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Two Superconducting Transitions in Heavy Fermion CePt3Si[1]
G.R. STEWART, J.S. KIM, P. KUMAR, D.J. MIXSON, D. BURNETTE, Physics Dept.,Univ. of Florida — Using small amounts of doping in $CePt_3Si$, along with annealing up to 1300 °C, we have discovered two very distinct superconducting transitions in good analogy to $U_{1-x}Th_xBe_{13}$. We have characterized these samples with specific heat, χ, and ρ in zero and applied magnetic field and created a phase diagram to track the existence of the two transitions as a function of several materials parameters. The sum of the discontinuities, ΔC, in the specific heat at T_{c1} ($\approx$0.8 K) and T_{c2} ($\approx$0.55 K) for both transitions exceeds the size of ΔC for pure $CePt_3Si$ by over a factor of four. The upper transition appears to be almost totally suppressed with impurites at the 100 ppm level, indicative of non-conventional superconductivity, while the lower transition is much more robust.

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