

Abstract Submitted
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Magnetism in the diluted induced moment system $(\text{La,Pr})_6\text{Ni}_2\text{Si}_3$ ¹ R. W. MCCALLUM, Y. JANSSEN, K. W. DENNIS, P. C. CANFIELD, Ames Laboratory, Iowa State University, Ames IA 50011 — $\text{Pr}_6\text{Ni}_2\text{Si}_3$ crystallizes in a complex hexagonal structure with two distinct Pr sites with no point symmetry, thus the $2J+1=9$ ground state levels are CEF-split into singlets. Single-crystal magnetization and specific heat measurements suggest that this splitting is large compared to the ordering temperature. As CEF-induced singlets are nonmagnetic, any ordered magnetic moment is induced by magnetic interactions. $\text{Pr}_6\text{Ni}_2\text{Si}_3$ orders with a ferromagnetic component parallel to the c-axis at $\sim 40\text{K}$, whereas $\text{La}_6\text{Ni}_2\text{Si}_3$ appears to be nonmagnetic. Upon substitution of Pr by La the ordering temperature decreases more rapidly than predicted by a rule of mixtures. For substitutions of more than 50% La, no ordering is observed above 5 K. For 50% La, both AC and DC magnetization measurements suggest superparamagnetic or spin glass type behavior. This behavior will be discussed in terms of clusters of Pr ions with size-dependent moment and anisotropy.

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