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Probing the unconventional superconductivity of $PrPt_4Ge_{12}$ through Ce substitution[1] KEVIN HUANG, LEI SHU, IVY LUM, BENJAMIN D. WHITE, MARC JANOSCHEK, DUYGU YAZICI, JAMES J. HAMLIN, DIEGO A. ZOCCO, Department of Physics, University of California, San Diego, La Jolla, California 92093, PEI-CHUN HO, Department of Physics, California State University Fresno, Fresno, California 93740, RYAN E. BAUMBACH, M. BRIAN MAPLE, Department of Physics, University of California, San Diego, La Jolla, California 92093 — Superconductivity has been observed in a new class of filled skutterudite compounds of the form MPt_4Ge_{12} (M = Sr, Ba, La, Pr, and Th), with the Pr member exhibiting a high superconducting transition temperature $T_c \sim 7.9$ K. Most of these skutterudite compounds seems to exhibit conventional BCS-type superconductivity; however, superconductivity in Pr appears to be unconventional as it exhibits characteristics of time-reversal symmetry breaking. To help clarify the nature of the superconductivity in $PrPt_4Ge_{12}$, we studied the response of superconductivity to the substitution of Ce for Pr throughout the series $Pr_{1-x}Ce_xPt_4Ge_{12}$ ($0 \leq x \leq 1$). Measurements of electrical resistivity, magnetic susceptibility, and specific heat were performed and superconductivity were observed up to a Ce concentration of 50%. A pronounced change was observed in the temperature dependence of specific heat below T_c where $PrPt_4Ge_{12}$ exhibits a crossover from a T^3 to an exponential temperature dependence when Ce is introduced.

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