

Superconductivity and magnetism in lanthanide platinum germanium compounds ¹

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Filled skutterudite compounds have several well known characteristics that are advantageous for an enhanced thermoelectric figure of merit Z [1]. To aid in the search for increased efficiency in filled skutterudite thermoelectric materials, it is important to improve our understanding of their strongly correlated electron phenomena. We have therefore performed a study of the $\text{Pr}_{1-x}\text{Ce}_x\text{Pt}_4\text{Ge}_{12}$ system. $\text{PrPt}_4\text{Ge}_{12}$ is an unconventional superconductor exhibiting evidence for time-reversal symmetry breaking [2], while $\text{CePt}_4\text{Ge}_{12}$ is a nonmagnetic Fermi liquid in which Ce assumes an intermediate valence [3]. Preliminary measurements of magnetization, resistivity, and specific heat down to ~ 2 K show that superconductivity is suppressed linearly with increasing Ce concentration up to $x = 0.4$, above which, no superconductivity was observed. Powder diffraction measurements show that the lattice parameter increases slightly with increasing x , consistent with previous work [3]. Power law analysis of the resistivity measurements show that the system remains a Fermi liquid throughout the entire series. The magnetization decreases with increasing Ce concentration.

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