the development of cube texture. We report the processing condition, microstructure, texture formation of Ni-Cu alloy tapes.

keywords: Ni-Cu alloy, cube texture, cold rolling, recrystallization

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