(PS25)

Transport properties in SmT_4P_{12} (T=Fe, Ru)

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The filled skutterudite compound $SmFe_4P_{12}$ is reported to be the first Sm-based heavy fermion with ferromagnetic ground state[1]. We have reported the Fermi surface (FS) topology and the mass enhancement based on the de Haas-van Alphen experiment and the transverse magnetoresistance measurement[2]. Figure 1 shows the angular dependence of the transverse magnetoresistance $\Delta\rho/\rho = (\rho(H) - \rho(0))/\rho(0)$ for the current along the $[1\bar{1}0]$ direction at 0.4 K in $SmFe_4P_{12}$ (RRR = 400). The angular dependence of $\Delta\rho/\rho$ in $SmFe_4P_{12}$ is weak compared to $LaFe_4P_{12}$. $\Delta\rho/\rho$ increases with $H^{1.7\sim1.9}$, without any tendency of saturation at least for 0, 20, and 90 degrees. These results may suggest the measured fields are in a crossover range from low- to high-field conditions.

$SmRu_4P_{12}$ is reported to exhibit a metal-insulator transition near 16 K based on the measurements on polycrystalline samples synthesized under high pressure[3]. We have succeeded in growing the single crystals of $SmRu_4P_{12}$ and measured the transport properties. Figure 2 shows the temperature dependence of the electrical resistivity down to 0.6 K. We observed the resistivity minimum around 10 K, which has not been seen in the previous result[3].

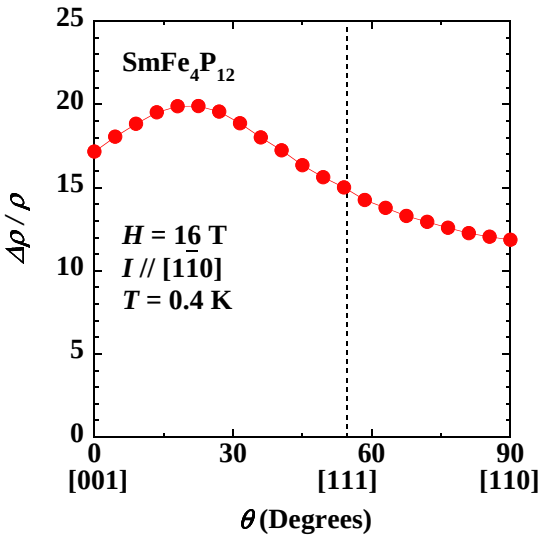

Figure 1: Angular dependence of the transverse magnetoresistance for the current along the $[1\bar{1}0]$ in $SmFe_4P_{12}$.

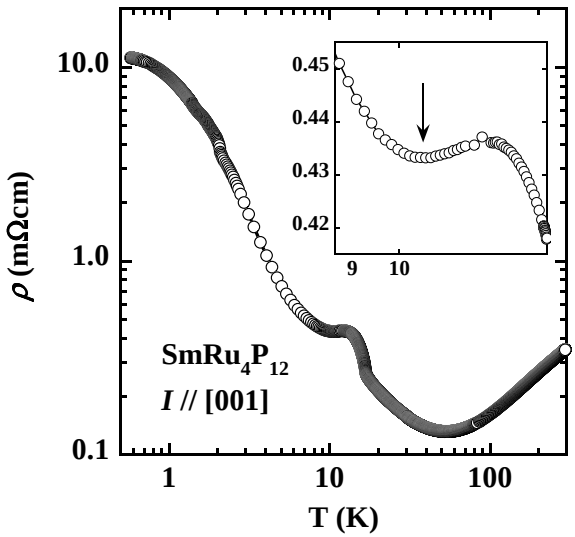

Figure 2: Temperature dependence of the electrical resistivity for the current along the [001] in $SmRu_4P_{12}$.

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[3] C. Sekine, T. Uchiumi, I. Shirotani, and T. Yagi: Science and Technology of High Pressure, ed M. H. Manghnant et al. University's Press, Hyderabad, India (2000) 826.