

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Physical properties and Ce-valence of the filled skutterudite $\text{CePt}_4\text{Ge}_{12}$ WALTER SCHNELLE, ROMAN GUMENIUK, MICHAEL NICKLAS, HELGE ROSNER, ANDREAS LEITHE-JASPER, YURI GRIN, Max Planck Institute for Chemical Physics of Solids, Dresden, Germany, KRISTINA O. KVASHNINA, ESRF, Grenoble, France, YURI SKOURSKI, HLD, Helmholtz-Zentrum Dresden-Rossendorf, Germany — Filled skutterudite compounds $M\text{Pt}_4\text{Ge}_{12}$ with a Pt-Ge framework structure show intriguing physical ground states (conventional ($M = \text{Sr}, \text{Ba}$) and unconventional superconductivity ($M = \text{Pr}$), heavy-fermion behavior ($M = \text{Sm}$), magnetic ordering), similar to the well-known transition-metal pnictogen skutterudites. Here, we report on the electronic, magnetic, and transport properties of $\text{CePt}_4\text{Ge}_{12}$ [1]. High-resolution X-ray absorption spectroscopy (XANES) measurements at the cerium L_{III} edge demonstrate that Ce in this compound has a temperature-independent valence close to three. However, magnetic susceptibility, thermopower, Hall effect, and electronic specific heat reveal broad maxima at $T_{\text{max}} = 65\text{-}80\text{ K}$, suggesting the presence of valence fluctuations. The Sommerfeld coefficient $\gamma = 105\text{ mJ mol}^{-1}\text{ K}^{-2}$ indicates moderately enhanced band masses for $\text{CePt}_4\text{Ge}_{12}$. We discuss these findings and conclude that $\text{CePt}_4\text{Ge}_{12}$ represents a system at the border between intermediate valence (IV) and Kondo lattice behavior.

[1] R.Gumenuik et al. J. Phys.: Condensed Matter 23 (2011) 456601.

Walter Schnelle
Max Planck Institute for Chemical Physics of Solids, Dresden, Germany

Date submitted: 14 Nov 2011

Electronic form version 1.4