

Magnetic Ordering and Magnetocaloric Effect in PrPdIn and NdPdIn

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Equiatomic ternary compounds $RPdIn$ (R =rare earth) crystallize in the hexagonal ZrNiAl-type crystal structure. A great variety of interesting magnetic properties of this family has been reported in number of works. Among them, the data previously reported in the literature show ferromagnetic ordering for NdPdIn at about 26 K, whereas no sign of magnetic ordering was detected for PrPdIn down to 1.7 K.¹ We have performed a systematic investigation on the well-annealed polycrystalline PrPdIn and NdPdIn samples by ac and dc susceptibilities, high field magnetization, magnetic relaxation, specific heat and electrical resistivity measurements. Our new results indicate that both PrPdIn and NdPdIn exhibit long-range ferromagnetic ordering with the transition temperature $T_C=11$ and 34 K, respectively. For NdPdIn, an additional phase transition was observed at $T_0=18$ K caused by the antiferromagnetic coupling. Below T_C , both samples show metastable magnetic properties, behaving as the irreversibility of the temperature dependence of magnetization and the long time magnetic relaxation behavior. On the other hand, evident magnetocaloric effect was also observed for PrPdIn and NdPdIn compounds with large magnetic entropy change at T_C caused by a field change of 7 T.

¹L. Gondek, A. Szytuła, D. Kaczorowski, and K. Nenkov, Solid State Commun. **142**, 556 (2007).