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Transport and Magnetic Properties of Nd_2Ni_2Pb and NdNiPb
V. GORUGANTI, YANG LI, JOSEPH H. ROSS, JR., K.D.D. RATHNAYAKA, Department of Physics, Texas A&M University, Y. ÖNER, Deparment of Physics, Istanbul Technical University — We report magnetic, transport and thermodynamic measurements for Nd_2Ni_2Pb and NdNiPb, members of recently-discovered R-Ni-Pb families of intermetallics. In Nd_2Ni_2Pb a λ-type specific heat jump was observed at 19 K corresponding to an antiferromagnetic transition. Magnetization measurements show this phase to have a canted structure, with a metamagnetic transition in $H = 3$ T at low temperatures. We have further explored the metamagnetic transition using field dependent specific heat, concluding that the metamagnetic phase is a fully aligned phase. The single antiferromagnetic phase stands in contrast to the more complex magnetic structures observed in the heavy-rare-earth members of this family. Nd is the lightest RE forming this type strucure. At high temperatures the magnetization obeys a Curie law and the magnetic moment agrees with the free ion moment of Nd. Resistivity measurements showed metallic behavior with a kink at 19 K. We performed similar measurements on NdNiPb and observed an antiferromagnetic transition at 4 K. Specific heat indicated rather different critical behavior, with magnetic fluctuations extending well above the transition. This work was supported by the Robert A. Welch Foundation (grant A-1526), the National Science Foundation (DMR-0103455), and by the Texas A&M University Telecommunications and Informatics Task Force.

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