(7c5)

Magnetism and superconductivity in a heavy-fermion superconductor $CePt_3Si$

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A recently discovered heavy-fermion superconductor $CePt_3Si$ attracts much interest, since it exhibits antiferromagnetic order at $T_N = 2.2$ K and becomes superconductor below $T_{SC} = 0.75$ K. [1] Moreover, the lack of inversion symmetry in the crystal structure points a new pairing symmetry of the superconductivity. We report here the magnetic and thermal properties of a single crystal of $CePt_3Si$. [2] The overall experimental data are principally explained on the basis of a crystalline electric field(CEF) scheme. Figure 1(a) and (b) show the $H - T$ phase diagram for $H \parallel [110]$ and [001], respectively. It is interesting to note that the superconductivity is suppressed by applying the magnetic field around 3 T, whereas the antiferromagnetism persists up to 8 T. We have also studied the pressure dependence of T_N and T_{SC} by the resistivity measurements as shown in Fig. 2. [3] The T_N decreases with increasing pressure and becomes unclear around 1 GPa. On the other hand, T_{SC} decreases markedly as a function of pressure and becomes zero at around 1.5 GPa. This suggests that the present superconductivity is the most stable at ambient pressure.

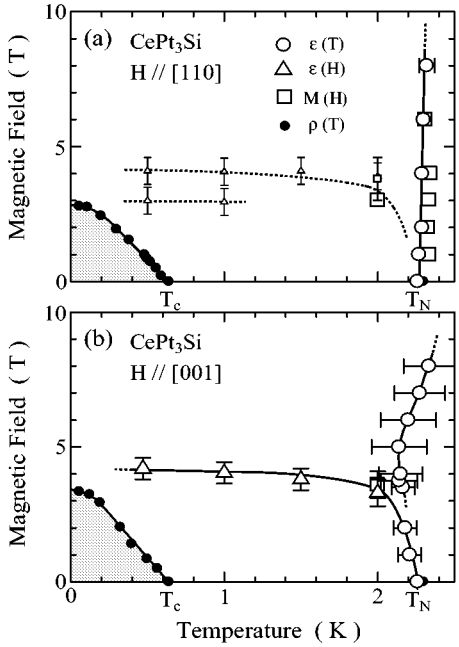

Figure 1: $H - T$ phase diagram in $CePt_3Si$.

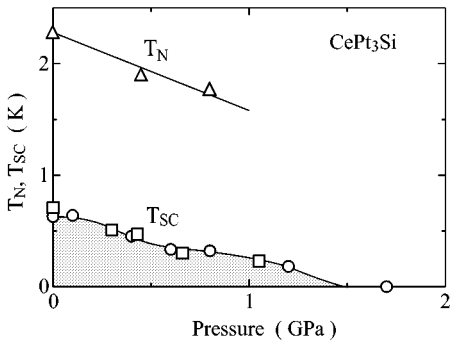

Figure 2: Pressure dependence of T_N and T_{SC} in $CePt_3Si$.

[1] E. Bauer *et al.*, Phys. Rev. Lett. **92** (2004) 027033.
[2] T. Takeuchi *et al.*, J. Phys.: Condens. Matter **16** (2004) L333.
[3] T. Yasuda *et al.*, J. Phys. Soc. Jpn. **73** (2004) 1657.