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de Haas-van Alphen effect under pressure in $CeRu_4Sb_{12}$

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$CeRu_4Sb_{12}$ is a semi-metallic compound which shows non-Fermi liquid behavior with large specific heat coefficient $\gamma \sim 200-400$ mJ/K^2·mol at low temperature[1]. A small pocket Fermi surface with the cyclotron mass $m_c^* = 5m_0$ was observed from the de Haas-van Alphen (dHvA) experiment [2]. The cyclotron mass of $5m_0$ is highly enhanced considering the small Fermi surface. The cyclotron mass is, however, too small to explain the large specific heat coefficient which suggests the existence of a heavy mass of $\sim 50m_0$. In order to investigate the heavy Fermion state in $CeRu_4Sb_{12}$, we have performed the dHvA experiment at low temperature under pressure. We expect the application of pressure will bring about the suppression of the mass enhancement.

Figure 1 shows the pressure dependence of (a) the dHvA frequency and (b) the cyclotron mass of $CeRu_4Sb_{12}$. The dHvA frequency and the cyclotron mass decrease with increasing pressure. According to the electrical resistivity measurements under high pressure up to 8 GPa, the resistivity increases with increasing pressure and $CeRu_4Sb_{12}$ becomes a small band-gap semiconductor above 6 GPa [3]. The decrease of the dHvA frequency, namely the decrease of the volume of the Fermi surface is consistent with above behavior. The heavy Fermi surface with large cyclotron mass was not observed in this experiment.

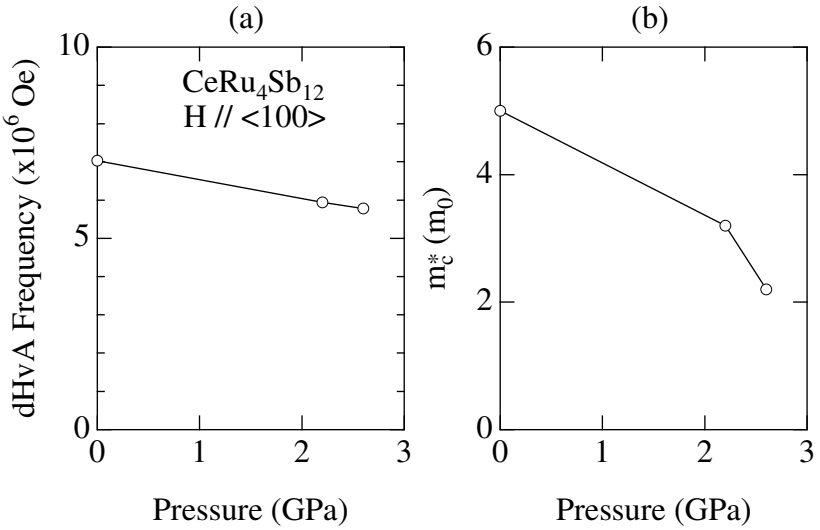

Figure 1: Single crystals of $R_3T_4Sn_{13}$ (R=Ce, Pr; T = Co, Rh).

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[2] H. Sugawara *et al.*, Physica B **312-313** (2002) 264.
[3] N. Kurita *et al.*, J. Magn. Magn. Mater. **272-276** (2004) e81.