(P2-3)

Effect of pressures for $PrOs_4Sb_{12}$ and $SmFe_4P_{12}$ up to 10GPa

N. Kurita[1], M. Hedo[1], M. Kano[1], T. Fujiwara[1], Y. Uwatoko[2], N. Takeda[3] and S. W. Tozer[3]

[1]Institute for Solid State Physics, University of Tokyo, Kashiwa, 277-8581
[2]Faculty of Engineering, Niigata University, Niigata 950-2181, Japan
[3]National High Magnetic Field Laboratory, Tallahassee, FL 32310-3706

The filled skutterudite compound $PrOs_4Sb_{12}$ is the first heavy fermion superconductor based on Pr with T_c∼1.85 K[1]. The crystal electric field (CEF) ground state is a Γ_1 singlet, which is separated by the first excited state of the $\Gamma_4^{(2)}$ triplet by a gap of Δ_{CEF}∼10 K. Because of this small Δ_{CEF}, quadrupole moment fluctuation arising from the $\Gamma_4^{(2)}$ state plays an important role in the heavy fermion superconductivity and antiferroquadrupolar transition in high fields. Since the magnitude of Δ_{CEF} can be controlled by pressure, it is very important to investigate high pressure experiments on $PrOs_4Sb_{12}$. To speculate how the CEF splitting does change under pressure, electrical resistivity measurements at hydrostatic pressures to 10 GPa were performed by means of a cubic anvil pressure apparatus. Figure 1 shows temperature dependence of electrical resistivity selected pressures to 10 GPa. As the pressure is increased, a roll-off in resistivity around 5 K associated with the CEF excitation was slightly suppressed up to 8 GPa. However, the roll off was drastically changed above 8 GPa, suggesting that some change might occur in the CEF splitting under high pressure.

More detailed results will be presented in the conference. In addition, we will also report the pressure effect on the heavy fermion ferromagnetic compound $SmFe_4P_{12}$, focusing on pressure dependence of the Kondo state and the ferromagnetic ground one.

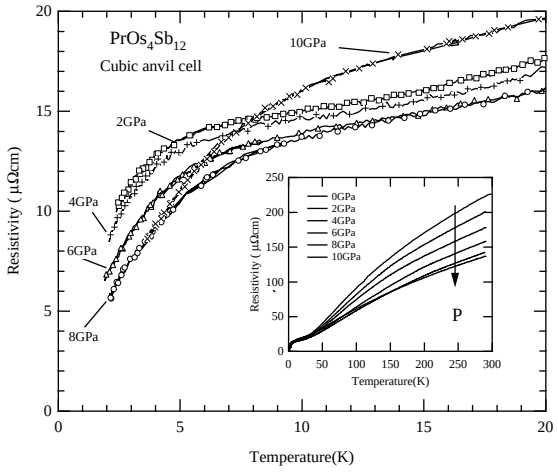

Figure 1: Electrical resistivity vs temperature of $PrOs_4Sb_{12}$ at low temperature under pressure. The inset shows temperature dependence of the resistvity below room temperature.

[1] E. D. Bauer et al.: Phys. Rev. B **65**, (2002) 100506.