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**Ni<sub>1-x</sub>Cr<sub>x</sub> Substrate Alloys with Reduced or non-Ferromagnetic Properties for Coated Conductor Applications<sup>1</sup>**

J.R. THOMPSON, Oak Ridge National Lab and University of Tennessee, A. GOYAL, D.K. CHRISTEN, D.M. KROEGER, Oak Ridge National Lab, H.J. KIM, University of Tennessee — The magnetic and textural properties of a series of Ni<sub>1-x</sub>Cr<sub>x</sub> alloys has been investigated, with Cr-contents  $x = 7, 9, 11,$  and  $13$  at %, as confirmed by ICP analysis. These substrate materials were formed by vacuum-melting of  $> 99.99\%$  elements, then thermo-mechanically processed by rolling and annealing to achieve biaxial texturing. X-ray diffraction  $\phi$  and  $\omega$  scans demonstrated the presence of very sharp and fully formed cube texture. Magnetic properties were investigated by SQUID magnetometry in magnetic field  $H$  to  $6.5$  T (generally applied parallel to the surface of a foil), for temperatures  $T = 5-300$  K. Both the Curie temperature  $T_c$  and the saturation magnetization  $M_{\text{sat}}$  decreased linearly with Cr-content and extrapolated to  $0$  K for  $x = 12$  at %. To quantify the hysteretic loss, a foil of Ni<sub>0.93</sub>Cr<sub>0.07</sub> ( $T_c = 250$  K) was deformed, then reverse bent about a  $9$  mm mandrel. An energy loss/cycle of  $\sim 200$  erg/gram was found; for  $60$  Hz ac applications, this is negligible compared with other losses.

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 Prefer Poster Session

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