

**Coated conductors on textured Ni-Cr alloys with reduced ferromagnetism:
substrate properties and YBCO current conduction**

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Abstract

A series of biaxially textured Ni_{1-x}Cr_x materials, with compositions $x = 0, 7, 9, 11,$ and 13 at % Cr, has been studied for use as substrate materials in coated conductor applications with high temperature superconductors. The magnetic properties were investigated, including the hysteretic loss in a Ni-7 at.% Cr sample that was controllably deformed; for comparison, the loss was also measured in a similarly deformed pure Ni substrate. Complementary X-ray diffraction studies show that thermo-mechanical processing produces nearly complete $\{100\}\langle 100\rangle$ cube texturing, as desired for applications.

Deposition of YBCO on appropriately buffered Ni₈₇Cr₁₃ yielded biaxially textured superconductor with $T_c = 89$ K. Analysis of the superconductive hysteresis using the Bean model yielded current densities in self field of 9 MA/cm^2 at 5 K and 0.62 MA/cm^2 at 77 K . The latter result compares well with the value 1.2 MA/cm^2 determined by transport methods with a less stringent criterion for J_c . Results for the field and temperature dependence of the current density will be presented.

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