

Abstract Submitted
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Normal and superconducting state properties of the $(\text{Pr}_{1-x}\text{Nd}_x)\text{Os}_4\text{Sb}_{12}$ system¹ PEI-CHUN HO, WILLIAM YUHASZ, TATSUYA YANAGISAWA, NEIL FREDERICK, NICHOLAS BUTCH, TODD SAYLES, JASON JEFFRIES, BRIAN MAPLE, Physics & IPAPS/UCSD, YUICHI NEMOTO, TERUTAKA GOTO, Grad. Sch. Sci. & Tech./Niigata U., Japan — Our previous experimental studies of the $(\text{Pr}_{1-x}\text{Nd}_x)\text{Os}_4\text{Sb}_{12}$ system revealed that: (1) superconductivity and ferromagnetism from both end compounds were suppressed almost monotonically toward $x = 0.55$, (2) retention of the antiferroquadrupolar order phase in $(\text{Pr}_{1-x}\text{Nd}_x)\text{Os}_4\text{Sb}_{12}$ to higher values of x than in $\text{Pr}(\text{Os}_{1-x}\text{Ru}_x)_4\text{Sb}_{12}$, (3) two possible CEF energy level schemes in $\text{NdOs}_4\text{Sb}_{12}$, in which the ground state is either the Γ_6 doublet or $\Gamma_8^{(2)}$ quartet. Recent ultrasonic measurements in the $\text{NdOs}_4\text{Sb}_{12}$ sample ($x = 1$) revealed softening of the C_{44} mode, which indicated that the CEF ground state in this compound is more likely to be the $\Gamma_8^{(2)}$ quartet. The lattice parameter in $(\text{Pr}_{1-x}\text{Nd}_x)\text{Os}_4\text{Sb}_{12}$ seems to increase slightly from $\text{PrOs}_4\text{Sb}_{12}$ ($x = 0$) toward $\text{NdOs}_4\text{Sb}_{12}$ ($x = 1$). The T-x and H-x phase diagrams related to superconductivity, ferromagnetism, antiferroquadrupolar order, and the CEF energy level scheme for the $(\text{Pr}_{1-x}\text{Nd}_x)\text{Os}_4\text{Sb}_{12}$ system for $0 \leq x \leq 1$ will be discussed.

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