(13B)

Anomalous Kondo effect and ordered state in $SmOs_4Sb_{12}$ under pressure

H. Kotegawa[1], H. Hidaka[2], K, Tabira[3], Y. Irie[3], T.C. Kobayashi[3], D. Kikuchi[4], H. Sugawara[5], H. Sato[4]

[1]Department of Physics, Faculty of Science, Kobe University, Kobe
[2]Graduate School of Science, Hokkaido University, Sapporo
[3]Graduate School of Natural Science and Technology, Okayama University, Okayama
[4]Graduate School of Science, Tokyo Metropolitan University, Hachioji
[5]Faculty of Integrated Arts and Sciencies, Tokushima University, Tokushima

We report resistivity, nuclear quadrupole resonance (NQR), and magnetization measurements under high pressures in a heavy fermion compounds $SmOs_4Sb_{12}$. The resistivity and the $4f$ contribution in nuclear spin-lattice relaxation rate $(1/T_1)_{4f}$ show the coherent behavior below a characteristic temperature $T^* = 20 - 25$ K at ambient pressure as shown in figure. Nuclear spin-spin relaxation rate $1/T_2$ was found to show a peak of electrical origin around T^*. The anomaly in T_2 becomes distinct around 0.8 GPa, and disappears above 1.9 GPa, where $(1/T_1)_{4f}$ does not show the coherent behavior. Some fluctuation of electronic or ionic origin is considered to play an important role in the Kondo effect of $SmOs_4Sb_{12}$. Interestingly, we observe the non-Fermi liquid like behavior in the resistivity around 0.8 GPa. On the other hand, the magnetization at low temperature does not increase under pressures, although the transition temperature increases. The NQR signals are strongly suppressed around the transition temperature and vanishes at low temperatures. These suggest that the ordered state in $SmOs_4Sb_{12}$ is not simple ferromagnetism.

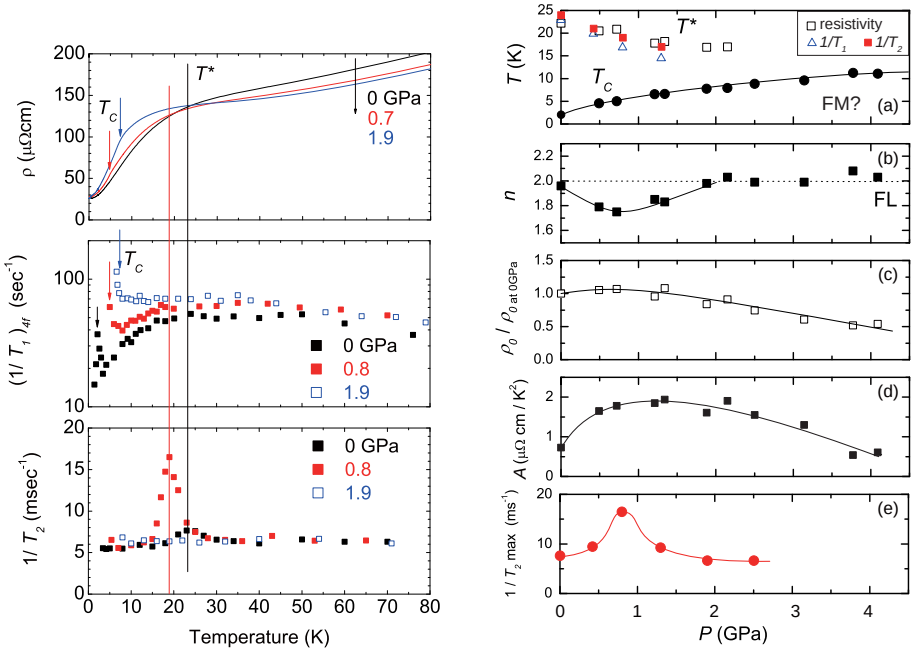

Figure 1: (left) Temperature dependence of ρ, $(1/T_1)_{4f}$, and $1/T_2$ under pressure. (right)Pressure–temperature phase diagram of $SmOs_4Sb_{12}$ and pressure dependence of the exponent n, the residual resistivity ρ_0, the coefficient A, the maximum value in $1/T_2$ around T^*.