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Crystal Fields and Metamagnetism in NdNiPb and Nd_5NiPb_3[1]
V. GORUGANTI, K.D.D. RATHNYAYAKA, JOSEPH H. ROSS, JR., Texas A&M University, Y. ONER, Istanbul Technical University — We report magnetic, transport and thermodynamic measurements for recently-synthesized NdNiPb (orthorhombic TiNiSi-type structure) and Nd_5NiPb_3 (hexagonal Hf_5CuSn_3-type structure), as well as non-magnetic Y-based analogs. High-temperature Curie-Weiss fits yield effective moments of 3.59 μ_B for NdNiPb and 3.70 μ_B for Nd_5NiPb_3. These are close to the Nd^{3+} ionic moment, 3.62 μ_B, showing that Ni is nonmagnetic in both cases. For NdNiPb a peak seen in both the magnetization and specific heat at 3.5 K indicates an apparent antiferromagnetic transition at that temperature. Specific heat measurements show this transition to be formed from crystal-field-split Nd magnetic levels, and we have made preliminary estimates of the crystal field scheme. Nd_5NiPb_3 exhibits two magnetic transitions, an antiferromagnetic transition at 42 K and an apparently weak ferromagnetic canting transition at 8 K. Entropy measurements also show the ground state to be composed of crystal-field-split doublet of magnetic levels. *M-H* curves show metamagnetism at temperatures between the two magnetic transitions. The materials are metallic, and we will discuss transport results providing a further probe of the magnetic behavior.

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