(P1-2)

**Temperature dependence of EXAFS in $SmOs_4Sb_{12}$ around the Sm $K$-edge**

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Filled skutterudite compounds have attracted much attention because of their potential as thermoelectric materials [1-2]. Furthermore, these filled skutterudite compounds attracting much interest because of a wide variety of physical properties at low temperature, such as superconductivity, magnetic ordering, small gap semiconducting behavior, and heavy fermion (HF) behavior. This remarkable feature is caused by a strong $p-f$ hybridization effect, a unique band structure and an orbital degree of freedom due to f electron in Ln (Ln = Lanthanide) site with cubic symmetry. Especially, $SmOs_4Sb_{12}$ is the most interesting materials. $SmOs_4Sb_{12}$ shows the behavior of HF with a large electronic specific heat coefficient of $\gamma = 0.82$ J/mol $K^2$ and the ferromagnetism below the $T_c$= 3 K [2]. Moreover, $SmOs_4Sb_{12}$ shows the HF behavior is insensitive to applied magnetic field [2]. This is very strange property of HF that is different from the other HF systems. In previous report, we have showed the Sm ions in $SmOs_4Sb_{12}$ are the mixed valence state [3]. In this study, we investigate the relation between the strange properties of heavy fermion behavior and the dynamics of lattice of $SmOs_4Sb_{12}$ using the EXAFS measurements. The EXAFS measurements were carried out at BL01B1 of SPring8, Japan. Figure 1 shows the temperature dependence of EXAFS spectrum around the Sm $K$-edge. The amplitude of EXAFS oscillation decreased with temperature increased. EXAFS oscillation disappeared at room temperature. This results means that the distance between Sm atoms and Sb atoms is fluctuated. It is possible that Sm atoms vibrate in the Sb-cage.

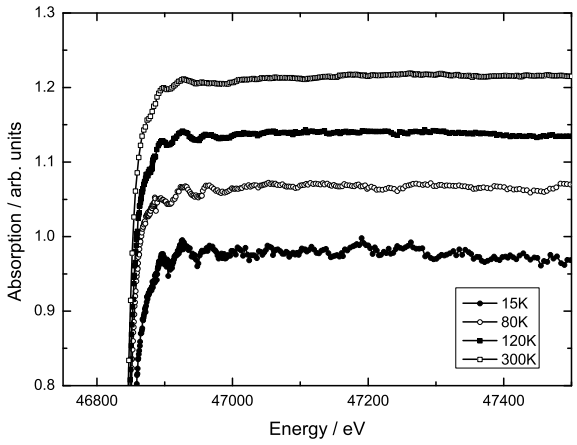


Figure 1: The temperature dependence of EXAFS spectrum of $SmOs_4Sb_{12}$ around Sm $K$-edge.

[1] H. Sato et al., Phy. Rev. B 62, 15125 (2000) and references there in.
[2] S. Sanada et al., J. Phys. Soc. Jpn. 74, 246 (2005).
[3] M. Mizumaki et al., Physica B to be published.